Abstract book for the ISBNPA 2019 Annual Meeting in Prague
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Note about the content of the abstract book
The organizing and abstract review committees have not made any edits to the content of the abstract. The abstracts are, therefore, presented as they were submitted by the authors.

THIS IS THE FINAL VERSION OF THE ABSTRACT BOOK
Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHOJ A VÍTEJTE</td>
<td>4</td>
</tr>
<tr>
<td>WELCOME TO PRAGUE</td>
<td>5</td>
</tr>
<tr>
<td>COMMITTEES</td>
<td>6</td>
</tr>
<tr>
<td>THANK YOU TO REVIEWERS</td>
<td>7</td>
</tr>
<tr>
<td>THANK YOU TO THE LOCAL TEAM</td>
<td>8</td>
</tr>
<tr>
<td>SPONSORS AND SUPPORTERS</td>
<td>8</td>
</tr>
<tr>
<td>SILVER SPONSER</td>
<td>8</td>
</tr>
<tr>
<td>IJNPA PUBLISHER &amp; ISBNPA 2019 PIONEERS SCHOLARSHIP PROGRAM SPONSOR</td>
<td>8</td>
</tr>
<tr>
<td>ISBNPA 2019 PIONEERS SCHOLARSHIP PROGRAM SPONSOR</td>
<td>8</td>
</tr>
<tr>
<td>SUPPORTERS</td>
<td>9</td>
</tr>
<tr>
<td>EXHIBITORS</td>
<td>9</td>
</tr>
<tr>
<td>TUESDAY JUNE 4 2019</td>
<td>11</td>
</tr>
<tr>
<td>Keynote #1: JUNE 04, 05:30 PM – 06:30 PM</td>
<td>12</td>
</tr>
<tr>
<td>WEDNESDAY JUNE 5 2019</td>
<td>13</td>
</tr>
<tr>
<td>SYMPOSIAS: JUN 05, 08:30 AM – 09:45 AM</td>
<td>14</td>
</tr>
<tr>
<td>Keynote #2: JUN 05, 09:50 AM – 10:30 AM</td>
<td>62</td>
</tr>
<tr>
<td>Poster Session: JUN 05, 10:50 AM – 12:05 PM</td>
<td>64</td>
</tr>
<tr>
<td>Oral Session: JUN 05, 12:05 PM – 01:30 PM</td>
<td>256</td>
</tr>
<tr>
<td>Oral Session: JUN 05, 02:30 PM – 03:45 PM</td>
<td>370</td>
</tr>
<tr>
<td>ECR Talks: JUN 05, 03:50 PM – 04:20 PM</td>
<td>383</td>
</tr>
<tr>
<td>SYMPOSIAS: JUN 05, 04:35 PM – 05:50 PM</td>
<td>388</td>
</tr>
<tr>
<td>THURSDAY JUNE 6 2019</td>
<td>432</td>
</tr>
<tr>
<td>SYMPOSIAS: JUN 06, 08:30 M – 09:45 AM</td>
<td>433</td>
</tr>
<tr>
<td>Keynote #3: JUN 06, 09:50 AM – 10:50 AM</td>
<td>478</td>
</tr>
<tr>
<td>Poster Session: JUN 06, 10:50 AM – 12:05 PM</td>
<td>480</td>
</tr>
</tbody>
</table>
ORAL SESSIONS: JUN 06, 12:05 PM – 01:30 PM ................................................................. 678
ORAL SESSIONS: JUN 06, 02:30 PM – 03:45 PM ................................................................. 753
SHORT ORAL SESSIONS: JUN 06, 03:50 PM – 04:25 PM ..................................................... 801
SYMPOSIA: JUN 06, 04:35 PM – 05:50 PM ................................................................. 857
SYMPOSIA: JUN 06, 04:35 PM – 05:50 PM ................................................................. 878

FRIDAY JUNE 7 2019 ................................................................................................................. 902

SYMPOSIA: JUN 07, 08:30 AM – 09:45 AM ................................................................. 903
INVITED TALKS: JUN 07, 09:50 AM – 10:50 AM ................................................................. 951
POSTER SESSION: JUN 07, 10:50 AM – 12:05 PM ................................................................. 954
ORAL SESSIONS: JUN 07, 12:05 PM – 01:20 PM ................................................................. 1158
SHORT ORAL SESSIONS: JUN 07, 02:20 PM – 02:55 PM ..................................................... 1208
KEYNOTE #4: JUN 07, 03:00 PM – 04:00 PM ................................................................. 1261
OPEN PANEL: JUN 07, 04:35 PM – 05:35 PM ................................................................. 1263
Hello and welcome from the President and Co-Chair

Dear ISBNPA members and delegates,

It is our pleasure to welcome you to the 18th scientific annual meeting for the International Society of Behavioral Nutrition and Physical Activity (ISBNPA). We are delighted to be in Prague, the capital of the Czech Republic, which is a first for ISBNPA. Prague is the largest city in the Czech Republic, the 14th largest city in the EU, and the historical capital of Bohemia. Prague has been a political, cultural and economic centre of central Europe complete with a rich history. It also offers wonderful opportunities to walk, cycle and to eat, so enjoy your time in this beautiful city.

We believe we have an exciting program for this year’s meeting with 10 workshops, 55 symposia, 298 oral and 110 short-oral sessions. In total we received 1320 abstract submissions. We welcome those of you who are attending an ISBNPA conference for the first time and welcome back old friends who are regular attendees. The social program is also busy and we hope you can join us at some if not all of these events.

We have four wonderful keynote speakers, all leading researchers in their respective themes, and include Sir Professor Andy Haines, Professor Greet Cardon, Professor Bruce Lee, and Professor Barry Popkin. This year, we have changed our program slightly and will feature two outstanding mid-career researchers, Esther van Sluijs and Uriyoan Colon Ramos, who will present the latest research in the fields of nutrition and physical activity. As with 2018, we have two invited early career researcher and two PhD talks in the program.

Our theme for the 2019 conference is ‘Healthy People, Healthy Planet’, which we want to focus more on sustainable behavioral nutrition and physical activity. As a result, the ‘open panel’ will align closely with this theme. We have invited three speakers who will give a short (7-min) presentation on their research and then Professor Knut-Inge Klepp (ISBNPA Fellow) will moderate the session facilitating discussion and inviting questions. The aim of this panel is to consider what we can do from a behavioral nutrition and physical activity approach to achieve both healthy people and a healthy planet. Our panelist include Professor Elling Bere, Dr. Wilma Waterlander and Professor Steven Allender.

Consistent with our strategy, we are delighted to continue to support LMIC delegates to attend the conference with 4 scholarships provided this year. Our special interest groups (SIGs) will continue to have an active role at the meeting and will present some awards for best presentations about the topics they cover. We congratulate all the award winners and welcome our scholarship recipients.

We would like to acknowledge and thank the conference Organizing Committee, our Executive Director António Palmeira, Kat Duda and Eva Tolosa from Venue West, as well as the team from Palicki University Olomouc for their tireless work in bringing the 2019 meeting to fruition.

We hope you have a wonderful meeting and use the time to gain new knowledge, build new and extend old collaborations, as well as enjoy catching up with old friends and make some new ones. Have a wonderful time.

Best wishes,

Professor Ralph Maddison
ISBNPA President

Dr. Ferdinand Salonna
Organizing Committee Co-Chair
Welcome to Prague

One of the most beautiful cities in Europe, Prague welcomes you with a rich architectural and natural heritage. From museums and art galleries to castles, gardens and churches - Prague has something for everyone.

Visitors can best explore the city on foot, by walking through its picturesque and uniquely designed cobblestone streets. The Historical Centre of Prague is part of UNESCO’s World Heritage List and rightfully so. A walk around the city will lead you to magnificent Romanesque, Gothic, Baroque and Renaissance era architectural gems. Charles bridge, which was built in the 14th century, is a major city landmark which offers breathtaking views of the Vltava River and the surrounding townscape. Sightseeing cruises on the Vltava is another delightful way of experiencing the charm of Prague. Scenic parks and gardens offer a great escape from the hustle and bustle of the city. You are likely to find yourself immersed in nature while visiting one of Prague’s many beautiful and tranquil gardens.

Prague Congress Center which is the venue of this year’s meeting is within walking distance from Vyšehrad.

According to ancient legends, Vyšehrad is oldest seat of Czech princes; in fact, the local settlement was established in the mid-10th century. Situated on a rocky promontory above the Vltava River, it offers stunning views of the city, and the park area holds hidden architectural treasures including the rare Romanesque Rotunda of St Martin, the neoGothic Church of Sts Peter and Paul, the national cemetery Slavin, and the underground casements housing the some of the original Baroque statues from the Charles Bridge.

Prague is also known for its locally brewed beers and a culinary variety that is bound to please one’s taste buds. Visitors can enjoy a light meal from street food vendors or opt for a fine dining experience at a restaurant. A truly magical and memorable experience awaits you in Prague!
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Thank You to Reviewers

The ISBNPA 2019 Abstracts Committee wish to acknowledge the abstract reviewers for the ISBNPA 2019 Annual Meeting. Their expertise is central to the quality of communications of the meeting. Thank you for your invaluable contribution to the ISBNPA.

Wendy van Lippevelde & Erica Hinckson
(Chair and Co-Chair of the Abstracts Committee)

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TUESDAY JUNE 4 2019

KEYNOTE SESSION 1
Urgent action is required to keep to the commitments of the Paris Climate Agreement which aims to limit a global mean temperature rise this century well below 2° C above pre-industrial levels and ‘to pursue efforts to limit the temperature increase even further to 1.5° C. Currently we are on a trajectory which would result in a rise of about 3.2° C by the end of the century in the absence of more effective policies to cut emissions of carbon dioxide and short-lived climate pollutants, such as methane and black carbon. Many such policies can yield major co-benefits for health and development more widely, through reduced exposure to particulate and ozone air pollution and through healthy sustainable diets and increased physical activity. Greater recognition of these multiple near-term benefits can help overcome barriers to urgent action. However such policies need to be designed carefully in order to avoid unintended harms, examples include the promotion of diesel vehicles as a ‘low-carbon’ alternative to petrol or the effects on food prices of poorly designed biofuel policies. This presentation will give an overview of recent developments in quantifying the health and related (co)benefits of different policy options to cut emissions in a range of sectors including transport, food and agriculture, housing and energy. It will also discuss how to minimise the risks of unintended adverse consequences.
Monitoring National Physical Activity Policy: A Global Challenge

Pratt M, Josef Mitas

Institute for Public Health and MPH Program Department of Family Medicine and Public Health, University of California San Diego School of Medicine, Global Observatory for Physical Activity (GoPA!), San Diego, United States, South Hall 2A, June 5, 2019, 8:30 AM - 9:45 AM

Policies and environments (SIG)

Purpose: Examine the importance of and challenges associated with monitoring national physical activity policy
Rationale: Physical inactivity is one of the most important factors contributing to global morbidity and mortality, but despite both importance and the recent launch of a WHO action plan, public health policy around physical activity remains poorly developed and monitored. Objectives:
- Identify lessons learned from monitoring global policy for tobacco, alcohol, obesity, and diet
- Present the findings of the GoPA! physical activity policy inventory pilot study
- Discuss the feasibility and use of policy indicators for advocacy and guidance of public health programs for physical activity
- To present the challenges of monitoring physical activity policy in the Czech Republic

Summary of the symposium:
Physical inactivity accounts for as many as 5 million deaths per year globally but has yet to be addressed effectively by most governments or the World Health Organization (WHO). Reasonable evidence for effective strategies exist, and several countries have implemented consistent public health policies and programs that have increased population prevalence of regular physical activity. In 2018 WHO launched a Global Action Plan for Physical Activity (GAPPA). Evaluating the GAPPA and understanding how some countries have developed sound public health programs for physical activity while most have not requires monitoring and evaluating policy, programmatic, and perhaps even research indicators for physical activity. In this symposium we will address several key questions about physical activity policy by examining the experience of monitoring policy globally (GoPA!), nationally (Czech Republic) and in comparison to other factors related to non-communicable diseases. We will examine whether it feasible to track physical activity policy at the global and country levels, if the existence of "good" physical activity policy is associated with less physical inactivity, how policy indicators may be used for advocacy and guidance, and whether there are lessons to be learned from monitoring global tobacco, obesity, diet, and alcohol policy?

Format: Agenda and Presenters
Introduction: Michael Pratt (10 minutes)
Talk 1: Can lessons from monitoring global policy for tobacco, alcohol, obesity, and nutrition inform physical activity? - Adrian Bauman (15 minutes)
Talk 2: The Global Observatory for Physical Activity-GoPA! National Policy Inventory, Andrea Ramirez (15 minutes)
Talk 3: Challenges of monitoring Physical Activity Policy in the Czech Republic - Zdenek Hamrik (15 minutes)
Discussion/ Q & A - Michael Pratt (20 minutes)
Can lessons from monitoring global policy for tobacco, alcohol, obesity, and nutrition inform physical activity?

Bauman A

University of Sydney, Sydney, Australia

Purpose: Much research has been published extolling the virtues of previous public health successes and failures as instructive for future population health efforts.

Methods: This review examined published and grey literature around "lessons from tobacco/obesity" and their relevance for physical activity policy development. Systematic reviews of the published literature and extensive reviews of the grey literature identified 38 documents of relevance, dating from 2001 to 2018. Qualitative analysis distilled the major themes reported in these documents of relevance to physical activity.

Results: The major themes included moving beyond individual responsibility, requiring sustained action, being aware of oppositional corporate interests, and utilising healthy public policy and socio-ecological approaches. For effective population health action, clear leadership is required, as are a skilled workforce, political support, community engagement, and the strategic use of legislation and regulation.

Conclusions: These attributes are mostly not new, emanate from health promotion frameworks such as the Ottawa charter in 1986, and extol the values of healthy public policy, intersectoral action and environmental and social determinants of health behaviours. Physical activity policy needs to embed these well-known precepts in current practice, rather than reinvent them.
Policies and environments (SIG)

Purpose: GoPA! measures physical activity research, surveillance, and policy at the national level. The aim of this study was to conduct a multi-country pilot of a brief policy inventory utilizing GoPA! country contacts.

Methods: The instrument was adapted from the European Monitoring Framework and the Health Enhancing Physical Activity (HEPA) policy audit tool, version 2.0. The tool was sent to 20 GoPA! Country Contacts from the six WHO regions to assess national PA policy.

Results: Eleven countries responded: Costa Rica, Colombia, Chile, Brazil, Mexico, Paraguay (PAHO); Croatia, Germany, Portugal (EURO); Seychelles (AFRO); and, Japan (WPRO). Main institutions for HEPA promotion (HEPA-P) were Health/Education ministries (n=11); least cited were Parks and Recreation, Culture, and Urban Planning (n=2). All countries had at least two NGOs actively engaged in HEPA-P and at least one law/policy/action plan promoting PA.

Six countries reported having national PA recommendations (54% targeting adults, 45% children/adolescents/seniors, 36% early years, 27% people with disabilities, and 18% pregnant women). Of these, 67% reported following the WHO recommendations.

27% of countries reported plans for reducing sedentary behaviour (SB), whereas 81% reported national systems that measure PA or SB.

Settings included in national policy for the delivery of specific HEPA actions were primary/secondary schools/sports and recreation (n=8), pre-schools/kindergartens/workplace (n=5), older adult/senior services, community, colleges/universities, primary healthcare (n=4), transport/urban design/planning (n=2), and clinical health care/environment (n=1). Countries reported HEPA plans aimed at increasing national PA levels targeting children/adults (n=10), general population (n=9), seniors (n=8), workforce (n=6), people with disabilities (n=5), women/clinical/sedentary populations (n=4); pregnant women/low socio-economic status/families (n=3), and indigenous peoples/migrant populations (n=2). Four countries reported an active physical activity network. Respondents mentioned that it was difficult to answer this instrument due to a lack of standardized terms and difficulties finding the specific data.

Conclusions: The pilot showed that HEPA actions are heterogeneous and that national PA policy varies substantially by geographic area and country income group. PA policy indicators can enhance understanding of the links between policy and population levels of PA. GoPA! is committed to further refining and improving a tool for informing and encouraging policy to address physical inactivity.
16007

S1, S1.01

Challenges of monitoring PA Policy in the Czech Republic

Hamřík Z, M Kudláček, J Mitáš

1 Palacký University Olomouc, Olomouc, Czech Republic

Purpose: To describe challenges of Physical Activity Policy monitoring in the Czech Republic, a GoPA! member.

Methods: Using a standardized methodology the GoPA! country contact's team from Czech Republic reviewed national documents related to national Physical Activity Policy.

Results: Physical activity (PA) in adolescents and children in the Czech Republic has been well documented recently. Local, regional and national studies were completed identifying the level and structure of PA in these age groups. Using common and relevant methods to obtain PA data (accelerometers, pedometers, heart rate monitors, surveys, wearables, fitness testing etc.) allows for comparable data for pooled international analyses in which the Czech Republic has consistently been included. The level of habitual PA in children in the Czech Republic remains low with negative trends in most age and gender categories. For the adult population research on PA prevalence is also present, but on a less regular basis. The last national survey on PA was completed in 2012, with some regional research in more recent years. The concept of national monitoring of PA has only weak support from Ministries of Health and Education, Youth and Sport. From the policy perspective, a first challenge on the national level was the development of the National Action Plan on Physical Activity dealing with the implementation of the "Health 2020" strategy in the Czech Republic in 2015. From 2016 forward, regional and municipal governments are also required to develop strategic plans on PA promotion in coordination with the National Action Plan on PA and its goals. Another important challenge is the implementation of strategies and policies for every stage of public policy, and finding sufficient political support for actions in PA promotion. Moreover, only a limited number of studies dealing with the evaluation of physical activity promoting strategies have been conducted in the Czech Republic.

Conclusions: Czech Republic is an interesting case with substantial activity around physical activity monitoring and policy, but relatively limited integration, implementation, and coordination of efforts into a cohesive national program.
S1, S1.02

Transactional Effects of Family, Dyadic, and Individual Factors on Eating Behavior and Weight in Early Childhood

Saltzman J, Jennifer Savage Williams

Harvard University, Boston, MA, United States | Massachusetts General Hospital, Boston, MA, United States

Children and families (SIG)

Rationale: The family is a critical unit-of-analysis for the study of childhood obesity etiology and prevention because it is the first and most consistent context in which children are socialized around food and weight. Transactional interactions between parents and young children create scripts for patterns of behavior that track into later life, pointing to the need for early prevention targeting modifiable behaviors in the parent-child dyad. Inherent to this transactional family systems approach is the understanding that parents are not the only actors in a dyadic or familial context; children may elicit and modify parenting behaviors relevant for obesity prevention. Most research in this area focuses on risk, but resilience processes are also at play, in which families draw on strengths to promote more optimal child health outcomes. This symposium provides an opportunity for ISBNPA attendees to learn about research investigating the complex interplay between familial, relational, and individual factors influencing eating behavior and weight in early childhood.

Objectives: After the symposium, participants will be able to:

1) Apply transactional family systems approaches to childhood obesity research.
2) Specify the interplay between familial, dyadic, and individual factors in influencing eating behavior and weight outcomes in early childhood.

Summary: The chair will describe transactional family systems approaches to research on childhood obesity, emphasizing the roles of risk and resilience (10 minutes). Each study presenter will have 10 minutes to present their work, and 5 minutes to answer clarifying questions. Study one will highlight the effect of innate individual temperamental characteristics on children's food preferences. Study two will examine interplay at the dyadic level by describing how parents' perceptions - and observations - of child temperament are associated with feeding and child weight. Study three considers the family as a unit-of-analysis by specifying how parenting practices may attenuate or exacerbate the effects of family factors on children's appetite self-regulation. The discussant will leverage her expertise in systems-based intervention development and implementation to facilitate a conversation about and reflect on applying this research in prevention programs addressing multilevel risk and resilience processes influencing weight and eating in early childhood.

Format:

1) Brief introduction by Chair: Dr. Jaclyn Saltzman, Harvard University, USA
2) Study One Presenter: Dr. Susan Johnson, University of Colorado, USA
3) Study Two Presenter: Prof. Jacqueline Blissett, Aston University, UK
4) Study Three Presenter: Dr. Jaclyn Saltzman
5) Conversation about applying findings by Discussant: Dr. Jennifer Savage Williams, The Pennsylvania State University, USA
The Good Tastes Study: Exploring developmental associations between temperament and food acceptance in young children

Johnson S, KJ Moding AE Flesher

University of Colorado Denver- Anschutz Medical Campus, Denver, CO, United States

Purpose: Temperamental approach characterizes behavioral reactions to novelty. High approach is associated with positive affect and acceptance of novel stimuli, whereas low approach is associated with negative affect and rejection of novelty. Recent research has demonstrated positive links between approach and acceptance of new foods in infancy, but this association has not been examined in toddlerhood. The purpose of the present analysis was to examine whether associations between approach and reactions to novel foods differ between infants (6–11.9 months) and toddlers (12–24 months).

Methods: Caregivers (n=106, 94% mothers) offered infants (6-24 mo; 57 boys) up to 8 tastes of kale puree during a laboratory visit. Caregivers rated their infants' liking of the puree (9-point hedonic scale). Further, the total number of kale tastes (range 0–8) was computed for each child. Prior to the study visit, caregivers completed questionnaires assessing their child's temperament (i.e., approach). Multiple regression analyses were used to examine age (infant vs. toddler), temperament, and the age x temperament interaction as predictors of kale liking (Model 1) and number of kale tastes (Model 2).

Results: Ratings of kale liking were positively correlated with number of kale tastes (r=.31, p=.001). Both regression models were significant (p's<.001). In Model 1, age was the only significant predictor of kale liking (B=.96, p=.02), with caregivers rating infants as liking the kale more than toddlers. In Model 2, age (B=2.07, p<.001) and approach (B=-1.71, p<.001) significantly predicted number of kale tastes, but these main effects were qualified by a significant age x approach interaction (B=1.68, p=.004). Follow-up tests demonstrated that for infants, there was no significant association between approach and number of kale tastes. However, for toddlers, higher levels of approach were associated with fewer kale tastes (B=-1.71, p<.001).

Conclusions: The association between temperamental approach and acceptance of novel foods may differ between infants and toddlers. Understanding developmental differences in this association, why they may occur, and how to facilitate food acceptance is important for helping caregivers make decisions about how to continue offering new foods to their child, despite initial rejection.
Interactions between parental feeding practices and temperament in infant and children’s eating behaviour

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Objective: This presentation will briefly review the role of temperament in feeding infants and preschool children as well as presenting some recent data from our laboratory linking temperament to parental feeding practices. The prior literature suggests that children's food avoidance behaviours have been associated with temperamental factors including emotionality, negative affectivity, difficulty, irregularity, low approach, shyness and low positive affect, which may also result in more challenging mealtimes and parental use of more pressuring feeding practices. In contrast, food approach behaviours are associated with greater surgency and sociability.

Methods: In addition to a brief review of the literature, data will be presented from two longitudinal studies: 1) A study of 81 mothers and infants across the first year of life, examining the associations between the timing of introduction to complementary foods and maternal perceptions of infant temperament. 2) A study of 62 mothers and their 3-5 year old children, followed to 5-7 years, examining the relationships between perceived temperament, restrictive feeding practice and subsequent BMI.

Results: In support of the literature's prior findings, Study 1 demonstrated that infants who are perceived to be high in smiling and laughter tend to be introduced to solid food earlier in life. Study 2 demonstrated that children rated as more emotional at 3-5 years had lower BMI at 5-7 years, received less restriction in observed mealtimes and were less accepting of any restriction that they did receive.

Conclusions: The mechanisms and pathways involved in the complex reciprocal relationships between child temperament, eating behaviour and parent's feeding practices need further exploration and elucidation. Observational and longitudinal studies are needed to disentangle the causal pathways involved and to address the potential confound of reliance on parental report.
S1, S1.02

Independent and interactive effects of family factors, maternal attachment, and responsiveness on child appetite self-regulation

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Children and families (SIG)

Introduction: Appetite self-regulation is associated with general self-regulation, and both are linked to healthier weight in early childhood. Development of general self-regulation depends on a positive parent-child relationship, which in turn is embedded within the family and its associated organizational processes (e.g., chaos, routines). Family factors influence child general self-regulation as a function of the parent-child relationship, but it is unclear whether etiological processes for general self-regulation are also at play for appetite self-regulation. The current study aims to examine independent and interactive associations between family factors, attachment, emotional responsiveness, and appetite self-regulation in early childhood.

Method: A sample of (n = 110) families of 18-24 month-olds were recruited for 3-hour home visits, as part of the larger longitudinal STRONG Kids 2 Study (N = 451). Videotapes of family mealtimes were collected during home visits, and were coded for observed maternal emotional responsiveness. Mothers completed questionnaires assessing self-reported maternal emotional responsiveness, family dinnertime routines, household chaos, maternal attachment insecurity, and child appetite self-regulation when children were 12, 18, and 24 months old. Moderation analyses assessed independent and interactive effects on child appetite self-regulation.

Results: Family factors (high chaos, few routines) were consistently independently associated with more child appetite dysregulation, controlling for parent age, household income, and child temperament (effortful control). In regards to moderation analyses, household chaos was associated with appetite dysregulation only among children of mothers who reported low levels of emotional responsiveness. There was no association between chaos and appetite dysregulation among children of mothers who engaged in high levels of self-reported emotional responsiveness.

Discussion: Family factors play an important role in promoting child appetite dysregulation. This study provides novel evidence that these effects can be attenuated or exacerbated by parenting, specifically, by maternal emotional responsiveness. However, questions remain in regards to differences between self-reported and observed emotional responsiveness in effects on child appetite self-regulation. The current study provides a window into the ways that socioemotional processes may influence child health.
Application of systems science principles to implementation of whole-of-community interventions targeting nutrition, physical activity and obesity.

Hennessy E, Steven Allender

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Implementation and scalability (SIG)

Rationale: Systems science and whole of community approaches have potential to advance complex public health issues like the childhood obesity epidemic. There is a critical need for empirical evidence demonstrating whether and how systems science can advance intervention efforts.

Purpose: This session provides an overview of how systems science principles can be used to advance whole-of-community (WOC) interventions, highlighting results from recently completed and ongoing research trials.

Objectives:

- Summarize the principles of systems science in their application to implementation of WOC obesity interventions
- Describe the processes, methods and preliminary results stemming from a recently completed study to integrate systems science and implementation science
- Discuss strengths, challenges and future directions in this work

Summary: WOC interventions show promise in preventing childhood obesity through their multi-sector, multi-level, and systems-oriented approach. While significant progress has been made to establish the efficacy and effectiveness of childhood obesity prevention strategies, there has been a lack of attention on the mechanisms that drive implementation of evidence-based strategies. Simply put, at the community-level, evidence is clearer on factors important to address childhood obesity but far less clear on how communities should effectively enact them. Thus, empirical evidence is critically needed to support the implementation and scale-up of WOC interventions. Systems science principles and methods offer opportunities to address gaps in understanding interactions between, and effects of, multiple variables, and support communities in responding to public health threats.

In this session we will provide an overview of system science principles, empirical examples drawn from a five-year, multi-armed study entitled COMPACT: Childhood Obesity Modeling for Prevention and Community Transformation, and discuss future directions of this work. In Presentation 1, Dr. Hammond will summarize the principles of systems science through their application to childhood obesity prevention interventions and describe the rationale and design for the COMPACT study. In Presentation 2, Dr. Economos will illustrate the systems science approaches used in COMPACT, agent-based modeling, group modeling building and social network analysis, and describe the preliminary results of the single community, prospective arm of the COMPACT study. In Presentation 3, Dr. Allender will discuss the potential for systems science principles to be used at scale, drawing on lessons learned from COMPACT and ongoing, multi-community efforts involving system dynamics, group model building and social network analysis.

The format includes an overview, three presentations, summary of the strengths and challenges and a 15-minute general discussion facilitated by the Moderator.
An application of systems science to childhood obesity prevention interventions: Lessons from an agent-based model

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15855: Application of systems science principles to implementation of whole-of-community interventions targeting nutrition, physical activity and obesity (Convenor: Erin Hennessy), North Hall, June 5, 2019, 8:30 AM - 9:45 AM

Implementation and scalability (SIG)

Purpose: Childhood obesity prevention is a problem can be productively approached through a systems science perspective because it is influenced by dynamic interactions between heterogeneous actors at multiple scales, each with their own incentives, perspectives, and constraints; actors affect one another and their environments, and can change their behavior over time. We explain how systems science can be used to test hypotheses about childhood obesity prevention. We use as our primary example an exploration of stakeholder dynamics during WOC interventions. Specifically, we posit the importance of "stakeholder-driven community diffusion" (SDCD). This process entails representatives from stakeholder groups attending regular meetings that increase attendees' knowledge about and engagement with obesity prevention. Through subsequent interactions with others in their stakeholder groups, stakeholders who attend these meetings "diffuse" increases in knowledge and engagement through the community; this increase in community knowledge and engagement lays the foundation for successfully and sustainably enacting effective changes in policy and practice.

Methods: We use longitudinal survey data from multiple, completed WOC interventions to describe salient stakeholder social networks and trends in knowledge and engagement. We develop an agent-based model (ABM) to simulate knowledge and engagement diffusion through these networks; by comparing ABM output to intervention data, we test the SDCD hypothesis across settings.

Results: Our ABM was able to successfully retrodict estimated trends in community knowledge and engagement in two real-world WOC interventions (i.e. could produce simulated trends that differed from estimated ones by no more than 5% of the range of each construct). In addition, we use model behavior under a large number of conditions to make further hypotheses about how SDCD processes operate.

Conclusions: We not only provide evidence in support of an actionable approach to WOC intervention design and implementation, but we also make two additional contributions to the field. First, we use the strengths of systems science in general and ABM in particular to help identify remaining uncertainty, and ways that future efforts might address this. Second, the ABM that we develop has the potential to be used as a tool to prospectively guide intervention planning.
16006

S1, S1.03

Systems science approaches to engage community stakeholders and evaluate diffusion of a community-based obesity prevention intervention

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15855: Application of systems science principles to implementation of whole-of-community interventions targeting nutrition, physical activity and obesity (Convenor: Erin Hennessy), North Hall, June 5, 2019, 8:30 AM - 9:45 AM

Implementation and scalability (SIG)

Purpose: Central to whole-of-community (WOC) trials is the role and strength of multisector community stakeholder participation and connection. Community stakeholder groups are often used as a prominent implementation strategy to leverage community assets, promote systems change, and enhance community well-being; however, the mechanism(s) by which stakeholders influence intervention processes and outcomes are understudied.

Methods: The prospective arm of the larger COMPACT trial, Shape Up Under 5 (SUU5), was a two-year pilot study (USA) involving a cross-sector stakeholder committee. An agent-based model with an embedded social network representing the agents' (i.e., stakeholders') relationships informed recruitment and selection of committee members and the design and evaluation of the study. Group Modeling Building (GMB), a participatory approach for promoting shared insight among stakeholders, consensus-building, and motivation to address a complex problem, informed the facilitation of monthly committee meetings. To capture changes in stakeholder attributes (knowledge, engagement, social networks), we surveyed SUU5 Committee members and their first-degree alters. Stakeholders self-reported community policy, practice and environmental changes.

Results: Using GMB, we documented a series of visualizations produced by the Committee that show a progression of the group's insights on multi-faceted variables connected to early childhood obesity. These insights parallel their chosen community intervention: a health messaging campaign focused on evidence-based best practices for children from birth to age five (eating well, playing together, developing good sleep habits, and limiting screen time). Preliminary trends over the two-year study period using a two-level growth model indicate significant increases in knowledge (7.5% increase; p<0.001) and engagement scores (2.7% increase; p=0.02) among SUU5 Committee members. Similar increases in knowledge scores (4.4% increase; Year0=0.68 p<0.01) were observed among their community ties (first-degree alters). Alters' engagement scores started high and remained level. The number of nodes and ties in the SUU5 social network increased over time.

Conclusions: Systems science tools provided a novel way to engage community stakeholders and measure and evaluate their impact on intervention diffusion. GMB activities may contribute to multi-sector partnership formation and sustainability. Ongoing analyses will explore the connection between upstream outcomes (i.e., knowledge, engagement, and social networks) and midstream policy and environmental changes.
16012

S1, S1.03

Use of systems science principles and evidence of promising outcomes in multiple community based trials in Australia

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15855: Application of systems science principles to implementation of whole-of-community interventions targeting nutrition, physical activity and obesity (Convenor: Erin Hennessy), North Hall, June 5, 2019, 8:30 AM - 9:45 AM

Early care and education (SIG)

Purpose: The primary purpose of the studies presented was the practical application of systems science principles in multiple whole of community trials to prevent childhood obesity in Australia. The work is innovative in the application of techniques informed by systems science to build community capacity and catalyze context-specific actions to create healthier nutrition and physical activity environments for children.

Methods: Data come from a range of community trials including a cluster randomized stepped wedge trial. Participatory, community-based approaches were used to map causal loop diagrams of existing complex drivers of obesity. Data were collected on traditional behavioral and anthropometric risks, structure of social networks and community readiness for change. Existing and proposed initiatives were tracked in relation to cause and effect on causal loop diagrams and analyzed in light of changes between baseline and two year follow up in outcome measures. Process measures were also collected to understand the ways in which initiatives developed.

Results: In the first two years of the trials, communities identified more than 400 potential actions to prevent obesity and enacted more than 300 actions. The range of interventions is presented along with the relative anticipated reach and impact for adults and children and active status at the two-year mark. Comparisons with measured outcome data indicate where community activity is aligned with significant changes in measured improvements in water consumption, sugar sweetened beverage consumption, use of active transport and prevalence of overweight and obesity compared to controls.

Conclusions: These trials indicate polyvalent interventions led by communities can be generated using a mix of tools and techniques inspired by multiple fields of system science and that these efforts have delivered promising results in the initial stages.
Behaviour change techniques used in tailored e- & mHealth interventions targeting physical activity, sedentary behaviour, and sleep

Cocker K, Aoife Stephenson

University of Southern Queensland, Queensland, Australia | Ghent University, Ghent, Belgium

E- & mHealth (SIG)

Purpose: To highlight the use of behaviour change techniques (BCTs, i.e. delivered intervention components) within electronic & mobile (e- & m) health interventions targeting several health-related behaviours among adults. The novelty of the session is its focus on BCTs used within recently developed tailored e- & mHealth interventions targeting physical activity, sedentary behaviour, or sleep. The findings will advance our understanding of behaviour change and strengthen future health promotion research and practice using e- & mHealth approaches.

Rationale: Low levels of physical activity, high amounts of sedentary behaviour, and poor/insufficient sleep are modifiable determinants of premature death and several chronic diseases. These behaviours are now considered major public health concerns and require effective behaviour change interventions. E- & mHealth interventions show great potential to promote health-related behaviours and effect sizes might even be larger when BCTs are incorporated within intervention designs. Several e- & mHealth interventions are indeed theory-based; however, little research is available on the use of, engagement in, and effectiveness of specific BCTs used within tailored e- & mHealth interventions.

Objectives:
1. To showcase which BCTs have been used in innovative tailored e- & mHealth interventions promoting more physical activity, less sedentary behaviour, or more/better sleep among adults.
2. To examine who engages in these specific BCTs and describe these users' attributes.
3. To present outcomes on the effectiveness of the e- & mHealth interventions using several BCTs.

Summary: The first presentation will address the effectiveness of a theory-based e- and mHealth intervention targeting physical activity and sedentary behavior in adults aged =50 years. The second presenter will discuss the use of action planning within a computer-tailored eHealth intervention aiming to reduce workplace sitting among employees. The third presentation will report on the behavioral and health effects of a tailored mHealth intervention (including BCTs from Theoretical Domains Framework and COM-B Model) to improve sleep in business workers.

Format:
Introduction (10'): Katrien De Cocker (University of Southern Queensland, Australia)
1st presentation (15'): Louise Poppe (Ghent University, Belgium): Effectiveness of a HAPA-based e- and mHealth intervention targeting physical activity and sedentary behaviour: a randomized controlled trial.
2nd presentation (15'): Katrien De Cocker (USQ, Australia): Action planning in a web-based computer-tailored intervention to reduce workplace sitting.
3rd presentation (15'): Grace Vincent (Central Queensland University, Australia): Can a tailored 28-day m-health behaviour change intervention improve sleep outcomes?
Discussion (20'): Aoife Stephenson (Ulster University, United Kingdom)
Effectiveness of a HAPA-based e- and mHealth intervention targeting physical activity and sedentary behaviour: a randomized controlled trial

**Poppe L, I De Bourdeaudhuij, M Verloigne, G Crombez**

1Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium, 2Department of Experimental Clinical and Health Psychology, Ghent University, Ghent, Belgium, 3Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium

15710: Behaviour change techniques used in tailored e- & mHealth interventions targeting physical activity, sedentary behaviour, and sleep (Convenor: Katrien De Cocker), Terrace 2A, June 5, 2019, 8:30 AM - 9:45 AM

**E- & mHealth (SIG)**

Purpose: Online interventions show stronger effects when they are grounded in a solid behaviour change theory. For example, the Health Action Process Approach (HAPA) model describes how behaviour change techniques (BCTs) such as action and coping planning help individuals translate their vague intentions to specific actions. 'MyPlan 2.0', a HAPA-based e- and mHealth intervention, aims to alter its users' level of physical activity (PA) and sedentary behaviour (SB) by targeting their personal determinants for change (i.e. self-efficacy, outcome-expectancies, intention, action planning, coping planning and monitoring). The purpose of the current study was to test the effectiveness of the intervention on PA, SB and personal determinants for change in adults aged =50.

Methods: A randomized controlled trial was conducted with 63 adults (mean age = 58.68±smn; 7.76 years, 47 women) in Flanders, Belgium. Participants were randomized using a 2:1 ratio to the intervention group (IG, n = 42) or the waiting-list control group (CG, n = 21). MyPlan 2.0 lasted five weeks and included the following BCTs: providing information of the consequences of behaviour, exploring social support, providing feedback on performance, action planning, coping planning, prompting self-monitoring and prompting review of behavioural goals. Participants completed validated questionnaires assessing PA, SB and personal determinants for change at baseline and post-test. Data were analysed using Independent Samples t-tests and Repeated Measures ANOVA in SPSS statistics 23.0. P-values <.05 were considered statistical significant. Taking into account the small sample size, p-values <.10 are also reported.

Results: Significant intervention effects were found on total PA (p=0.03) and work-related PA (p=0.001) with an increase for the IG (+34.7 min/day and +19.94min/day) and a decrease for the CG (-17 min/day and -31.29 min/day). We also found significant effects on coping (p<.001) and monitoring (p=0.07) with an increase for the IG (+2.33 and +0.85 on a 10-point scale) and a decrease for the CG (-0.52 and -0.3 on a 10-point scale).

Conclusions: 'MyPlan 2.0', implementing BCTs derived from the HAPA model, is a promising intervention, as it is able to alter users' personal determinants and establish behavioural change. The lack of effect regarding SB needs to be investigated.
Action planning in a web-based computer-tailored intervention to reduce workplace sitting

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1University of Southern Queensland, Queensland, Australia, 2Ghent University, Ghent, Belgium, 3University of Zurich, Zurich, Switzerland, 4Central Queensland University, Queensland, Australia, 5University of Southern Queensland, Queensland, Australia | Ghent University, Ghent, Belgium

Objective: Action planning plays an important role in many behaviour change interventions, including the 'Start to stand' intervention, one of the first web-based, computer-tailored interventions showing to be effective in reducing workplace sitting. This intervention effect was moderated by action planning, suggesting that completing an action plan is essential to decrease workplace sitting. As such, it is important to identify who engages in action planning, in order to address this behaviour change technique better in future interventions. This study examines the attributes of users engaging in action planning during this web-based intervention.

Methods: The Start to stand intervention has been promoted among working adults in Flanders, Belgium. In this freely available website, users completed an assessment questionnaire in order to receive personalised feedback on their sedentary behaviour. Users were also invited to develop an action plan to reduce their sitting, by answering 'what' (brief sitting breaks and/or longer periods of standing), 'when' (working hours, work breaks, commuting), 'where' (workplace, transport mode), and 'how' (frequency, duration, implementation intentions) questions. One-way MANOVA tests were conducted to compare the demographics, work-related, health-related, and psychosocial variables of those setting up an action plan with those who did not. Descriptive statistics were used to examine the content of the action plans.

Results: Those setting up an action plan (n=236, 13.9%) were significantly older (p=0.013), more sedentary at work (p=0.026), and more aware of health risks related to excessive sitting (p=0.044) compared to those not planning (n=1465). The majority planned standing breaks (n=212) every 30 minutes for one minute, and periods of standing (n=173) for one-two hours. Those who rated the action planning section (n=105) were on average positive (3.9±smn;1.0 out of 5).

Conclusions: Action plans were compatible with current sitting messages used in health promotion. The number of Start to stand users setting up an action plan is relatively low, so future interventions should promote action planning more. Future research needs to understand why this attrition occurs and how it can be avoided, especially in those of a younger age and those less aware of the health risks related to too much sitting.
Learning to sleep: Can a tailored 28-day m-health behaviour change intervention improve sleep outcomes?

Vincent G, E Crome, G Rigney
1The Appleton Institute, Central Queensland University, Adelaide, Australia, 2SleepFit, Sydney, Australia

Objective: Up to 45% of adults are not obtaining the recommended 7-9 hours of sleep per night. Inadequate sleep is associated with a range of deleterious effects including chronic disease, psychological disorders, and premature mortality. Evidence suggests that increasing sleep duration can improve measures of health and well-being. M-health applications provide increased access to evidence-based sleep interventions, yet there is a paucity of research to date. This study aimed to investigate the efficacy and effectiveness of a 28-day behaviour change program (SleepFit Reset) in a cohort of business workers.

Methods: The SleepFit 28-day Reset m-health program was developed in collaboration with sleep experts. Theoretical Domains Framework and COM-B Model were the behaviour change theories applied. The program consists of 5-min modules, completed daily, which aim to improve sleep (e.g., improving sleeping conditions, reducing technology use prior to sleep, etc.). Telecommunications office workers (n=384) were recruited. Participants completed baseline and post-intervention self-reported assessments of sleep quantity and quality, time taken to fall asleep, and time awake at night. Insomnia risk (Regensburg Insomnia Scale) and Anxiety and Depression (Patient Health Questionnaire) were also evaluated. Participant's ratings of feeling valued in their job and presenteeism (Stanford Presenteeism Scale) were collected. Participants were provided with access to the SleepFit 28-day Reset program and logged their sleep, and complete the daily modules. Paired sample t-tests were used to determine differences in outcomes variables pre- and post-intervention.

Results: Following the intervention, self-reported sleep hours improved from 6.7 h to 7.1 h, sleep efficiency improved from 79.1% to 87.2% and average hours spent awake during the sleep period reduced from 51.4 min to 27.5 min. Insomnia risk and anxiety and depression both reduced by 20.2% and 16.1% respectively. Participants ratings of feeling valued increased to 13.6% and presenteeism decreased by 6.2%.

Conclusions: The SleepFit Reset program was effective in improving sleep outcomes and workers feelings of value. Insomnia risk, anxiety and depression, and presenteeism rates were also reduced following the program. Future research should compare the 28-day program to a control group (no intervention) and simply logging sleep hours (partial intervention) to further determine program effectiveness.
Western Cape on Wellness (WoW!): Implementation, Evaluation and Adaptation of Champions for Health in South Africa

Lambert E, Tracy Kolbe-Alexander

1University of Cape Town, Cape Town, South Africa

Implementation and scalability (SIG)

Purpose: We are regularly reminded that there is a paucity of evidence concerning interventions focused on promoting healthy eating and physical activity from lower- and middle-income countries, particularly from Africa. Moreover, such examples that are available are typically researcher-initiated trials of short duration or, alternatively programmes implemented at scale, with little or no evaluation. In this symposium, we will present the Western Cape on Wellness (WoW!) Initiative, a health promotion programme designed to address modifiable risk factors associated with NCDs. The programme, running since 2015, incorporates a novel transversal partner approach, involving "health champions", to promote and support healthy lifestyles in workplaces, schools and communities. Using a translation research pipeline framework, we will present mixed-methods results from efficacy to implementation and scale-up.

Rationale: In South Africa, non-communicable diseases (NCDs) affect more than 2 in every 5 adults, with more than 1 in every two adult women and 1 in every three men either overweight or obese, and half of all adults insufficiently active. Recent examples of effective lifestyle interventions in the public sector, involve "health champions", who are recruited from within settings or communities, and trained to provide contextually-appropriate, community-based interventions concerning, physical activity and weight management. WoW! has been adapted from these models, along with a strategy to build partnerships with community and other stakeholders.

Aims: The primary aim of this symposium are to provide a clear example of collaborative implementation research, involving health champions within communities to effect lifestyle change, from efficacy through to implementation. A key objective is to demonstrate how implementation was modified through process evaluation, and scale-up was aided by development of a partnership network.

Summary Format: In 3 parts, speakers will firstly, describe the conceptual model for the WoW! programme, present formative research and pre-post efficacy results from initial implementation. The second speaker will share the outcomes of qualitative research, interrogating barriers and facilitating factors with successful and less successful champions, groups, and meso-level actors. Our third speaker will present the results of process evaluation using the RE-AIM model, and the vertical and horizontal scale up of the WoW! programme, as well as critical learnings and future direction. Finally, our discussant will highlight the manner and extent to which this model adds to the body of knowledge, in an under-represented part of the world.

There are few examples of implementation research in LMICs that speak to the "know-do" gap. This symposium will provide platform for this important discussion and to share the various challenges and pitfalls.
Western Cape on Wellness (Wow!) Health Promotion Initiative Pilot: Impact and Effectiveness of Health Champions in South African Worksites, Schools and Communities

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15767: Western Cape on Wellness (WoW!): Implementation, Evaluation and Adaptation of Champions for Health in South Africa (Convenor: Estelle Lambert), Terrace 2B, June 5, 2019, 8:30 AM - 9:45 AM

Implementation and scalability (SIG)

Rationale: South Africa is facing a growing epidemic of non-communicable diseases (NCDs). In response, the Western Cape Government Department of Health developed the Western Cape on Wellness (WoW!) Initiative, a health promotion programme designed to address modifiable risk factors associated with NCDs. The programme incorporates a novel transversal partner approach, involving "health champions", to promote and support healthy lifestyles in workplaces, schools and communities.

Aims: We report on results at 3 and 6 months of implementation, challenges and lessons learned for scaling-up.

Methods: Champions were self-selected within 13 provincial departments, 10 schools and 9 community groups. Champions underwent training regarding healthy lifestyles, health risk assessment (HRA), and behavior change counseling. Members were screened for blood pressure (BP), BMI (kg/m2), waist (cm) and fitness (12-min walk), and completed questionnaires concerning physical activity (PA), nutrition (Rate-your-Plate), healthy-related quality of life (HRQOL), lifestyle goals and barriers. Participants were invited for repeat testing at 3 and 6 months.

Results: Of the 790 participants, 80% were overweight or obese, only 44% were meeting PA guidelines, more than 30% were hypertensive, 25% had poor dietary habits, and 15% were smokers. Overall retention was low, with only 39% of participants presenting for follow-up at 3 and/or 6 months. Members from worksites and schools cited lack of time and from communities, lack of knowledge and resources, as the greatest barriers. At 3 months, prevalence of overweight and hypertension decreased (P<0.001), there was a reduction in systolic and diastolic BP and waist circumferences (P<0.01) and overall better HRQoL (P<0.001). At 6 months, systolic BP and waist circumference were significantly lower.
Conclusions: The health champions model was shown to be effective in changing health risk behaviour in those persons completing the programme. Lessons learned include: assessment may be a barrier for entry into care or into the programme, and rapid, onsite feedback is essential following HRA. There needs to be greater administrative support for, recognition of and ongoing training of champions. Training should be evaluated, and modified according to outcomes and consultative feedback and identified barriers to implementation and retention. There needs to be a more participatory approach, and a simple monitoring and evaluation tool to measure implementation, adherence and retention. Finally, going forward, there is a need to manage expectations, and to enhance communication and engagement between stakeholders and partners.
Qualitative evaluation of the WoW! health promotion initiative: gaining insights into “what works”, for whom, and why, to address retention and inform scale-up and sustainability

**Young M, S Bassett, B Andrews, G Smithdorf, M Malema, S Onagbiye, C Johannes, D Faro, R Woodruff, EV Lambert, F Marais**

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15767: Western Cape on Wellness (WoW!): Implementation, Evaluation and Adaptation of Champions for Health in South Africa (Convenor: Estelle Lambert), Terrace 2B, June 5, 2019, 8:30 AM - 9:45 AM

**Implementation and scalability (SIG)**

Purpose: The growing burden of non-communicable diseases affects more than two in every five adults in South Africa. The WoW! health promotion initiative engages health "champions" across community and worksite settings, who are responsible for recruiting members, and to provide regular activities (typically weekly) to promote healthy lifestyles and assist participants in self-management to change health risk behaviours. Aim: The aim of this study was to explore the factors that facilitated participation in the WOW! Programme, and challenges experienced in implementing and sustaining the programme in different settings. The goal was to use this information for quality improvement, going forward.

Methods: A qualitative exploratory approach was followed, making use of semi-structured interviews and focus group discussions with champions, managers and group members. Participants were purposefully selected in conjunction with the Western Cape Department of Health. In total, 12 face-to-face interviews with champions, 5 interviews with managers from workplace settings, and 12 focus-group discussions (6 workplace, 6 community) were conducted. Data were analysed using AtlasTi and coded in order to identify themes. Results: Training for champions, which included information concerning NCDs, lifestyle risk factors, health risk assessment, brief behavioural counselling and group leadership, was well received, and champions were able to effectively use this training in their groups. Champions felt that community-based training should be reconsidered, in terms of visual aids, time slots and accessibility. There was a need for greater branding and visibility, as well as more equipment. Group members also wished to undergo training. In worksites, some champions felt 3 days training was not enough, and that training should be more geared towards the workplace. Champions felt that managers would be more receptive to time needed for training, if the champion's role was made clearer. In general, champions wanted more frequent training and revision workshops and felt that training should translate into a formal accreditation. Summary: Overall, champions felt that behaviour change was visible in their members. A limitation to the study was limited representation from less successful groups. Nonetheless, lessons learned have been applied for quality improvement for scale-up and dissemination.
Western Cape on Wellness (WoW!): From efficacy to scale-up, evaluating process and implementation using the RE-AIM framework

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Implementation and scalability (SIG)

Purpose: There is a paucity of implementation research, for health promotion initiatives targeting non-communicable diseases (NCDs) in LMICs, despite the growing burden of disease in these settings. To this end, the Western Cape on Wellness (WoW!) initiative is a government-led, cross-sectoral partnership platform, designed to co-create healthy lifestyle-enabling environments through a network of trained volunteer Wellness champions. Central to these objectives is the application of community participatory approach, with integrated monitoring and evaluation and a continuous improvement framework. Aim: The aim of this paper is to report on the application of the RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework, for process evaluation in year 3 of implementation of the WoW! programme. Methods: Wellness champions were asked to complete a 6-page, quarterly RE-AIM instrument, along with monthly telephonic reports, on membership, activities, and any challenges encountered. Results: Of the 80 current "active" WoW! groups, RE-AIM surveys were completed by 39 (49%), of which nearly half were worksites. Word-of-mouth was the most common means of recruitment and retention in community groups was excellent (> 50% of members). More than half of champions surveyed reported members had achieved significant health benefits (weight loss, fitness, healthy eating, quality of life). There was evidence for engagement in healthy lifestyle activities, with increased membership in more than half of the groups, some evidence of organizational and strong community support. Exercise was the most commonly reported group activity. Since 2016, over 375 WoW! Champions have been trained, with > 1470 registered members, and > 4500 participants. WoW! has undergone horizontal scaling, incorporating household food gardening (participation was increased almost 2-fold through WoW! partnership), "Play Streets", WoW! Active Public (physical activity in public spaces) and a school bicycle distribution project. WoW! partnerships have increased from 15 (2016/2017) to 44 (2017/2018), and are currently undergoing evaluation. A wellness passport application, online accredited training and electives on social entrepreneurship are under development. Summary: WoW! is an evolving dynamic healthy lifestyle-promoting partnership platform. Community engagement combined with a continuous improvement framework, create a responsive and inclusive approach that enables contextually appropriate co-actions, supporting a social movement which addresses NCDs.
Promoting sustainable behavioural, nutrition and physical activity interventions in healthcare settings - tackling challenges of health professional gatekeeping

**Anderson A, Giota Mitrou**

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**Cancer prevention and management (SIG)**

**Purpose:** Clinical encounters are an opportunity to endorse and support changes in health behaviours. However, health care professionals (HCPs) in cancer settings (screening, diagnostic, and survivorship) seem reticent to promote physical activity (pa) and nutrition changes. This symposia aims to identify challenges and evidence based approaches to win support of HCPs in promoting sustainable lifestyle changes.

**Rationale:** HCPs in cancer settings are seen as experts and key stakeholders for supporting lifestyle change but further understanding is needed on how to optimise their role.

**Objectives:**

To explore
- experiences of challenges in engaging HCPs with behaviourally focussed interventions
- experiences of successfully addressing HCP engagement
- the potential of training HCP's to improve intervention implementation
- a portfolio of strategies to enhance HCP engagement in promoting behaviour change interventions.

**Summary:** Three papers will be presented covering HCP engagement and implementation of nutrition and physical activity endorsements in differing cancer settings, followed by facilitated audience discussion on experiences of how we can better engage HCP through educational and behavioural strategies. We aim to use this symposium as a starting point for a discussion paper for future research.

**Format:** Three presentations and a facilitated audience discussion with draft output collated by the SIG group members. Erica James will present findings from The Universal Screening of Exercise needs for cancer patients In Treatment project that aimed to incorporate standardised screening and referral to PA support. The engagement of HCPs was achieved through the use of evidence-based implementation strategies resulting in successfully enhanced HCP engagement.

John Saxton will reflect on factors influencing the ability, confidence and willingness of HCPs to provide PA advice in two settings. Qualitative findings with HCPs from the UK Bowel Cancer Screening Programme will be contrasted with those of HCPs providing support for hospital supervised and home-based exercise as part of the PREPARE-ABC prehabilitation trial.

Rebecca Beeken will discuss findings from UK oncology HCPs on awareness of lifestyle guidelines for cancer survivors, current practices, and perceived barriers which informed the development of the habit theory based intervention 'Healthy Habits for Life'. In order to optimise recruitment, the intervention trial was eventually designed to bypass HCPs as gatekeepers.

Discussant Giota Mitrou will discuss experiences from WCRF in communicating evidence based science and supporting practice related to and lifestyle change cancer amongst HCPs. She will encourage participants to discuss the reasons for poor engagement and to report achievements.
Using best practice implementation science to underpin a practice change intervention to support behaviour change amongst health care professionals


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Purpose: Common barriers to the implementation of exercise programs in oncology include limited time, resources, expertise, and awareness of benefits on the part of health care professionals (HCPs). This study aimed to establish the feasibility of a practice change intervention (based on best practice implementation science) designed to integrate systematic exercise screening and referral of patients undergoing cancer treatment.

Methods: A review of evidence based implementation strategies was conducted. Implementation science strategies deemed relevant by HCPs for this practice change intervention included: executive support and endorsement, staff training, integration of systems and development of prompts, and provision of tools and resources. To evaluate the feasibility of the intervention, a 3-month, pre-post trial was conducted at the Calvary Mater Hospital, Newcastle, NSW, Australia. The primary outcome for the feasibility trial was the proportion of eligible patients that were screened and referred to an exercise program (determined via a medical record audit).

Results: Executive support was gained from the Director of Cancer Services, the Nurse Unit Manager, the Head of the Physiotherapy Department, and key Medical and Radiation Oncologists who 'championed' the program. The practice change intervention focused on oncology nurses delivering chemotherapy education sessions in the Day Treatment Centre. Thirteen chemotherapy nurses underwent training conducted by a Physiotherapist experienced in oncology. Screening and referral was prompted by a structured risk assessment (using a decision tree). Recording of the screening and referral process was integrated into the chemotherapy education session that is provided to every outpatient undergoing treatment. Screening increased from zero (0/195) to 57% (117/207) after implementation of the practice change intervention. Referral rates were 69% low risk, 19% moderate risk (referred to exercise specialist), and 12% high risk (referred to supervised conditioning class). The intervention was acceptable to the majority of HCPs and patients.

Conclusions: The practice change intervention resulted in increased screening and referral of patients indicating successful change in behaviour of the HCPs. Use of evidence based implementation strategies can successfully overcome some of the barriers faced by HCPs.
Support for physical activity and/or structured exercise along the cancer care continuum: qualitative perceptions of healthcare professionals

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Purpose: Evidence that a physically active lifestyle is associated with a reduction in colon cancer risk and improved survival after curative-intent colon cancer treatment has provided a platform for embedding physical activity/structured exercise support within colorectal cancer screening and treatment pathways. This presentation will reflect on factors influencing the ability, confidence and willingness of healthcare professionals (HCPs) to provide such support at different ends of the colorectal cancer care continuum.

Methods: (i) interviews and focus groups with a purposive convenience sample of health professionals (4 endoscopists, 4 colorectal surgeons, 4 staff nurses and 4 specialist screening practitioners) explored perceptions around providing physical activity advice via the UK Bowel Cancer Screening Programme (BCSP); (ii) interviews/observations (as part of a process evaluation) and monthly teleconferences with HCPs involved in delivering hospital-supervised and supported-home exercise interventions to patients undergoing curative-intent surgery for colorectal cancer in the ongoing multi-centre PREPARE-ABC prehabilitation/rehabilitation trial.

Results: Three key themes emerged from the framework analysis of qualitative data gleaned from HCPs involved in the UK BCSP: (i) perceptions of the concept focused on the issues of relevance and need, and the question of which patients would gain most benefit; (ii) barriers to provision highlighted concerns about which HCP(s) should provide the advice, logistical issues of implementation and the challenges of motivating patients to change health behaviours; and (iii) implementation strategies yielded ideas for how to most effectively embed support within the screening pathway and improve patient awareness of the implications of an abnormal screening test. Challenges to engaging sites in the PREPARE-ABC trial included issues with sites covering treatment (delivery) costs, delays to confirming capacity/capability due to concerns about missing NHS recruitment targets, difficulties in coordinating the right mix of HCPs for this complex intervention and concerns about the intervention causing delays to surgery. Challenges experienced by HCPs delivering the PREPARE-ABC interventions included resource limitations, lack of workload capacity and time management.

Conclusion: These qualitative data provide important insights into the perceptions of HCPs and the challenges experienced in providing support for physical activity/structured exercise within colorectal cancer screening and treatment settings.
S1, S1.06

Seeking the views of healthcare professionals to inform the development of a lifestyle intervention for cancer survivors; ‘Healthy Habits for Life’

**Beeken R**, H Croker, A Fisher


15756: Promoting sustainable Behavioural, Nutrition and Physical Activity Interventions in healthcare settings - tackling challenges of health professional gatekeeping (Convenor: Annie Anderson), Club A, June 5, 2019, 8:30 AM - 9:45 AM

**Cancer prevention and management (SIG)**

Purpose: A better understanding of healthcare professionals (HCPs) perspectives on providing lifestyle advice for cancer survivors, including barriers and beliefs about optimal delivery, could improve the development and implementation of effective interventions. The aim of this presentation is to describe how the views of HCPs informed the content of a lifestyle intervention for cancer survivors ('Healthy Habits for Life') and the design of the efficacy trial.

Methods: HCPs views about the provision of lifestyle advice were captured via two studies carried out by the authors. Oncology HCPs (n=460) responded to an online survey that included questions on awareness of guidelines, current practices, and perceived barriers to giving advice. A sub-sample (n=21) took part in semi-structured interviews.

Results: A key barrier to providing advice was lack of knowledge of guidelines, particularly for individual lifestyle behaviours (50%-67% unaware based on survey responses). Other barriers included a lack of time (36%), and there was an identified need for any intervention to be cost-effective, but also tailored. 'Healthy Habits for Life' was consequently developed to consist of a self-guided booklet describing the World Cancer Research Fund lifestyle recommendations combined with a brief, one-off, tailored discussion. However, the main barriers to provision of advice were the patient being too frail/unwell (70%) and a perception that patients would not be interested (48%). HCPs also raised concerns about the resource required for trial participation. Our trial was therefore designed to recruit via a cohort study enabling us to bypass HCPs as potential gatekeepers. Additionally, HCPs indicated that an overall health behaviour change score would be of more value than individual behaviours for convincing them to introduce a lifestyle intervention into the care pathway. Our primary trial outcome is therefore a Composite Health Behaviour Risk Index (CHBRI).

Conclusions: 'Healthy Habits for Life' has been developed to meet an identified need for an intervention that can be delivered within the cancer care pathway without prohibitive costs. If this intervention can promote improvements in the CHBRI when delivered by researchers, HCPs may be more supportive of recruitment to a future implementation study, and ultimately integrating it into standard care.
Healthy eating and physical activity in home-based/family childcare

Okely T, Dianne Ward

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Early care and education (SIG)

Purpose/Rationale:
Early Childhood Education and Care services have been identified as an influential setting to promote children's physical activity and healthy eating behaviors. Home-based childcare (i.e. family child care homes; family day care) is a unique form of childcare characterized by care of children within the childcare provider's home instead of a center. Home-based childcare regulations vary greatly between countries, including child ratios and training requirements. Compared to center-based childcare, there has been limited research conducted in the home-based childcare setting. Research exploring home-based childcare is important due to the unique challenges experienced in this environment, including differing ages of children, limited space and isolation of childcare providers/educators. Promoting healthy eating and physical activity in home-based childcare is an emerging area of research and our symposium will contribute to this evidence base.

Objectives:
- Present research from three countries, comparing the similarities and differences of home-based care among countries;
- Describe the challenges associated with intervening in these settings;
- Identify future research directions in the area of nutrition and physical activity interventions in home-based childcare

Summary:
Three international speakers will present their findings from nutrition and physical activity research in home-based childcare from three different countries.
Presenter 1, Dr. Kim Gans (University of Connecticut) will present findings from a childhood obesity prevention randomised control trial in family child care homes. The presentation will focus on changes in feeding behaviors of family child care providers and dietary changes of 2-5 year old children cared for in these homes comparing intervention and control.
Presenter 2, Dr Leigh Vanderloo will present finding from a systematic review that examined preschoolers' levels of sedentary time in home-based childcare.
Presenter 3, Erin Kerr (University of Wollongong) will present the findings of a surveillance study in home-based childcare that assessed polices related to healthy eating and physical activity and examined the support provided to educators from their registered organisations.
The Discussant, Prof. Dianne Ward, will provide her thoughts regarding the immediate and future opportunities and challenges when conducting research with home-based care settings

Format:
The Chair, Professor Tony Okely will introduce the speakers and provide a 5-minute overview of the symposium. The three presenters will each be provided 15-minutes to present the findings from their studies. The Discussant will close with a 10-minute presentation, drawing upon the presentations and her
experience of FCCH. During the remaining 15-minutes, the Discussant will moderate questions from the audience.
Participation in an obesity prevention intervention likely improves diet quality of 2-5 year old children cared for in family childcare homes: preliminary results from the healthy start/Comienzos Sanos Trial

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15815: Healthy eating and physical activity in home-based/family childcare (Convenor: Tony Okely), Club B, June 5, 2019, 8:30 AM - 9:45 AM

Early care and education (SIG)

Purpose: Family childcare homes (FCCHs) are the second-most utilized form of non-relative childcare in the United States and may be more obesogenic environments than childcare centers. Yet, little intervention research has been done in this setting.

Methods: Healthy Start/Comienzos Sanos is an ongoing cluster randomized trial in FCCHs to help family childcare providers (FCCPs) change FCCH environments and improve the diet and physical activity of children aged 2-5 years in their care. FCCPs complete two surveys and undergo two days of FCCH observation at both baseline and 8 months to measure the FCCH environment and children's eating, activity and screen-time. The intervention arm receives an obesity prevention intervention and the control arm receives a reading readiness intervention. The current analysis examined preliminary changes from baseline to 8 months in observed children's diet quality by experimental condition (measured by Healthy Eating Index 2015 (HEI) and 13 HEI component scores). HEI score was calculated per child. The total sums of food/drink and nutrient variables were divided by total energy intake, then compared with the HEI standard on a cup/nutrient equivalent per 1000 kcal basis. We used ANOVA models to look at change in mean HEI component and total scores, from baseline to follow-up, between Intervention and Control sites.

Results: 119 FCCP enrolled in the study (100% female, 72% Hispanic, 16% Black, mean age 48.4 years, 11% no high school education). As of October 2018, 38 FCCP have completed follow-up observations with data collection continuing until June 2018. Preliminary results suggest that the intervention group had greater changes than the control group in total HEI scores (5.86 vs. 0.25, p=.07), and some component scores, i.e. fruit (0.15 vs. -0.42, p<0.12); vegetable (0.98 vs. 0.19, p=0.19); added sugar (0.81 vs. 0.16, p=0.32) and fatty acids (0.95 vs. 0.26, p=0.36). More statistical power with the full sample should clarify and strengthen these results.

Conclusions: The Healthy Start intervention appears to be improving the dietary quality of 2-5 year old children cared for in FCCHs, which has important implications for professional development and policy. The presentation will also discuss changes in FCCPs' nutrition behaviors by intervention arm.
S1, S1.07

A Review of sedentary time in home-based childcare

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15815: Healthy eating and physical activity in home-based/family childcare (Convenor: Tony Okely), Club B, June 5, 2019, 8:30 AM - 9:45 AM

Early care and education (SIG)

Background & Objective: Little is known regarding preschoolers' (2.5-5 years) physical activity levels within the home-based childcare environment, even less is known about their sedentary behaviours. This review aimed to explore and synthesize the literature on preschoolers' sedentary time (ST) in home-based childcare.

Methods: Databases (n = 9) were searched for peer-reviewed, English-language, primary studies which quantitatively measured ST levels of preschoolers in home-based childcare. This review followed the PRISMA and Cochrane Review guidelines.

Results: Of the 349 studies identified, a total of 8 studies were selected for inclusion in this review. Accelerometry data reveal that children's ST was high, ranging from 39.5 - 49.6 mins/hr (depending on the device, epoch, and cut-points used).

Discussion & Conclusion: This is the first systematic review to explore ST among preschoolers attending home-based childcare. The findings from this work underscore the need for a better understanding of preschoolers' activity patterns, and mechanisms to decrease ST in home-based childcare. Given parents' growing dependence on this particular setting (and its respective staff or caregivers), additional research is required to identify ways to support healthy active behaviours among these young children.
Opportunities for FDC Service Providers to promote healthy eating and physical activity

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Purpose
Early Childhood Education and Care services are a key setting to promote healthy eating and physical activity behaviours in young children. In Australia, Family Day Care (FDC) is a unique form of childcare where education and care are provided for up to four children below school age and an additional three school-aged children, in a home environment. Over 200,000 children attend FDC in Australia. To operate as a FDC and receive government subsidies, educators must be registered through an approved Service Provider. The Service Provider consists of a coordination unit who monitors and supports educators to ensure they comply with the Australian National Quality Framework. The present study aimed to examine the support that FDC Service Providers provide to educators and families and assess the extent to which Service Provider's policies adhere to national standards and relevant guidelines.

Methods
Family Day Care Service Providers (n=51) from two Health Districts in New South Wales, Australia, were invited to participate in a structured interview from February 2018 to September 2018. Policies were collected and Service Providers were asked about resources provided to families and educators and professional development related to nutrition and physical activity for children aged 0-5 years old.

Results
Twenty-eight Service Providers participated in the study (55% participation rate), representing 885 educators. All Service Providers had a nutrition policy and most had a breastfeeding policy (89%); however only about two thirds (64%) had a physical activity policy and just over half (54%) had a screen time policy. Health-related information provided to families varied: healthy eating (85%), breastfeeding (58%), limiting screen time (62%) and promoting physical activity (69%). Service Providers were more likely to provide educators with educational resources on healthy eating (89%) than physical activity (71%) and supervised floor based play (78%). Less than three quarters of Service Providers had offered training to educators in physical activity or nutrition.

Conclusion
FDC Service Providers have the potential to influence the healthy eating and physical activity behaviours of a large number of educators and families. This study identified key areas where training and resources can be provided Service Providers.
The role, opportunities, and challenges of feasibility and pilot studies in behavioural nutrition and physical activity research

Klingberg S, Richard Rosenkranz
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Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose:
The purpose of this symposium is to critically comment on the current practice of feasibility and pilot studies in behavioural public health research in terms of development, implementation, and informing definitive trials.

Rationale:
Feasibility and pilot studies are frequently, but inconsistently, carried out as part of intervention development and evaluation processes. Despite debates in terminology, methodology, and their overall contribution in informing definitive trials, feasibility and pilot studies can offer ample opportunities for learning and informed decision-making for intervention development. This symposium brings together methodological and pragmatic perspectives for preparing and delivering feasibility and pilot studies, and thus invites participants to critically engage with the strengths and limitations of these study designs, avoiding common pitfalls, and overcoming practical challenges. Ultimately, the aim is to promote thoughtful, transparent, and methodologically sound formative research as part of the intervention development and evaluation process.

The symposium will be of interest to those who develop, implement, and evaluate public health interventions. While there is a slight thematic focus on physical activity promotion, the session will be applicable to both nutrition and physical activity researchers.

Objectives:
1) To critically review what feasibility and pilot studies are in theory and in practice
2) To discuss experiences of how these studies inform the intervention development and evaluation process
3) To encourage interest and action for high-quality formative research in behavioural public health
4) To make recommendations for improved consistency, transparency, and quality in carrying out formative research through feasibility and pilot studies

Summary:
The three symposium presenters will provide both methodological and practical reflections about feasibility and pilot studies. Two presentations will focus on challenges and opportunities from a methodological point of view. The third will serve as a case study to provide real-world lessons from the feasibility and pilot stages of a family-based physical activity intervention in the UK.

Format:
The symposium chair, Ms. Sonja Klingberg, will open the symposium with a brief (5 minutes) background on the topic. Next, three individual presentations of 15 minutes each, including clarifying
questions at the end, will be given by Dr. Britt Hallingberg, Prof. Michael Beets, and Dr. Justin Guagliano. After this, the discussant Associate Prof. Richard Rosenkranz will briefly (5 minutes) comment on the presentations, and finally open up the session to, and moderate, a general discussion of 15-20 minutes.
Feasibility studies for complex public health interventions: a systematic review of guidance and an audit of current practice.

Hallingberg B, R Turley, J Segrott, D Wight, P Craig, L Moore, S Murphy, M Robling, S Simpson, G Moore

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Objective: Evaluations of interventions to improve behavioural nutrition and physical activity are often undermined by problems that could have been identified before the effectiveness study stage. Feasibility studies can provide vital information to support more robust evaluations; however, there is considerable divergence over the definitions, aims and the associated methods of feasibility studies, including whether and how they should determine progression to future studies. As part of a larger study to develop GUIDance for FEasibility STudies of complex public health interventions (GUEST), two evidence syntheses were conducted: a systematic review of guidance for conducting feasibility studies and an audit of current practice.

Methods: For the systematic review, published and unpublished guidance reported between January 2000 and November 2016 were searched via bibliographic databases, websites, citation tracking and expert recommendations. Included papers were thematically synthesized. For the audit of current practice, a search for feasibility studies published between 2012-2017 was conducted in SCOPUS. Thirty papers meeting the eligibility criteria were randomly selected for inclusion. A narrative synthesis of the aims, conduct and reporting of the included feasibility studies was performed.

Results: Thirty papers were included in the systematic review, representing 25 unique sources of guidance. Eight themes were identified: pre-requisites for conducting an exploratory study, nomenclature, guidance for intervention assessment, guidance surrounding any future evaluation study design, flexible versus fixed design, progression criteria to a future evaluation study, stakeholder involvement and reporting of exploratory studies. For the audit, the thirty studies included captured a range of public health issues and delivered interventions at the individual- and/or community/organisation-level. Most studies focused on uncertainties related to the intervention, used a pretest-posttest design and assessed early effectiveness. Only two studies addressed uncertainties regarding the future evaluation design and none discussed progression criteria.

Conclusions: There is discrepancy between existing guidance of feasibility studies and current practice; with the latter focusing predominantly on intervention-related uncertainties with no consideration of progression criteria for a future evaluation. These findings were used to generate questions for a subsequent Delphi study and to inform the development of new guidance for researchers and funders on the conduct of feasibility studies.
The influence of risk of generalizability biases in pilot studies – a systematic review and meta-analysis

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Implementation and scalability (SIG)

Objective: The pilot evaluation of behavioral interventions represents an essential step in determining whether future testing of the intervention in a well-powered (WP) trial is warranted. The ability of a pilot study to inform a WP study relies on considerations related to the design, delivery, and interpretation of the pilot results to avoid exaggerated early discoveries. Referred to as "risk of generalizability biases (RGB)", we propose that biases introduced in a pilot can reduce the probability of obtaining meaningful results in a WP trial. The present study describes the development and preliminary validation of the RGBs in a sample of published childhood obesity pilot studies paired with a WP trial.

Methods: A systematic review was conducted through Dec 2017 to identify pairs of pilot studies and WP trials evaluating the same/similar intervention. Eligible studies were pilot (e.g., feasibility) behavioral interventions involving youth (=18yrs) on a topic related to childhood obesity (e.g., prevention/treatment, activity, diet). RGBs were defined as features of the intervention study in the pilot that may systematically distort the results/interpretation of the intervention. Multi-level random effects meta-analyses were performed to investigate the association of the biases with study outcomes.

Results: Of 24,570 references, 740 pilot studies met the eligibility criteria and 39 pilot studies had a published WP trial of the same/similar intervention. A total of 10 RGBs were identified. A complete list and definitions of the RGBs will be presented. An example of an RGB, "risk of intervention delivery agent bias", defined as the intervention delivered by study authors or graduate students in pilot and delivered by lay health practitioners in WP, showed that pilot studies coded as having this bias exhibited a larger standardized mean difference (SMD) compared to pilots with this bias absent (0.466 vs. 0.244), while in the WP trial, when this RGB was removed, the SMD was reduced to 0.087 compared to 0.197 for those WP without this risk in the pilot. The impact of all biases will be presented.

Conclusions: These findings provide initial evidence that biases present during pilot testing may lead to exaggerated early discoveries and subsequent failed WP trials.
Describing the transition from feasibility to pilot study: Families Reporting Every Step to Health (FRESH)

Guagliano J, HE Brown, C Hughes, AP Jones, KL Morton, E Wilson, E van Sluijs

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15732: The role, opportunities, and challenges of feasibility and pilot studies in behavioural nutrition and physical activity research (Convenor: Sonja Klingberg), Club C, June 5, 2019, 8:30 AM - 9:45 AM

Purpose. Interventions aiming to increase family physical activity (PA) are needed. Here we describe the transition from feasibility to pilot study for FRESH, a child-led family-based PA intervention delivered online, focussing on recruitment/intervention changes.

Methods. Changes applied to the FRESH pilot were informed by a two-armed theory-based randomised feasibility study, where recruited families (with an 8-10-year-old index child) were allocated to a 'child-only' (CHILD) or 'family' arm (FAM). Both received access to the FRESH website, allowing participants to 'travel' to target cities around the world, log steps, and track their progress as they virtually 'globetrot'. In CHILD, only index children wore pedometers; in FAM, all family members wore pedometers and worked toward collective goals. All family members were eligible to participate in the evaluation. Mixed-methods process evaluation at 6-week follow-up consisted of questionnaires and semi-structured focus groups and; informed a 1-yr pilot randomised controlled trial targeting to recruit 60 families.

Results/Findings. Twelve families enrolled (60% of target), 33% were whole families. We encountered the following recruitment challenges: children's inability to describe FRESH to their families, families lacking confidence for PA, and a reluctance to be measured. Suggested new recruitment strategies included targeting adults, using social media, and using familiar/trusted organisations. Amendments for the pilot study included the creation of a video explaining FRESH and emphasising whole family imagery and separate intervention/evaluation participation. Preliminary pilot findings showed 41 families enrolled (68% of target), ~75% were whole families. Regarding intervention delivery/fidelity, focus groups revealed 5 of 6 CHILD families preferred whole family participation, which led to the discontinuation of the CHILD arm, in favour of a family pedometer-only arm. Additional changes to improve fidelity included more support for parents (e.g., reminder emails), more feedback/praise for children, resolving website technical issues and adding competition. Pilot findings showed greater website engagement versus the feasibility study as families completed a greater percentage of challenges (~85% vs. ~70%).

Conclusions. Feasibility findings indicated a need for further optimisation of recruitment and intervention delivery. After applying changes related to recruitment and intervention delivery, preliminary pilot findings appear promising, demonstrating the value of learning from feasibility and pilot testing.
Examining the behavior change technologies used in seven weight control interventions in young adults

Lytle L, Marta Marques
University of North Carolina, Chapel Hill, NC, United States

Motivation and behavior change (SIG)

Purpose: The purpose of this symposium is to describe a process used to 'unpack the black box' of interventions into behavior change strategies (BCTs) using a process described by Michie (2013) and an Analytic Hierarchical Process (AHP) to examine the emphasis placed on the BCT domains. This was done for 7 weight control intervention trials from EARLY (Early Adult Reduction of weight through LifestYle). Results of this process will be presented and insights into BCTs most commonly used in the interventions focusing on weight gain, weight loss and with special populations will be shared. The session will conclude with commentary by Dr. Marques, a colleague of Susan Michie. This session is innovative because of the use of the BCT deconstruction process as well as the AHP approach to understand the relative use of BCTs in weight management trials.

Rationale: Behavioral interventions targeting weight are typically multi-component and include a comprehensive set of strategies to help participants change diet and activity behaviors. In randomized clinical trials, interventions are evaluated as a treatment package as a whole. This 'black box' approach does not allow for assessing whether all of the intervention strategies are required to produce change or if a more parsimonious set of strategies would be as effective. Identifying the BCTs used in interventions has been suggested as an important step to understand the active ingredients of an intervention.

Objectives: The aims of this symposium are to describe the:
1. EARLY trials and the approach used to deconstruct weight control interventions into the behavior change techniques described by Michie et al.
2. Use of the AHP to obtain the relative emphasis put on each BCT in each intervention
3. Results and provide insights for researchers and practitioners from these processes

Summary: The process and results of deconstructing the interventions will be reported followed by a critique by our discussant.

Format: This session will be organized as follows:
- Introduction of the session and the EARLY trials (Lytle): 5 minutes
- The process used to deconstruct the EARLY trials into BCTs and related findings (Lytle): 13 minutes
- Use of the AHP process to understand how BCT domains were emphasized across the EARLY trials (Belle): 13 minutes
  - How the use of BCTs differ between types of weight control trials (Tate): 13 minutes
  - Reflecting on the EARLY Taxonomy findings (Marques): 15 minutes
- General discussion between presenters, discussant and participants: 15 minutes.
Deconstructing weight control interventions using the Michie behavior change taxonomy

Lytle L
University of North Carolina, Chapel Hill, NC, United States

15945: Examining the behavior change technologies used in seven weight control interventions in young adults. (Convenor: Leslie Lytle), Club D, June 5, 2019, 8:30 AM - 9:45 AM

Purpose: The purpose of this presentation is to describe the process used to deconstruct 17 treatment arms used in the seven EARLY weight management trials into behavior change domains and techniques (BCTs) and to present related outcomes.

Methods: Each of the EARLY studies provided materials describing their interventions, including intervention descriptions, protocol, manuals of procedures, materials, and screen shots or logins for direct access to technology components. Four coders at the University of North Carolina at Chapel Hill were trained to identify the BCTs and their related domain using BCTTv1 using the website (http://www.bct-taxonomy.com/) and app created by Michie and colleagues. Practice coding permitted establishing reliability. Each treatment arm (n=17) was coded independently by two to three raters. As discrepancies were identified, additional documents were requested from the sites, and raters independently re-coded those BCTs for which there was disagreement. A domain was coded as present if an intervention included at least one BCT from the domain.

Results: Of the 93 possible BCTs, 36 (39%) were not used in any of the treatment arms. Fifty-seven (61%) BCTs were used in at least one of the active interventions whereas the control arms used only 13 (14%) of the BCTs. Fifteen BCTs were used in at least 11 of the 12 intervention arms. From the Goals and Planning domain these BCTs include: Goal Setting (behavior), Problem Solving, Goal Setting (outcome), Action Planning, Review Behavior Goals, and Review Outcome Goals. From the Feedback and Monitoring domain the following BCTs were used by at least 11 of the 12 arms: Feedback on Behavior, Self-monitoring of Behavior, Self-monitoring of Outcomes of Behavior, and Feedback on Outcomes of Behavior. Intervention arms used, on average, more BCTs per domain compared to control arms. The biggest mean differences between treatment conditions occurred with two domains: Goals and Planning (mean 6.6 I vs 0.6 C) and Reward and Threat (mean 4.3 I vs 0 C).

Conclusions: While all of the studies targeted young adults, their approaches varied from intensive face-to-face interventions to entirely technology-based approaches, and the study arms varied in the extent and type of BCTs they delivered.
Purpose: The purpose of this presentation is to describe the process used to rank the emphasis of the domains used in the EARLY weight management trials and to present related outcomes.
Methods: AHP is a process for analyzing complex decisions using pairwise comparisons to determine the relative emphasis of factors being compared. For the present study, we made comparisons at the domain level rather than BCT level to manage the number of comparisons required. Study teams were trained on how to apply the AHP during a multi-day face-to-face meeting. Each study received the list of the domains used in each of their study arms, examples of which BCTs were used, and how they were employed in the intervention. Pairwise comparisons of the domains were made on an anchored scale where 1 indicated equal emphasis, and values 2 - 9 represent progressively divergent emphasis. Consensus for the team was reached after independent scoring occurred. Results were then presented as pie charts showing the percentage emphasis of each domain for each treatment arm.
Results: One of the EARLY weight loss trials, CITY, will be used as an example. The CITY trial had two interventions and one control arm. The CITY control arm used only two domains (Shaping Knowledge and Comparison of Outcomes) and 80% of the emphasis in the control group was on Shaping Knowledge. The CITY cell phone intervention arm used a total of nine domains with more than half of the emphasis occurring with BCTs from the Feedback and Monitoring (36%) and the Associations (25%) domains. The CITY personal coaching intervention included BCTs from 13 domains with more than half of the emphasis on BCTs from Goals and Planning (20%), Feedback and Monitoring (22%), and Social Support (17%). Results from other interventions will also be shared.
Conclusions: To date, the literature on BCTs has focused on the presence or absence of the BCTs, not on how much they are emphasized relative to other techniques within an intervention. The use of the AHP process in this study allows finer grained analysis of what domains are being emphasized across controls vs. interventions.
The use of behavior change techniques differ by types of weight control trials

Tate D
University of North Carolina, Chapel Hill, NC, United States

Purpose: The purpose of this presentation is to discuss how the use of BCTs differed between EARLY interventions focusing on weight loss (WL), weight gain prevention (WGP) or special populations (SP). The presentation will conclude with the opportunities and challenges in deconstructing behavioral interventions.

Methods: Across the seven EARLY intervention trials, three were designed as WL trials, two as WGP, and 2 targeted special populations including preventing weight gain during smoking cessation attempts and appropriate gestational weight gain and post-partum weight loss. The use of BCTs and their emphasis using the AHP approach are compared by study type.

Results: Differences in the BCTs were observed across the three types of interventions tested in EARLY. Interventions targeting SP tended to include more BCTs than WL or WGP interventions (e.g., 49 vs. 39 and 38, respectively), and may be the result of attempting to simultaneously change multiple behaviors (i.e., diet, exercise, and smoking). Both SP studies used more BCTs from the Antecedents and Social Support domains as compared to the WL and WGP studies, likely due to the belief that during these times (smoking cessation, and pregnancy/post-partum) social support may be particularly important for behavior change. Likewise, the WGP interventions used more BCTs from Repetition and Substitution and Reward and Threat compared to the others, possibly building in more rewards for behavioral progress made when natural rewards of weight loss were not expected. In considering the emphasis of domains used, among WL and WGP interventions, Feedback and Monitoring and Goals and Planning domains were the most emphasized relative to other domains with remarkable consistency and more BCTs from these domains were included. For the SP interventions, Goals and Planning, Feedback and Monitoring and Antecedents were the most emphasized domains.

Conclusions: The differences in BCTs used across intervention type may reflect the perceived need to tailor intervention strategies based on the population of interest and specific nuances of the behaviors targeted. It may also highlight the BCTs that are being under-utilized by some types of interventions. Identifying these differences may help interventionists design stronger interventions.
Using a co-creation approach in health research within different contexts and populations

**Latomme J, Deborah Thompson**

*Ghent University, Ghent, East-Flanders, Belgium*

**Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)**

Purpose: To describe and explore different co-creation processes, methodologies and strategies, and to formulate and (practical) recommendations for using a co-creation approach in health research. 

Rationale: Traditionally, interventions and measurement tools have been developed by researchers/experts using a top-down approach. Recently, there has been increased attention for using a co-creational approach as a participatory technique in health research studies. Because its potential to reduce the gap between theory, research and practice, this approach is increasingly advocated as a more efficient solution to achieve positive and sustainable effects among general and at-risk populations. This is mainly because it enhances the engagement of the target group, resulting in contextually appropriate interventions and measurement tools. This symposium will explore how a co-creational approach can be applied in health research studies. Co-creational approaches, strategies and results will be discussed in various contexts and populations.

Objectives: This symposium aims to: (1) demonstrate the importance and relevance of actively involving end-users and relevant stakeholders in the development of interventions and measurement tools related to physical activity and sedentary behaviour; (2) describe different co-creation processes (and its products) within different contexts and populations; (3) outline and compare different co-creation approaches, methodologies and strategies that can be used among the general and in at-risk populations; and (4) provoke discussion about these different approaches, methodologies and strategies, and delineate key principles and recommendations for future research using a co-creational approach.

Summary: An introduction will demonstrate how using a co-creational approach as a participatory technique can be useful and promising in health research. This will be followed by three presentations: (1) using a co-creation approach for developing an intervention to promote physical activity in fathers and their children, (2) co-creating an intervention to reduce sedentary behaviour and increase movement in care home residents, and (3) co-creating a physical activity measurement tool with school-aged children. The discussant will summarize these presentations and will facilitate an audience discussion about how to integrate what has been learned and implications for future research and interventions.

Format: The chair, Julie Latomme (Belgium), will introduce the general topic of the symposium, followed by three ten-minute presentations, each with a further five minutes allocated for questions/clarifications. These will be delivered by Drs Julie Latomme (Belgium); Dr Maria Giné-Garriga (UK) and Drs Lisan Hidding (The Netherlands). The discussant, Professor Deborah Thompson (United States), will provide an overview of the main issues and will facilitate the subsequent audience discussion.
Co-creating an intervention for fathers and their children promoting physical activity and limiting screen-time: the Run Daddy Run-project

Latomme J, M Verloigne, M De Craemer, G Cardon

1Ghent University, Ghent, East-Flanders, Belgium

Objective: Fathers play an important role in establishing health behaviours in their children, but are often underrepresented in interventions. The Run Daddy Run-project aims to develop and implement an intervention promoting physical activity (PA) and limiting screen-time in fathers and their children. As the literature has shown that fathers are difficult to engage in and not appealed to the existing interventions, a co-creation approach will be used to develop the intervention. This approach involves the end-users actively in the development of the intervention and includes a strong collaboration between the target group and the researcher, resulting in a contextually appropriate intervention and intervention strategies tailored to fathers’ needs/preferences. Aims of this study were to describe the co-creation process and to quantitatively and qualitatively evaluate the process of the developed intervention.

Methods: Five co-creation sessions were conducted including five fathers of primary school-aged children and two researchers of Ghent University (Belgium). The co-creation process included the following steps: (1) describing the needs/barriers and facilitators/motivators of fathers related to PA and screen-time with their children, (2) identifying what is needed for behaviour change and outlining intervention goals, (3) exploring which theoretical methods and practical strategies can be used to achieve these goals, and (4) integrating the information obtained in the previous steps into a coherent intervention. The co-creation process was evaluated based on two process evaluation questionnaires.

Results. The information obtained in the co-creation sessions resulted in a tailored, contextually appropriate intervention for fathers and their children including two components: an (inter)active component focusing on engaging fathers and children together in PA, and an online component, including key information on PA and screen-time, options for father-child PA, etc. Process evaluation scores revealed high co-creator satisfaction with the co-creation process and showed that the designed intervention reflected fathers’ needs/preferences.

Conclusions: Using a co-creational approach might be appropriate for developing interventions targeting fathers and their children, as this approach led to a tailored, contextually appropriate intervention, which appealed to fathers. Future research could test whether this co-created intervention leads to improvements in health behaviours of fathers and their children.
The GET READY study: A co-created intervention with care home residents and university students following a service-learning methodology to reduce sedentary behaviour and increase movement

Giné-Garriga M, M Sandlund, PM Dall, SF Chastin, DA Skelton
1Glasgow Caledonian University, School of Health and Life Sciences, Glasgow, United Kingdom, 2Blanquerna - Ramon Llull University, Department of Sport Sciences and Physical Therapy, Barcelona, Spain, 3Umeå University, Department of Community Medicine and Rehabilitation, Umeå, Sweden, 4Glasgow Caledonian University, School of Health and Life Sciences, Glasgow, United Kingdom | Blanquerna - Ramon Llull University, Department of Sport Sciences and Physical Therapy, Barcelona, Spain

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: The GET READY project aims to integrate service-learning methodology into Physical Therapy and Sport Sciences University degrees by offering students individual service opportunities with residential care homes, in order to co-create the best suited intervention with researchers, care home residents, care staff, caregivers, relatives and policy makers. Once this first stage is finished, we aim to assess the intervention's feasibility to reduce sedentary behaviour and increase physical activity in care home residents.

The main objectives of GET READY are wider than improving quality of life and physical function in residents as we aim to raise awareness, knowledge, skills and passion of graduates entering the workforce, to lead to a change in culture of professionals working in this frail and co-morbid population.

Methods: Two care homes in Glasgow and two care homes in Barcelona participated in stage 1. Overall, 26 students from Glasgow Caledonian University and Blanquerna-Ramon Llull University, 22 care home residents, 14 care staff, 4 family members, and 4 policymakers participated in the workshops. Students designed and conducted two workshops for care home residents and one workshop for care staff, family members and policymakers aimed at answering the following two research questions: (a) how are sedentary behaviour and movement in care homes perceived and experienced among care home residents, staff members, relatives and policymakers?, and (b) how can we decrease sedentary behaviour and increase movement in care home residents?

A total of 10 workshops had been transcribed verbatim and analysed with Thematic Analysis following the phases described by Braun and Clarke (2006).

Results: Three themes emerged that encapsulated the perspective of the care home residents: (1) knowledge of and attitudes towards the behaviours to be tackled; (2) is PA/SB worth an effort? Assets for decreasing SB and increasing PA; and, (3) taking action: suggestions and strategies.

Conclusions: The endpoint had been a report with the best-suited (and most sustainable) strategies to reduce sedentary behaviour and increase movement in care home residents.
MyDailyMoves: Co-creating a 24-h movement child-report together with 9-12-year-old children

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1 Amsterdam UMC, Amsterdam Public Health research institute, Amsterdam, Netherlands, 2 Amsterdam UMC, Amsterdam Public Health research institute, Amsterdam, Netherlands

Objective: Valid and reliable physical activity and sedentary behavior child self-reports are highly warranted, as they can provide information on the type and context of children's behavior. Currently, no questionnaires for children exist with conclusive evidence for both acceptable reliability and validity. One reason for the inconclusive evidence might be the lack of focus on the content validity of these questionnaires, and in none of these studies children were involved in the development. Therefore, this study aimed to co-create a 24-h movement self-report tool together with 9-12-year-old children.

Methods: Concept mapping and photovoice meetings were held to identify children's physical activity behavior. During four concept mapping meetings children (n=40) generated an extensive list of physical activities they engaged in, sorted the activities in categories and rated the frequency and perceived intensity of these activities. Using photovoice, children (n=24) photographed their physical activities during one weekday and one weekend day, titled the photographs, and placed them on a timeline. Based on the concept mapping and photovoice results we developed the first version of MyDailyMoves. Thereafter, we examined the content validity of the tool together with children (n=22).

Results: MyDailyMoves has a timeline format, at which children add the activities they performed the previous day. Based on the concept mapping and photovoice studies eight physical activity categories were included in MyDailyMoves: playing inside; playing outside; sports; hobbies; chores; daily personal care; transport; and others. To define the timeline and to enable filling the timeline completely, MyDailyMoves also includes sleep questions and two additional sedentary categories (schoolwork and screen time; based on a previous review). The content validity study showed that all items in the tool were relevant, and that it was comprehensive. The most important point for improvement concerned the understandability of how to use the tool. Therefore, in the second version of the tool, a short explanation video was added which shows how the tool works.

Conclusion: Including the children's perspectives throughout the tool development, resulted in a comprehensive and practical tool, which is easy to use for children.
S1, S1.11
Socioeconomic and contextual factors on SSB consumption and implications for SSB tax designs

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Policies and environments (SIG)

Purpose: This symposium aims to improve our understanding of the extent of sugar-sweetened beverage consumption and the potential effectiveness of taxes as a policy instrument to reduce consumption and improve health.

Rationale: Obesity rates worldwide continue to pose significant risk of disease burden. Sugar-sweetened beverage (SSB) consumption is linked to obesity and independently to adverse health outcomes. SSB taxes are proposed as a fiscal policy instrument aimed at reducing SSB consumption and improving population health, particularly because such taxes have broad population reach. This session will focus on the extent of SSB consumption and the results of fiscal policies that have been implemented in different countries.

Objectives: The session aims to:
· Provide an overview of consumption patterns of sweetened beverages and assess which populations are most at risk for heavy consumption.
· Understand the context, design and evaluation methods of different sweetened beverage tax policies.
· Share international results from evaluations of sweetened beverages taxes and results on potential unintended consequences.

Summary:
Dr. Cornelsen will present on a study analyzing take-home beverage purchase patterns in the UK in 2016 showing that the majority of households bought relatively small quantities of sugar-sweetened beverages while only a small proportion of the sample (7%) bought large quantities. In the presentation she will discuss these findings in the context of what is known about the price elasticities of SSBs in different population groups.

Dr. Powell will present results from an evaluation of the impact of the $0.01 per ounce Cook County, IL, USA, sweetened beverage tax on sales of taxed and non-taxed beverages and on changes in sales related to cross-border shopping. The results reveal significant reductions in net sales even after taking into consideration increased sales in the border area implying that the tax had the potential to significantly reduce sweetened beverage consumption.

Dr. Teng will present the various types and combination of excise and import taxes that have been implemented across the Pacific Islands. and focus on results from the Cook Islands and Tonga show on how increased taxes are associated with changes in prices and volumes.

Format: The three presentations will be allocated 15 minutes each. The discussant will spend 10 minutes summarizing the key points. The final 20 minutes will consist of open discussion.
Non-alcoholic and alcoholic beverage purchase patterns across socio-economic groups: Implications for SSB taxes

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1 London School of Hygiene & Tropical Medicine (LSHTM), London, Great Britain, 2 University of Exeter, Exeter, Great Britain

Purpose: Taxes on sugar-sweetened beverages (SSBs) aim to both raise revenue and decrease consumption. While a number of studies in the UK have predicted small positive effects at population level from such taxes, the expenditure data show that not all households purchase sugary drinks and many purchase only small volumes. There is a gap in understanding which segments of the population would most likely be affected from taxing SSBs and what are their patterns of other beverage purchases to understand possible substitution patterns and the likely effectiveness of taxes.

Methods: Volume of take-home purchases of non-alcoholic and alcoholic beverages in Britain was estimated from home-scan data (2016) provided by Kantar Worldpanel. Individual beverages were aggregated into five groups and we applied latent class analysis to predict distinct classes of consumers based on purchase volumes. Latent profile regression was then used to analyse how socio-demographic variables predicted class membership.

Results: Majority (78%) of the sample were predicted to belong to a class that bought small volumes of SSB's (average 8.6 L/year). Two small classes of the households (7% each) were characterised by large volumes of SSB purchases (53.0 L/year) or alcoholic drink purchases (61.3 L/year). Income, social class and life stage were the largest factors predicting class membership. Households that purchased large volumes of SSBs tended to be poorer, with younger and less educated main shopper whereas those households purchasing larger volumes of alcohol were wealthier and had older main shopper. The analyses indicated most likely substitution of SSBs with diet alternatives, rather than alcohol or fruit juice.

Conclusion: Given the small share of high-volume purchasers in the UK, a tax on SSBs would have a relatively small absolute impact on total volume of SSBs purchased from supermarkets, with a larger impact in the poorer and more deprived segments of society. These findings will be further considered in the context of price elasticity across different population groups.
The Impact of the Cook County, IL, Sweetened Beverage Tax on Beverage Sales

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Purpose: The purpose of this study is to evaluate the impact of the $0.01 per ounce Cook County, IL, sweetened beverage tax (SBT) which was in place from August 2 to November 30, 2018 on taxed and non-taxed beverage sales within County, IL, and on sales within a 2-mile border area surrounding the taxing jurisdiction.

Methods: We assess the impact of the SBT on beverage sales based on a quasi-experimental research design which includes pre-post intervention site (Cook County, IL) and matched comparison site (St. Louis City/County, MO) observations in a difference-in-differences (DID) model. We draw on UPC-level store scanner data on sales volume obtained from Nielsen for the 4-month period that the SBT was in place and the corresponding period the year prior to implementation for taxed (soda; energy drinks; sports drinks; ready-to-drink (RTD) tea/coffee; fruit drinks) and non-taxed (100% fruit juice; milk; water) beverages. Differential impacts are assessed by beverage categories and package sizes (individual size: single package =1L; family size: multipacks or individual sizes >1L).

Results: Preliminary DID regression results reveal that during the 4-months that the SBT was in place sales of taxed beverages were 27% lower compared to the same period a year earlier relative to the change in sales in the comparison site. Sales were lower by 32% for soda, 25% for sports drinks and RTD tea/coffee, 19% for fruit drinks and just 11% for energy drinks. Sales fell to a greater extent for family-sized (-29%) compared to individual-sized (-19%) taxed beverages. There were no statistically significant changes in sales of untaxed beverages except store-brand milk. Sales in the 2-mile border area increased by 39% (+12% for individual-sized taxed beverages; +47% for family sized).

Conclusions: Sales of sweetened beverages fell by 27% in Cook County, IL, during the 4-month period that the SBT was in effect. Back of the envelope calculations based on sales volume in the taxing jurisdiction and its border area in our scanner sample, assuming the increase in border area sales reflect cross-border shopping, suggest a net reduction in sales of approximately 21% which represents a significant reduction in related consumption.
Impact of Sugar-sweetened Beverage Taxation in the Pacific

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Purpose: Pacific leaders have acknowledged a NCD crisis and several Pacific Island countries and territories (PICTs) have responded. The objective of this study was to describe taxes on sugar-sweetened beverages (SSBs) in PICTs and to evaluate the impact of these taxes on beverage trade and purchasing in two case study nations: the Cook Islands and Tonga.

Methods: SSB taxes in PICTs introduced from 2000-17 were identified by systematically searching online legislation, government websites, law libraries, and contacting key health and finance stakeholders. The Cook Islands and Tonga were selected (primarily based on large cumulative tax size) for further analysis to describe the impacts of recent increases in SSB taxes. Context and tax information were collected via stakeholder interviews with key experts. In Cook Islands; New Zealand export data (98% of SSB imports to the Cook Islands, [HS 22.02]) were used to examine changes in trade over time; and household income and expenditure surveys were examined for heterogeneity in SSB consumption by household type and income, before and after increases in SSB tax. Time series analysis was used to model quarterly SSB import volumes per capita before and after tax increases. Models were adjusted for changes in GDP, visitor numbers and season.

Results: From 2000-2017, half of the PICTs (n=11/22) introduced SSB excise policies (n=8) or increased existing import tariffs (n=3). SSB taxes included the 2014 US$7.77 per kg of sugar excise in Cook Islands and the 2017 Tonga excise of US$0.68/L for beverages with sugar content of 5-20g/100ml or US$1.81/L for >20g/100ml. Cook Islands' 2008 sweetened beverage tariff increase from 40% to 60% was associated with lower SSB and non-taxed beverage imports than were expected based on existing trends but these differences were not statistically significant. The average price of Coca-Cola increased faster than expected after the tariff was introduced (p<0.001 for change in trend).

Conclusions: Significant leadership on SSB taxes to address the NCD crisis has been demonstrated in the Pacific with evidence of favourable price impacts. Further SSB tax evaluations are required from low- and middle-income countries to inform optimal design of any SSB tax policies.
WEDNESDAY JUNE 5 2019
KEYNOTE SESSION 2,
Low hanging fruit for optimizing active ageing

Cardon G
1Ghent University, Belgium

Keynote (Chair: Mark Tremblay), Congress Hall, June 5, 2019, 9:50 AM - 10:30 AM

Nowadays most people, even in the poorest countries, live longer lives. The theme of this year’s conference “Healthy people on a healthy planet” directly links to active ageing as compressing morbidity in the ageing population is of utmost importance for the planet to be sustainable. With the right active ageing approach ageing offers opportunities, next to important challenges. This keynote will address some physical activity challenges and opportunities in our (super-)aged societies.

The fact that people live longer results in a large age range in the older population. To prevent physical, cognitive, mental and social health decline physical activity programs are needed for the full range of the ageing population. A major challenge in our ageing population is tackling the wave of cognitive function decline and dementia. Physical activity is known to improve cognitive function at older age through processes of neuroplasticity. Enriching physical activity interventions with cognitive challenge is found to maximize the neuroplastic properties of the brain that could enhance the potential of prevention and treatment programs for alleviating cognitive decline and also to play an important role in fall prevention. In physical activity programs for the elderly, sufficient cognitive challenge seems even more important to obtain cognitive effects than high doses of intervention sessions. Consequently in order to avoid the decline in quality of life and enhance mental next to physical vigour, program developers and implementers need to cognitively enrich physical activity programs. We can learn from many good practices already out in the field and need to define the most effective and implementable strategies.

Furthermore, this keynote will touch on some other merging physical activity topics in older adults, like lifecourse-approaches with intergenerational programs and ageing-friendly neighbourhoods.
WEDNESDAY JUNE 5 2019
POSTER SESSION 1
Does a fall prevention education program improve knowledge and change exercise prescribing behaviour in health and exercise professionals? A randomised controlled trial.

Tiedemann A, D Sturnieks, AM Hill, L Lovitt, L Clemson, S Lord, C Sherrington

Institute for Musculoskeletal Health, Sydney School of Public Health, Faculty of Medicine and Health, The University of Sydney, Camperdown, NSW, Australia

Objective: Health and exercise professionals play a crucial role in promoting evidence-based fall prevention exercise to older adults. Little is known, however, about the effectiveness of education programs that aim to develop a workforce with the appropriate skills and knowledge. This trial evaluated the impact of a fall prevention education program, compared with a wait-list control group, on health and exercise professionals' fall prevention knowledge and fall prevention exercise prescription behaviour and confidence to prescribe the exercises to older people.

Methods: A randomised controlled trial was conducted involving individual randomisation to an educational workshop (intervention group), or to a wait-list control group. The two primary outcomes, measured three months post-randomisation, were: a) knowledge about fall prevention; and b) self-perceived change in fall prevention exercise prescription behaviour. Secondary outcomes included: a) participants' confidence to prescribe fall prevention exercise; b) the proportion of people aged 60+ years seen by trial participants in the past month that were prescribed fall prevention exercise; and c) the proportion of fall prevention exercises prescribed by participants to older people in the past month that complied with evidence-based guidelines. Outcomes were measured with a self-report questionnaire designed specifically for the trial. Data were analysed with linear regression models for continuously scored outcomes and with the relative risk statistic for binary outcomes.

Results: Participants were 200 health and exercise professionals (163 (82%) female, 130 (65%) physiotherapists). The intervention had a significant impact on knowledge (between-group difference 0.26/6 points, 95%CI 0.02 to 0.50, p=0.03), clinical behaviour change (RR=5.58, 95%CI 3.3 to 9.6, p=0.0001), confidence (between-group difference 1.02/10 points, 95%CI 1.4 to 0.6, p<0.001) and the proportion of evidence-based exercise, in terms of both the number of exercises prescribed (between-group difference 0.56, 95%CI 0.20 to 0.92, p=0.003) and the dose of exercise prescribed (between-group difference 28 minutes/ week, 95% CI 0.6 to 55.3, p=0.045).

Conclusion: An educational workshop had a significant impact on knowledge, confidence and behaviour in relation to the prescription of exercise for prevention of falls in older age. Further research is needed to determine the long-term impact on clinical practice.
Objective: To assess the effect of exercise interventions for preventing falls in community-dwelling older people.

Methods: Cochrane Collaboration systematic review including randomised controlled trials that evaluated the effects of any form of exercise as a single intervention on falls in people aged 60+ years living in the community. We classified exercise programmes in the included trials into six categories using the Prevention of Falls Network Europe guidelines. Rate and risk of falling were calculated and we pooled data where appropriate.

Results: This review includes 108 randomised trials with 23,407 participants, conducted in 25 countries. Overall, the risk of bias in the included trials was low to moderate. Exercise reduced the rate of falls by 23% (Rate Ratio 0.77, 95% CI 0.71 to 0.83, p<0.001, I^2 56%, 59 trials) compared to control. Exercise also reduced the number of people who fell by 15% (Risk Ratio 0.85, 95% CI 0.81 to 0.89, p=0.02, I^2 27%, 62 trials), number of fall-related fractures by 27% (Risk Ratio 0.73, 95% CI 0.56 to 0.95, p=0.02, I^2 0%, 10 trials), and number of falls requiring medical attention by 39% (Risk Ratio 0.61, 95% CI 0.47 to 0.79, p<0.001, I^2 4%, 5 trials). There was no significant effect on number of fall-related hospitalisations or quality of life.

Three types of exercise reduced rate of falls: balance and functional exercises (Rate Ratio 0.76, 95% CI 0.70 to 0.81), Tai Chi (Rate Ratio 0.81, 95% CI 0.67 to 0.99), and multiple types of exercise (primarily balance and functional exercise plus resistance training) (Rate Ratio 0.66, 95% CI 0.50 to 0.88). There was no statistically significant effect on falls from programmes involving only resistance exercises, dance or walking.

Conclusions: This review provides moderate to high quality evidence that well-designed exercise programmes can prevent falls. Effective programmes primarily involve balance and functional exercises, Tai Chi, or incorporate multiple exercise categories. Future work should investigate the relative impact of different exercise programmes and evaluate the effectiveness of fall prevention programmes in emerging economies.
Influence of health empowerment and level of frailty on intention to participate in physical activity among community-dwelling older adults

Caillouet K, L Cosio-Lima
1Georgia Gwinnett College, Lawrenceville, GA, United States

Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: The purpose of this study was to investigate the influence of health empowerment and level of frailty on intention to participate in physical activity among older adults by using the theory of planned behavior (Ajzen 1985, 1991).

Methods: The Korean Health Empowerment Scale (K-HES) (Park & Park, 2013) was used as a measure of health empowerment. Handgrip strength was used as a measure of level of frailty. Intention to participate in physical activity was measured using five items. Participants of this study included 103 community-dwelling older adults (Mage=76.45±9.395; Male=42, Female=61).

Results: Statistical analyses revealed that all participants were knowledgeable about the health benefits of exercise and most participated in regular physical activity (n=84.5%). The majority had normal handgrip strength (n=60.7%) and most indicated strong intentions to participate in regular physical activity (n=85%). A stepwise multiple regression revealed health empowerment significantly and positively (F(1,101) = 30.511, p < .001, R2 = .232, R2Adjusted = .224) predicted intention to participate in physical activity. Health empowerment explained 23.2% of the variance in intentions. There was no significant contribution of handgrip strength on intention.

Conclusions: The K-HES as a measure of health empowerment provides health educators with the means to examine health empowerment among individuals as a whole, including the tenets of self-control and self-efficacy, and through specific subscales, including problem-solving, decision-making, obtaining support, psychosocial coping, and motivation. Determination of low scores in any one subscale may indicate the need for an intervention addressing that specific subscale in hopes of improving health empowerment scores and resulting in overall positive health behavior outcomes. Future research should explore potential associations between health empowerment and intention to participate in physical activity among community-dwelling older adults.
Study protocol for a RCT on the effectiveness of Active Plus, a computer-tailored physical activity intervention, on the cognition functioning of elderly with chronic conditions

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Physical activity (PA) not only prevents damage to a person's health, but also has a positive influence on cognitive functioning (CF). However, elderly people with a chronic condition (ECC) often do not meet the physical activity guidelines. PA programs for the elderly exist, but these are often expensive and not easily accessible to the ECC. In addition, the beneficial effects of these PA programs on CF have never been specifically tested in ECC. Hence, this RCT aims to test whether Active Plus, a proven effective PA intervention, is able to improve the CF of elderly with ECC or to slow down cognitive decline. In addition, it studies what kind of activity, intensity, duration and frequency of PA most strongly influence CF.

Methods: A randomized controlled trial (RCT) is performed, comparing the intervention group to a waiting list control group (access to Active Plus after a year). In total 540 older adults (=65 years) with at least one chronic condition that limits mobility are recruited from 7 municipalities. Comparable neighborhoods within a municipality are randomly allocated to the intervention or control group. Baseline and follow-up measurements after 6 and 12 months assess MVPA min/week, measured both objectively and subjectively, CF ((working) memory, inhibition, shifting, processing speed). Multilevel analyses are conducted to assess effects on CF, including analyses on moderation effects for PA type and intensity.

Results: The expectation is that the intervention group declined less or even improved CF after the intervention. Baseline data is available for 558 persons (mean age 74,3 years, 52% male). Data collection is completed in July 2019.

Conclusions: It is anticipated that the findings will contribute to our understanding of how physical activity can contribute to cognitive functioning in elderly with chronic conditions, and whether Active Plus is suitable to improve cognitive functioning in this target group via PA. Furthermore, analyses yield insight in effectiveness of type, duration, frequency and intensity of PA on CF.
Promoting health literacy and self-management in older informal caregivers. Demands and needs of action

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective:
Older informal caregivers are considered to be a growing, vulnerable group with multiple strains. Existing support programs are rarely used which indicates a lack in meeting the specific demands of the target group. The purpose of this study was to examine the need for support and the preferred design of support programs for older informal caregivers.

Methods:
Based on Sorensen's health literacy model, a mixed-methods approach was used to identify demands regarding health promotion and self-management of informal caregivers aging 65 years and older. Therefore, focus group discussions (FGD) and interviews with informal caregivers as well as FGD with disseminators were performed. Merging results of qualitative research provided information about preferred types, scopes, topics and communication channels. Next to that, target-group-specific burdens and resources were identified.

Results:
Most FGD participants preferred support programs which combine social interaction with health promotion activities such as physical activity and relaxation. The primary condition to enhance the utilization of support programs is the guaranteed care of the person who requires care. In the course of FGD with disseminators, reasonable cooperations and networks for support programs were determined.

Conclusions:
FGD participants preferred regular long-term support programs focusing on relaxation, physical activity, mental support, social interaction and self-awareness. To enhance the utilization of support programs certain key factors regarding scope, time and accessibility need to be met. A better organized care system, a strengthened competence of informal caregiver to manage care and the enhancement of the caregiver's self-awareness are preconditions of utilizing support programs.
Community participation, physical activity, loneliness and health related quality of life in older adults: an observational study

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

**Purpose**

Improved understanding of physical activity and community participation of older adults in relation to location is required in order to predict health risk factors, and provide environments that promote healthy behaviours. This study aimed to measure the physical activity and community participation of older people and determine their preferred locations for activity.

**Methods**

Fifty-four participants were targeted for recruitment in this study. Participants wore Qstarz BT1000XT GPS device and GENEActiv accelerometer for seven days whilst keeping an activity and community participation diary. Loneliness and health-related quality of life were measured with validated questionnaires. Global Positioning System (GPS) data were analysed to determine the number of locations visited, trips away from home, mean total trips and location type. Types of GPS location visited were grouped into categories (e.g. residential, commercial and health). The GPS and accelerometry data were combined using timestamps to inform the activity location and cross-checked against diary entries. Descriptive statistics were performed to identify relationships between all variables.

**Results**

Preliminary results (n = 10) demonstrate mean activity time of 2.9 hours per day. With an average of 16.5 trips away from home, with social interaction reported for 11.9 trips over a seven day period. A total of 142 locations were reported, residential (n = 30), recreational (n = 31), commercial (n = 30), health (n = 14), local area/greenspace (n = 34), city (n = 1) and place of worship (n = 2). Of the 136 activities, 111 occurred away from home accounting for 82% of all activity over a seven day period. The number of trips away from home was positively correlated with the number of social interactions (p = .012).

**Conclusions**

Preliminary results demonstrate that older adults' number of trips away from home is positively associated with social interaction. Understanding where older people participate in physical activity can inform policy to provide environments conducive to active ageing and community participation.
17051

P1, P1.7

Association of Social and Physical Environments with Older Adult’s Walking for Transportation

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Objective: Previous studies showed different influences of physical environment on walking for transportation and recreation in Chinese older adults. However, these studies did not consider the social environment or examine the dynamic interaction between environments and walking for specific purpose. The current study therefore aimed to examine the associations between physical and social environments and walking for transportation among Chinese older adults in Hong Kong.

Methods: A cross-sectional data from 450 older adults [79 years old or younger (71.9%), and female (79.7%)] from 18 districts in Hong Kong were used. Participants' perceived physical and social environments as well as walking behaviors were recorded through interview and self-report, respectively. A structural equation modeling was applied to examine the proposed relationships between the studied constructs (i.e., physical environment, social environment, and walking).

Results/findings: Results revealed that positive physical environment, facilitators (βa = 15, p < .05) and social environment (βa = .16, p < .05) were associated with increased total walking (χ²(111) = 231.32, p < .001; χ²/df = 2.08; CFI = .902; NNFI = .090; SRMR = .061; RMSEA = .049 [90% CI = .040 to .058]). Next, only positive physical environment, facilitators (βa = .15, p < .05) associated with increased walking for transportation (χ²(111) = 234.76, p < .001; χ²/df = 2.11; CFI = .900; NNFI = .88; SRMR = .062; RMSEA = .050 [90% CI = .041 to .059])

Conclusions: The findings suggest that policy-makers and walking intervention designers should develop strategies to enhance physical and social environments in order to promote total walking and walking for transportation of older adults.

Keywords: environments, walking, transportation, recreation, Hong Kong, older adults
Gait as predictor and/or mediator of falls in glaucoma

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Purpose: To investigate whether gait measures are associated with fall rates in patients with varying degrees of visual field (VF) damage from glaucoma, and if these measures mediate the associations between VF damage and falls. Methods: This was a prospective, observational cohort study. Gait was evaluated using the GAITRite Electronic Walkway. Falls data were collected prospectively using daily falls calendars. Daily steps were evaluated over a seven-day period of accelerometer wear. Mean sensitivities of the integrated VF (IVF) was used to judge VF damage. The relevance of gait to falls was determined in multivariable negative binomial models evaluating the rate of falls over time or per step. Additional models investigated the interaction between gait parameters and IVF sensitivity, and whether gait parameters mediated the association between IVF sensitivity and falls. Results: Two hundred thirty-nine individuals (average age=70.6 years) with glaucoma or suspected glaucoma were included in this analysis. No measure of gait or gait variability were associated with the rate of falls/year (p>0.17 for all), and neither base of support nor stride length were associated with falls/step (p>0.13 for both). More time spent in double support was associated with a more falls/step (p=0.009) while higher gait velocity and faster cadence were associated with fewer falls/step (p<0.05 for both). Among gait variability measures, only greater variability in swing time was associated with a higher rate of falls/step (p<0.001). Measures associated with falls/step but not falls/year were generally associated with fewer daily steps. Gait measures did not mediate the relationship between VF damage and fall rates, nor was there evidence of interaction between gait parameters and IVF sensitivity with regards to fall rates. Conclusions: While gait measures are associated with fall rates, they do not explain the propensity of persons with greater VF damage to fall more frequently, suggesting the importance of other unidentified factors such as, potentially, hazard perception.
Physical activity-based interventions on resilience in older adults: A systematic review and meta-analysis

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Purpose: Physical activity (PA) intervention is identified to be an effective approach to improve the resilience of older adults. To date, no systematic review of the effect of these PA interventions in older adults has been conducted. The purpose of this study is to systematically review and quantify the effectiveness of physical activity to enhance the resilience of older adults. In addition, possible moderating factors were examined.

Methods: A computerized systematic literature searching was conducted in PsycINFO, Medline, Embase, Web of Science, and Scopus before July 2018. Independent title/abstract and full-text screening were undertaken. Inclusion criteria were articles available in full text, human species, journal articles, randomized controlled trials, English as publication language, and subject aged 65 years and above. Two review authors independently screened the searching results and performed data extraction and risk of bias assessment. Information were extracted on characteristics of participants, intervention type, intervention duration and frequency, length of follow-up, improvement of resilience. The methodological quality of all eligible intervention studies was assessed using the Physiotherapy Evidence Database (PEDro) scale. Weighted average standardized mean differences of the intervention-induced adaptations in resilience was computed using a random-effects model and tested for overall and individual intervention effects relative to no-PA controls.

Results: 296 articles were identified by the database searching, 5 intervention studies were included in the final analysis. Compared with control groups, the intervention groups showed significantly greater improvement in resilience. Further, moderator analyses showed that sample, and intervention characteristics influenced the effects of physical activity interventions on resilience.

Conclusions: Physical activity, especially aerobic exercises like Yoga and Tai Chi, is beneficial to increase resilience in the older adults. Future research should clearly describe sample and intervention characteristics.
Rural area-specific neighborhood environment and physical function among Japanese community dwelling older adults

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Although neighborhood environments are known to be associated with older adults' physical activity, research are limited in urban western settings. In addition, the association between neighborhood environment and health outcomes are unclear. The purpose of this study is to examine the cross-sectional association between rural area-specific neighborhood environment attribute: land slope, and objectively measured physical function: grip strength among Japanese community dwelling older adults.

Methods: The study subjects were residents in Shimane where is a rural-mountainous region in Japan, and agreed to participate in the Shimane CoHRE study (>=60 years, n=2,051). Participants were measured for grip strength by digital hand dynamometer twice for each hand. We used the maximum grip strength as continuous outcome. As a primary exposure variable, we computed mean land slope by geographic information system. Mean land slope was calculated within 30 minutes driving network distance from each residential point of the study subject, and the value was weighted based on distance-decay theory. Subjects' driving status (have a license/no license) were collected via face-to-face interviews. Multiple linear regression were conducted for men and women separately, adjusting for age, smoking, drinking, physical activity habit, driving status, and bone musculoskeletal diseases.

Results: Among men, there was a significant positive association between grip strength and mean land slope (Coefficient: 0.33 (95% Confidence Interval: 0.01, 0.65)) after adjusting for all potential confounders. In addition, men without driving license had significantly lower grip strength compared to those with driving license (-1.54 (95%CI: -2.36, -0.71)). Among women, there was no significant association between land slope and grip strength. Women without driving license had significantly lower grip strength compared to those with driving license (-1.48 (95%CI: -1.99, -0.98)).

Conclusions: From this study findings, hilly neighborhood would be a possible environmental attribute that affects physical function among rural older men. In addition, not having driving license potentially limit their activities and lead to physical function decline in both men and women residing in rural settings. It gives a new perspective that region-specific factors such as land slope and driving status are important to better understand population's physical activity and physical function.
Participant experiences of The REACT (Retirement in ACTion) study, a physical activity intervention targeting mobility-related disability in older adults

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Purpose

The REACT study is a large, multi-centre, pragmatic randomised controlled trial (N=777) of a 12-month multi-component programme targeting mobility-related disability in older adults. Nested within REACT, a longitudinal qualitative study aims to better understand older adults' barriers to and facilitators of participation in the REACT programme and maintenance of daily activity at six, 12 and 24 months.

Methods

Seventeen semi-structured interviews were conducted with four men and 13 women (Mean age 76.12, SD 6.99) from five socioeconomically diverse geographical locations of REACT delivery at six months. Stratified purposive sampling by physical functioning (Short Physical Performance Battery scores 4 - 9) and 3-month rate of attendance (High >75%, Low <75%) was employed to maximise variation. Interviews were audio recorded and transcribed verbatim. Data were analysed using Framework Analysis.

Results

The need for better mobility and social engagement were key drivers to participation regardless of baseline physical function or three-month attendance. The group social interaction and the motivation for lifestyle change this interaction facilitated led to high attendance rates. Participants highlighted the important role of exercise leaders in supporting people with diverse levels of physical function exercising in the same group. Improved mobility, balance, strength, confidence and well-being, as well as changes in views towards physical activity (PA) were key outcomes. Health was a key barrier to sustained PA for all participants, whereas transport was a barrier particularly for people with lower attendance rates. All participants had discussed plans for more PA with session leaders and 14 highlighted their intention to do so within the 12 months of the REACT programme.

Conclusions

Physical and social well-being needs were reasons to engage with the REACT programme during the first six months. The professional delivery of the group exercise programme and the encouragement provided by session leaders as well as the positive group social interaction were key factors for programme attendance. The high number of participants reporting having plans in place to increase and maintain daily activity is encouraging. Analysis of 12-month interviews will provide a longitudinal insight into whether and how the REACT programme supported sustained lifestyle changes.
Bouted and non-bouted physical activity: Associations with adiposity in elderly women

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Background: The avoidance of physical activity (PA) is associated with adverse health outcomes; however, it remains unclear what the actual patterns of PA in older adults are and how they are associated with adiposity. Therefore, the aim of this study was to investigate the cross-sectional associations between the total amount and defined bouts of PA with adiposity indicators in elderly women. The project was funded by internal grant (IGA-2018_003).

Methods: Cross-sectional data on 313 community-dwelling women from Central Europe with a mean age of 67 (95% CI 65.8-67.3) years was used. To collect data on PA, all the women wore an accelerometer for one week. Using bioelectrical impedance analysis, following adiposity indicators were obtained: percentage of body fat (FM%), visceral fat area (VFA) and fat mass index (FMI). In multiple linear regression analysis, we adjusted the models for the following confounders: age, wear time, sedentary behaviour, socio-demographic information, smoking, and health status.

Results: The mean values of FM%, VFA, and FMI were 36.1%, 125.9cm² and 10kg/m², respectively. The women reported 38min/day of total moderate-to-vigorous PA (MVPA) on average and 18.9min/day of MVPA accrued in bouts lasting ≥10min. The frequency of MVPA bouts lasting ≥10min was, on average, 1.1 times/day. Light-intensity PA was significantly inversely associated only with FM%, while both bouted and non-bouted MVPA were highly associated with all adiposity FM%, VFA and FMI. Each additional 150 min of MVPA per week (regardless of whether it was accumulated in bouts lasting ≥10min) was associated with a decrease of 2.4% in FM%, 11.7cm² VFA, and 1.2kg·m² FMI. Doing MVPA lasting ≥10min fifteen times a week (to meet the target of at least 150min of MVPA a week) would be associated with a decrease of 4.8% in FM%, 24.15cm² VFA, and 2.55kg·m² FMI.

Conclusions: Significant associations between fat indicators and PA were found in Central European women. The beneficial associations were much larger for frequency than for the duration of bouted MVPA lasting ≥10min. These findings could be useful for designing interventions for community-dwelling ambulatory elderly women.
Engaging older adults in tablet-based interventions

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Objective
The increasing adoption of mobile technologies amongst older adults creates new avenues to deliver ICT-based interventions that impact health behaviours. There are many such products targeting healthy lifestyle and wellness promotion. This study investigated the feasibility of a tablet-based platform to deliver physical activity and brain training interventions. The target group was community-dwelling older adults aged 65+ wishing to counteract mild memory loss. The platform provided a means of engagement to encourage persistent usage of the platform and prolonged adherence to the onboard interventions.

Methods
Using Living Laboratory methodology, the Flinders Assistant for Memory Enhancement (FAME) was developed as a generic platform to host ICT-based interventions (physical activity and brain training). The platform provided a set of simple tools for everyday use including time/date/weather display, calendar/scheduler, and a phoneable image-based contact list. Initial interventions comprised publicly available physical activity and brain training apps selected for their alignment with the target group. Eligible participants participated in a 12-week pilot study on usage of the platform tools and intervention apps. Relevant baseline characteristics were collected at the start and end of the study. A fortnightly questionnaire was pushed to measure the level of confidence of users and their engagement with the apps over time.

Results
The usage pattern of participants was observed to determine whether such a tablet-based platform can contribute to engagement to the interventions and so promote healthy behaviour change. The variables measured to indicate engagement were the number of visits to the functions (tools, physical activity and brain training) per day and the duration of each visit. For all 48 participants, the average weekly statistics were computed for these variables. On average the participants visited/accessed the app 19 times per day (range: 1-188 times) and on average the duration of visits were 13 minutes per day (range: 5-20 minutes).

Conclusion
A slower decline than was anticipated in both variables were observed for the duration of the pilot. Results shows that the behaviour change was sustained above normal level of adherence over the period of 12-weeks.
Weight loss maintenance: reach and effectiveness of a behaviour change program in mid-older adults

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Objective

Australian private health insurers offer chronic disease management programs to support members to manage obesity-related chronic disease. A lifestyle program, Healthy Weight for Life (HWFL), was recently (mid-2017) extended to assist participants maintain weight loss and health benefits achieved through the initial 18-week program. This Long-Term Maintenance Program (LTMP) is novel to the Australian health insurance setting. Although program reach is important to benefit those most in need, little is published about who uses health insurance lifestyle programs or their effectiveness. Addressing this gap, this study assessed the profile of health insurance members who registered and declined to register for the LTMP and reports on six-month program impact.

Methods

The LTMP provides remotely-delivered support to maintain lifestyle behaviour change including portion-controlled eating and regular physical activity. Individuals completing HWFL were invited to join the 24-month LTMP. Recruitment to this study included LTMP participants who consented to evaluation of their data. Socio-demographic details and self-reported anthropometric measures were collected from all participants. A pre- and post-test design was used and descriptive, chi-square and logistic regression analysis conducted.

Results

There were significant differences between LTMP registrants and non-registrants. Registrants (n=245) lost more weight (2.9kg, p<0.0001) and reduced their waist circumference (3.2cm, p<0.0001) and BMI (1.1 kg/m2, p<0.0001) more than non-registrants (n=834). Younger (<55 years, p=0.001), obese (p<0.0001) or greatly increased waist circumference risk (p=0.001) participants were less likely to register. Adjusting for co-variates, obese participants and those from major cities were less likely to register than overweight participants (AOR=2.08, 95% CI:1.44-2.99, p<0.0001) and participants living outside major cities (AOR=1.55, 95% CI:1.09-2.18, p=0.01). HWFL participants lost an average 7.2% body weight during the program and six months into the LTMP, participants' weight loss, waist circumference and BMI changes were maintained.

Conclusions

A maintenance program which includes healthy lifestyle support for sustained behaviour change shows promise with mid-older participants effectively maintaining weight loss for up to six months. Possible implications include improved quality of life and chronic disease outcomes. Opportunities to ensure that the program reaches and retains those most at need such as obese participants is the next critical aspect to explore.
Personal and behavioral correlates of total and specific sedentary behaviors in older adults

HM

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Objective: Evidence of the harmful health effects of sedentary behavior is emerging; however, little is known about domain-specific sedentary behavior correlates. Thus, in this study, the personal and behavioral correlates of total and domain-specific sedentary behavior in older Taiwanese adults were identified. Methods: The sample comprised 1046 older adults (aged = 65 years). Cross-sectional data on self-administered personal behavioral variables and time spent engaging in domain-specific sedentary behavior were obtained using computer-assisted telephone-based interviews. Binary logistic regression analyses were performed. Results: Age than 75 years were less likely to have longer total, computer use, and transport time. Compared with the reference group, older men were more likely to have longer total and transport time. Older adults with low educational levels were less likely to have longer total and computer use time but were more likely to have excessive television (TV) viewing time (= 2 hours/day). Older adults who lived alone and were overweight had longer TV viewing time. Furthermore, unemployment was associated with excessive TV viewing time and shorter transport time. Older adults residing in nonmetropolitan areas had lower total, TV viewing, and computer use time. Older adults who engaged in insufficient leisure time physical activity were more likely to have longer total and transport time. Conclusions: Both common and different personal and behavioral factors were associated with total and domain-specific sedentary behavior. Interventions for reducing total and domain-specific sedentary behavior should focus on both common and different subgroups in Taiwanese older adults.
Physical activity, mood and cognition of older adults living in residential care: an observational study

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose. The aims of this study were to investigate the physical activity of older adults living in residential care, determine associations between activity, mood and cognition, and the feasibility of using accelerometry in this population. There is a paucity of literature investigating physical activity in this population in Australia.

Methods. This study used an observational cross-sectional design. Data were collected in four residential care facilities in metropolitan Adelaide over 18 months. For inclusion, participants had to be independently mobile (+/- walking aids) and have adequate cognition to understand the study aims. People with an acute medical condition, conditions with tremors that may interfere with accelerometry, and severe dementia were excluded. During a face-to-face visit, participants completed a health questionnaire, Mini-Mental, and Geriatric Depression Scale. Activity was measured with 7d, 24h wrist-worn accelerometry (GeneActiv). A self-reported sleep diary was completed by all participants and staff. Descriptive statistics were calculated for all variables. Associations between activity, mood and cognition were explored. Alpha was set at 0.05.

Results. Fifty older adults participated (87±smn;6 years, 56% female). Most participants were single (80%) and all were independently mobile indoors, with 4% using a walking stick, 24% no aids, and 72% a frame/walker. The average Mini-Mental score was 24±smn;5., representing a mild cognitive deficit, and the average Geriatric Depression score was 9±smn;5 (upper end of ‘normal’). On average, participants spent 769±smn;95 min/d sedentary, 96±smn;67 min/d in light activity, and 15±smn;25 min/d in MVPA. The majority of participants (88%) reported the devices were easy to wear, and satisfaction with the study was high, with a mean satisfaction rating of 9±smn;2 out of 10. There was no significant difference in activity between weekdays and weekend days. There were no significant associations between activity, cognition or mood.

Conclusions. Older adults living in residential care in Australia spend most of their day sedentary, and engage in only small amounts of light, and higher intensity activity. The findings of this study demonstrate a clear need for guidelines for activity for this population, and the design of targeted interventions to increase physical activity and break up sedentary time.
Development of a novel app-based self-monitoring and goal setting intervention to help older adults ‘sit less and move more’

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Objective: Being sedentary is associated with poorer cardio-metabolic, musculo-skeletal and mental health in older adults, whilst physical activity is associated with improved health risk, better physical functioning and prolonged independent living. Older adults typically spend 65-80% (8.5-9.6 hours) of their waking day sedentary, and many do insufficient physical activity. Interventions to reduce sedentary behavior, as well as increasing physical activity, are therefore a priority for this age group. We aimed to develop an app-based intervention to encourage older adults to self-monitor and set incremental goals to sit less and move more in their daily lives.

Methods: We conducted two field trials and used a think-aloud approach at five half-day workshops with community-dwelling older adults (N=6-8) to first, iteratively develop a Smartphone/tablet app linked to a pocket-worn sensor and associated online facilitator dashboard to support self-monitoring and goal setting around sedentary behavior (time spent not sitting) and physical activity (step counts). Second, to explore how to motivate older adults to sit less and move more in their daily lives. Logged field trials app usage data were summarized descriptively. Workshops were audio-recorded and detailed field-notes analysed thematically.

Results: Most participants were enthusiastic about the pocket-worn sensor. During field trials, many reported being confident in using the app to review the amount of time they spent not sitting and their daily step counts. Some reported succeeding in changing their behavior; however, logged data revealed that actual app usage and goal setting were variable. The think-aloud approach suggested simple visualizations and highly descriptive terminology ('on your feet time') were most helpful in allowing participants to use the app to understand daily patterns of (non-) sedentary behavior and physical activity. Motivating factors included better physical functioning and health, and finding activities that were enjoyable and/or purposeful (e.g. with other people). Some participants described how 'listening more' to their body (e.g. feeling stiff) encouraged them to break up sitting.

Conclusions: Final versions of the app, online facilitator dashboard, and associated information and training resources are currently undergoing evaluation in a feasibility trial of an individual face-to-face/telephone intervention to support older adults to sit less and move more.
Longitudinal Associations Between Neighborhood Walkability Index and Changes in Physical Activity in Elderly Subjects at High Cardiovascular Risk during an intensive weight-loss lifestyle intervention program

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Background: Many cross-sectional studies have investigated the relationship between neighborhood walkability and physical activity. However, few studies have examined this relationship longitudinally, and no study has examined the association between objective measurement of neighborhood walkability and change in physical activity during an intervention program in older adults.

Method: The present study involved secondary analysis of physical activity data from 218 elderly participants recruited in the PREDIMED-Plus center of Palma de Mallorca (Spain). Physical activity was assessed using the validated REGICOR Short Physical Questionnaire (self-reported leisure-time brisk walking) and accelerometer measures (moderate-to-vigorous physical activity at least in 10 min bouts) at baseline and at 2 follow-up visits (0.5 and 1 years later). We measured the walkability index adapted from Frank et al. (sum of z-scores of net residential density, land use mix, and intersection density) within 0.5 and 1 km sausage network walkable buffer around each participant's home address and used linear mixed-effects models to estimate the association between the walkability index and change in physical activity.

Results: After adjusting for potential confounders, we found that the interaction between baseline walkability index and time was negative for self-reported leisure-time brisk walking and positive for objectively measured moderate-to-vigorous physical activity, but the estimates were not statistically significant in both cases. Otherwise, the interaction between baseline walkability index and intervention group was positive for self-reported and objectively measured physical activity, but the estimates was only statistically significant associated for objectively measured moderate-to-vigorous physical activity (intervention group for each 1-unit increase in walkability index at baseline = 0.13 objectively measured moderate to vigorous physical activity minutes/day, SE: 0.05, P<0.05).

Conclusions: Better walkability index may benefit older adults by enabling them to maintain objectively measured moderate-to-vigorous physical activity as they age during an intensive weight-loss lifestyle intervention program.
Phenotypes of movement behavior pattern after returning home in people after first-ever stroke

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Disease prevention and management (SIG)

Background and Purpose: Movement behaviour, i.e., both the amount of physical activity and sedentary behaviour, are independently associated with health risks. Although both behavior types have been investigated separately in people with stroke, little is known about combined movement behavior pattern and the differences in these patterns between individuals. Nor do we know what factors are associated with different types of behaviour. Therefore the objectives of the study are: 1) to identify movement behavior phenotypes in people with first-ever stroke discharged from facility-based care to the home setting, and 2) explore which factors are associated with the identified phenotypes.

Methods: A total of 190 people with first-ever stroke discharged to the home setting were recruited. Movement behavior was determined by an accelerometer. Phenotypes of movement behavior were identified using k-means clustering algorithm. Activities and participation, demographic, stroke, care, psychological, cognitive and social factors were obtained. Differences between phenotypes were investigated. Univariate and multivariate logistic regression analyses were performed to study specific associating factors per phenotype.

Results: On average the accelerometer was worn for 13.69 hours per day. Mean movement behavior of participants was: 9.25 hours sedentary behavior, 3.81 hours light physical activity and 0.62 hours moderate to vigorous physical activity. Three phenotypes were identified: 1. interrupted sedentary and active group; 2. interrupted sedentary and inactive group; and 3. prolonged sedentary and inactive group. Important factors associated with phenotype one were low levels of fatigue and being a community walker, with phenotype two higher age, higher level of self-efficacy and female gender, and with phenotype three more stroke symptoms, lower level of pre-stroke physical activity and lower level of self-efficacy.

Conclusions: Three movement behavior phenotypes in people with stroke were identified, from which especially in the prolonged sedentary and/or inactive phenotypes movement behavior interventions seem indicated. However, the differences between identified movement behavior patterns and associated factors suggest that a different and tailored approach is needed to adapt to the specific challenges of each specific phenotype.
P1, P1.211

Using an app for identifying environmental barriers and facilitators of walking in older adults of Curitiba, Brazil

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Objective: Describe environmental barriers and facilitators for walking in Curitiba, Brasil, identified by older adults, using the Stanford Discovery Tool app. Methods: The sample was composed by 32 older adults (=60 years old), selected from 64 census tracts distributed by indicators of walkability and income. The older adults had to live in the neighborhood for at least a year and not possessing physical and/or cognitive limitations that impeded walking. The participants walked from 15 to 30 minutes in their neighborhood with a research assistant while using a tablet containing the Stanford Discovery Tool application. The app allowed participants to identify and register environmental barriers and facilitators for walking through geolocated photos and voice recording. Then, the audio records were transcribed and imported with the photos into Atlas.ti software. Content analysis was used to codify the quotes based on the following domains: functional, safety, aesthetics, land use and others. Results: Among the 205 quotes of facilitators identified by the older adults, 40% referred to the functional domain, 26% to land use, 20% to the aesthetic domain, 7% to the security domain and 7% to others. A total of 345 quotes were identified as barriers in which 66% were related to the functional domain, 16% to aesthetics, 13% to safety, 3% to land use and 2% to others. The most commonly reported specific facilitators were presence of sidewalks and good walking surface, presence of parks and proximity/availability of destinations and services. While the most common barriers by the participants were absence of sidewalks, presence of drug users and lack of public clean. Conclusions: The environmental facilitators and barriers of walking were similar to those reported previously in the literature. However, through this methodology it was possible to identify that some features are more relevant in terms of frequency than others. Knowledge of the perceptions of the elderly can help in the decision making of managers thus making the cities healthier and adapted for this population.
How do associations between diet quality and metabolic risk vary with age? A cross-sectional analysis in a UK-representative sample

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective
Higher diet quality shows associations with decreased risk of all-cause, cardiovascular disease, and cancer mortality in adults. To understand whether these associations also apply in younger age groups, we can study proximal metabolic risk factors: abdominal obesity, insulin resistance, hypertension and dyslipidemia. In this study we investigate how associations between diet quality and metabolic risk vary with age.

Methods
We used data (n=2105) from the UK-representative National Diet and Nutrition Survey (2008, 2016), across three age groups: adolescents (age 11-18), young adults (age 19-35), older adults (age 36-60). Four-day food diaries were processed to give an energy-adjusted diet quality index (DASH index). Measures of plasma vitamin C, beta-carotene and lutein were combined to give a fruit and vegetable (F&V) biomarker score. Data on components of metabolic syndrome (waist circumference, blood triglycerides, blood HDL cholesterol, blood pressure, fasting plasma glucose) were combined to give a metabolic risk z-score. We assessed associations of (1) standardized DASH index and (2) standardized F&V biomarker score with metabolic risk z-score, across all ages, adjusted for potential confounders. We tested for interaction of the exposures with the three age groups, to understand moderation of effect estimates by age.

Results
Standardized DASH index (beta=-0.15, CI -0.22, -0.08) and standardized F&V biomarker score (beta=-0.33, CI -0.39, -0.27) were associated with metabolic risk z-score. Both DASH index and F&V biomarker score showed significant interactions with age group, with smaller associations with metabolic risk seen among adolescents and young adults compared to older adults (p<0.05). Associations between F&V biomarker score and metabolic risk remained significant across all age groups (adolescent: beta=-0.17, CI -0.26, -0.07, young adult: beta=-0.26, CI -0.36, -0.17, older adult beta=-0.39, CI -0.47, -0.32) while associations between DASH index and metabolic risk were attenuated below significance in adolescent and young adult groups (adolescent: beta=-0.00, CI -0.07, 0.08, young adult: beta=-0.07, CI -0.19, 0.04).

Conclusions
Higher diet quality was associated with decreased metabolic risk, with stronger associations seen using nutritional biomarkers, compared to self-reported dietary data. Across both diet measures, we found weaker cross-sectional associations between diet quality and metabolic risk in young people compared to older populations.
Long term sustainability of a home-based nutrition and physical activity intervention for rural adults with or at risk of metabolic syndrome

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Purpose: Older adults experience a high prevalence of overweight, obesity and metabolic syndrome, with these health issues being particularly prevalent in neglected rural communities in Australia. This 18 month follow-up study aimed to determine the sustainability of a six-month physical activity and nutrition intervention for 50 to 69 year olds with, or at risk of metabolic syndrome, residing in a rural community.

Methods: This 18-month prospective cohort study followed intervention group participants (n=151) after an initial six-month home-based physical activity and nutrition intervention was completed. Two follow-ups time points occurred at 12 months and 18 months. Outcome measures were: nutrition behaviours (Fat and Fibre Barometer, serves of fruit and vegetables); physical activity behaviours (International Physical Activity Questionnaire Short Form); anthropometry (waist and hip circumference [cm], weight [kg], BMI), systolic and diastolic blood pressure, and blood parameters (triglycerides, glucose, LDL-, HDL-, non-HDL and total-cholesterol). Paired sample t tests and repeated measures ANOVA were performed to assess changes between the three time-points (six, 12 and 18 months post-test).

Results/findings: The overall retention rate from t2 to t4 was 43.7%. Across the three time points (t2, t3, t4) for the 18 month follow-up, physical activity and nutrition intake outcome measures remained stable. A marginal decrease was observed for waist circumference (p=0.001) and an increase in diastolic blood pressure (p=0.010). Between t2 and t4 there was an increase in blood glucose (p=0.001) and a marginal decrease in HDL cholesterol (p=0.039).

Conclusions: This study examined the long-term outcomes of an intervention to improve nutrition intake and levels of physical activity in a rural community. Behaviour change is possible, as shown by the positive impact of the initial 6-month home-based intervention. However, to support healthy lifestyle behaviours in the longer-term, community and organisational supports may need to be implemented. Future studies should look at ways of embedding booster interventions into communities to support health enhancing behaviours.
Can participation in a Latin dance program lead to secondary behavioral changes in adherence to the MIND diet?

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Background: Globally, the numbers of people living with dementia will increase from 50 million in 2018 to 152 million by 2050. Physical activity (e.g. dance) and diet interventions (e.g. Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) diet) have been shown to slow cognitive decline. Growing evidence suggests that targeting one health behavior may increase the potential to change a second health behavior. However, few studies have examined the indirect diet changes that may occur within an exercise intervention. Objective: The purpose of the present study was to examine whether participation in a Latin dance program may induce changes in diet, specifically adherence to the MIND diet. Methods: Older Latinos (N= 22, 67.18±smn;6.42 years old, 63.6% female, 8.95±smn;4.55 years of education) were randomized to either a 4-month Latin dance intervention or a wait-list control group. Dietary intake was assessed using the Block 2005 Food Frequency Questionnaire Spanish Version. MIND diet scores consisted of 10 brain health food groups (green leafy vegetables, other vegetables, nuts, berries, beans, whole grains, seafood, poultry, olive oil, and wine), and frequency of consumption of each food item was assigned a score of 0, .5 or 1. Mixed Analysis of Variance (ANOVA) was conducted. Cohen's d values were subsequently calculated as an estimate of the effect sizes. Results: Mixed ANOVA results show no significant time X group effect for the MIND diet scores, F (1,15) =2.86, p=.11; ?;p2=.11. However, Cohen's d results showed greater MIND diet scores favoring the dance group. For example, there was a large effect size, (d = .78) driven by higher MIND diet scores in the dance group and a decrease in MIND Diet scores in the control group at 4-months, ([Dance, Baseline, 8.46 ±smn; 1.21; 4-months, 9.33 ±smn; 1.60]; [Wait-list, Baseline, 9.30 ±smn;1.68; 4-months, 9.10 ±smn;74]). Conclusions: Participation in a Latin dance intervention produced positive changes in diet in comparison to the control group. Findings suggest that participating in an exercise program may lead to secondary changes in diet. Future studies may consider intervening on both exercise and diet to produce magnified effects on these behaviors.
Isotemporal substitution of sedentary time with sleep time and physical activity on cardiometabolic risk: Results from the PREDIMED-Plus study

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Purpose:
The purpose of the present study was to assess the association of sedentary time measured by accelerometer with cardiometabolic risk factors, including measures of body composition (anthropometry and DXA), blood biochemical parameters and blood pressure. We also evaluated how the substitutions of sedentary time with sleep time and physical activity, affect the cardiometabolic risk. The innovation of the present study is the use of numerous objectively measured variables of both sedentary behaviours and health parameters in a large population, and the use of isotemporal replacement models.

Methods:
A baseline sub-sample of 1605 Caucasian men and women aged 55-75 years, with BMI 27-40 Kg/m2 and the metabolic syndrome, from the PREDIMED-Plus study was used. Sedentary, sleep and physical activity time was determined with accelerometer. For the statistics we had used multiple adjusted linear and logistic regression models.

Results/findings:
Isotemporal substitution of 30 min/day of sedentarism for 30 min/day with sleep was significantly associated with a lower BMI (Kg/m2) (βa; -0.42, -0.67;-0.17, p= 0.001). The substitution of 30 min/day of sedentarism with 30 min/day of light physical activity (LPA) was significantly associated with a lower BMI (Kg/m2) (βa; -0.24, CI95% -0.42;-0.06.), WC (cm) (-0.76, -1.22;-0.30.), VAT (Kg) (-0.07, -0.14;-0.00.), and triglycerides (mg/dL) (-6.20, -10.2;-2.23.). The substitution of 30 min/day of sedentarism with 30 min/day of moderate-to-vigorous physical activity (MVPA) was significantly associated with a lower BMI (Kg/m2) (-0.48, -0.64;-0.31), WC (cm) (-1.36, -1.78;-0.95), total fat (%) (-0.80, -1.16;-0.44), HbA1c (%) (-0.11, -0.15;-0.06), glucose (mg/dL) (-3.91, -5.33;-2.50), VAT (Kg) (-0.07, -0.13;-0.01) and triglycerides (mg/dL) (-10.4, -14.0;-6.81), and with a higher HDL cholesterol (mg/dL) (1.45, 0.94;1.96).

Conclusions:
Sedentary time accumulation was associated with a poor cardiometabolic profile. Guidelines of health lifestyle promotion should be more focused in sedentary reduction, in addition to physical activity and healthy nutrition promotion. Substituting sedentary behaviour for MVPA, and to a lesser extent, for LPA, has great benefits on cardiometabolic health.
Effect of changes in movement behaviours on bone health depending on the changes in the frailty status during ageing: a compositional data analysis

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Purpose: To determine the effect of changes in movement behaviour [physical activity and sedentary behaviour (SB)] during ageing on bone health deterioration as a function of changes in the frailty status.

Methods: For this longitudinal study (4-year follow-up), 227 participants (125 women) >65 years (80.5±smn;4.3yrs) from the Toledo Study for Healthy Aging (TSHA) were analysed twice. The time spent on SB, light physical activity (LPA) and moderate-to-vigorous physical activity (MVPA) were evaluated from accelerometry. Bone mineral content (BMC) and density (BMD) at spine and femoral neck were determined by dual photonic X-ray absorptiometry. The sample were classified depending on the frailty status changes using The Frailty Trait Scale. The statistical system-R was used for the compositional data analysis and, in addition, all models were adjusted for several covariates.

Results: In the subgroup that improved its frailty status, the combined effect of all movement behaviours was significantly associated with spine and femoral neck BMD and, with spine BMC (p=0.05) in the subgroup that maintained its frailty status. In the improved frailty status subgroup, the change in the time spent in LPA in relation to the change in the other movement behaviours was negatively associated with femoral neck BMC (p=0.05). However, the change in the time spent in MVPA was positively associated with femoral neck BMC and spine BMC and BMD (p=0.05). Only the change in the time spent in MVPA related to the changes in the other movement behaviours was positively associated with spine BMC in the subgroup with maintained frailty status (p=0.05). No significant associations were found in the deteriorated frailty status subgroup.

Conclusion: When older people manage to improve their frailty status during ageing, to increase MVPA and to decrease or maintain time spent in SB and LPA leads to improve bone health. Furthermore, this would be beneficial for osteoporosis and bone risk fractures, due to the fact that both body sites are the most appropriated to study these pathologies. Therefore, older people who improved their frailty status during ageing showed more positive bone mass changes compared to those with no changes or deteriorations in their frailty status.
Associations of mutually exclusive categories of physical activity and sedentary time on physical function. Moving more or sitting less?

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: To examine the combination of mutually exclusive categories of physical activity and sedentary time with physical function among older adults.

Methods: 771 older adults (54% women; 76.8 ±smn; 4.9 years) from the Toledo Study for Healthy Aging participated in this cross-sectional study. Physical activity and sedentary time were measured by accelerometry. Physically active was defined as meeting current aerobic guidelines for older adults proposed by the World Health Organization. Low sedentary was defined as residing in the lowest quartile of the light physical activity-to-sedentary behaviour ratio. Participants were then classified into one of four mutually exclusive movement patterns: (1) 'physically active & low sedentary', (2) 'physically active & high sedentary', (3) 'physically inactive & low sedentary', and (4) 'physically inactive & high sedentary'. The Short Physical Performance Battery was used to measure physical function. A multiple linear regression analysis with the behavioural category as independent variable and physical function as dependent variable was fitted with the following covariates: age, sex, education, marital status, and income. The 'physically inactive & high sedentary' category was selected as the reference category.

Results/findings: 'Physically active & low sedentary' and 'physically active & high sedentary' individuals had significantly higher levels of physical function ($\beta_a; = 1.73; IC = 0.77; 2.68$; and $\beta_a; = 1.30; IC = 0.63, 1.98$; respectively; all $p <0.001$) compared to 'physically inactive & high sedentary' participants. However, 'physically inactive & low sedentary' group had not significantly lower physical function ($\beta_a; = 0.31; IC = -0.23, 0.84$; $p = 0.26$).

Conclusions: Physically active older adults had a better physical function than those physically inactive, even in the presence of a high sedentary time. Lower levels of sedentary time seem to confer additional improvements in physical function only among those who meet the physical activity guidelines. However, there are no differences between inactive subjects, regardless of their level of sedentary time. Our findings reinforce the idea that moving more with moderate-to-vigorous intensity reports greater health benefits than sitting less.
Ten-month health education program to reduce sedentary time in elderly people

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: With extreme population aging in Japan, it is important to prevent cardiovascular diseases, fall and fractures, and dementia. In elderly people, decreased physical activity and increased sedentary time result in poor health outcomes. A college for people older than 60 years has been established to learn about health promotion, exercise, and the management of community activity. Its purpose is to initiate community-based health promotion. We expect the participants to experience reduced illness, falls, and dementia and to expend health effect on the community. The aim of this study was to clarify the role of health promotion in the elderly people by investigating whether participants' physical activity increased after attending a 10-month college program.

Methods: The program included 30 participants (mean age, 70.9 ±smn; 5.1 years), who all gave written informed consent. The College for the Elderly Program comprised lessons about health and 60 minutes of exercise every 2 weeks for 10 months. At baseline and at the end of the program, the participants completed the International Physical Activity Questionnaire (IPAQ) and underwent the following tests: 4-m walk speed, 6 minutes' walk, timed up and go, functional reach, stand-up and sit-down chair, and one-leg standing. Paired t-tests were used to compare the baseline and final measurements.

Results: According to the IPAQ responses, the participants' sedentary time at the end of the program had significantly decreased from the baseline; however, there was no significant change in the other physical activity indexes. Compared with the baseline, there were significant improvements in the timed up and go and the stand-up and sit-down chair tests; however, there were no significant changes in the other measures.

Conclusions: The College for the Elderly Program can play a role in reducing the sedentary time in elderly people. Extensive sedentary time can result in cardiovascular diseases, diabetes, and dementia. This program may contribute to the improved health in the participants. However, it remains uncertain whether the program influences health promotion in the elderly. Therefore, this program will be held every year, and this study will continue.
Quality of life and perception of ageing process in elderly living independently and elderly living in the institution

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Healthy ageing, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Purpose: This preliminary results presentation focuses on identifying the quality of life (WHOQOL-BREF questionnaire) and a self-report measure of older people expression on their attitudes to the process of ageing (AAQ questionnaire). The comparison of different level of active life style is done by evaluating older adults living independently and older adults living in institution.

Methods: Czech versions of standardised questionnaires WHOQOL-BREF (World Health Organization Quality of Life Assessment) and AAQ (The Attitudes to Ageing Questionnaire) were used. Personalised surveys has been implemented to compare answers from both questionnaires related next to type of living to different age groups of elderly, sex, family status, physical activity frequency and health condition).

There were 52 responders participating in the research from which 26 of them live at their homes and 26 live in a nursing home.

Mann-Whitneyova U test and Kruskall-Wallis ANOVA test (p=0.05) and Spearman correlation to evaluate relation between WHOQOL-BREF and AAQ questionnaires were used (p = 0, 05).

Results/findings: In the WHOQOL-BREF questionnaire, participating respondents have the highest life quality in environment domain and lowest in the domain of physical health. Statistically important differences were found between age, type of living, family status and health. In the questionnaire AAQ, respondents mostly identified themselves with domain psychological growth. Domains psychological losses and physical changes scored almost the same. Statistically important differences were also found between age, type of living, and health. As per Spearman’s correlation, there has been correlations found in 15 cases, between domains of questionnaire AAQ and questionnaire WHOQOL-BREF out of 20, which points out the relation between self-report measure expression on attitudes to the process of ageing and evaluation of life quality.

Conclusions: This preliminary results support strategies of pre-pensioning active live style programs and importance of maintaining the independency in older age.
How long do mHealth prompts influence self-monitoring and exercise behaviours following a diabetes prevention program?

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E- & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Given the nature of rapidly evolving mobile-health applications, research should focus on irreducible, replicable, and observable components, behaviour change techniques (BCTs). Within exercise apps, the BCTs "self-monitoring" and "prompts/cues" are often used. There is strong evidence supporting use of self-monitoring for promoting exercise adherence. Prompts can increase exercise self-monitoring and adherence; however, studies have not addressed how long following a prompt behaviours are influenced. The purpose of this study was to assess the impact of prompts on app-logged self-monitoring and exercise behaviour in the days following a prompt, to determine whether effects differ based on exercise modality and examine differences in months one-to-six and seven-to-twelve.

Methods: Ninety-nine adults with prediabetes participating in a diabetes prevention program were randomly assigned to high-intensity interval training or moderate-intensity continuous training. In the year following a 2-week diabetes prevention program, all participants self-monitored their daily exercise within an app in which they were also sent personalized prompts. App-logged self-monitoring and exercise data were averaged over the one, three, five, and seven days preceding and following a prompt and were compared using t-tests.

Results: App-logged self-monitoring (t(68)=6.82, p<.001, d=.46) and exercise (t(68)=2.16, p=.03, d=.38) significantly increased in the three days following a prompt compared to the three days preceding. Prompts were most effective in the first half of the year, and there were no differences in self-monitoring or exercise behaviours between exercise modalities (p's>.05). In the first half of the year, app-logged self-monitoring was significant in the three days following a prompt (t(68)=8.61, P<.001, d=.60); and exercise was significant in the three (t(68)=3.7, P=.001, d=.37); five (t(67)=2.15, P=.04, d=.14); and seven days (t(68)=2.46, P=.02, d=.15) following a prompt, whereas no significant changes were found in the second half of the year.

Conclusions: This study provides preliminary evidence regarding the impact of prompts on app-logged self-monitoring and exercise and the duration for which prompts may be effective as exercise behaviour change tools. Future studies should examine optimal prompting frequency on self-monitoring and exercise behaviours. Understanding prompt frequency can encourage consumers to self-monitor using mHealth technology while ensuring prompts are sent when necessary and effective.
Usability test results of smart walk: A culturally relevant smartphone-based physical activity program for African American women

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E- & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

**E- & mHealth (SIG)**

**Objective.** Smart Walk is a culturally relevant, theory-driven smartphone-delivered physical activity (PA) intervention for cardiometabolic risk reduction among African American (AA) women. The Smart Walk smartphone application includes 4 key features: 1) Personal profile pages, 2) PA promotion modules delivered via short videos (i.e., 3- to 7-minutes) and electronic text with images, 3) Discussion boards, and 4) a PA self-monitoring/tracking tool integrated with Fitbit activity monitors. Participants also receive 3 PA promotion text messages each week during the intervention. This presentation reports results of the Smart Walk usability trial.

**Methods.** The trial was designed to identify usability/functionality issues associated with the smartphone-delivered intervention and to obtain preliminary feedback on intervention acceptability prior to larger-scale testing. Participants (n=12 AA women; M age 35.0 ±smn; 8.5 years, M BMI 40 ±smn; 5.0 kg/m2) received the Smart Walk intervention, originally designed to be delivered over 8 months, in an abbreviated 1-month period. Qualitative data were obtained during the trial with weekly telephone calls and/or email communication and at the end of the trial during focus group (n=2) and individual interview sessions (n=6). Content analysis using NVivo data analysis software was used to categorize participant narratives.

**Results.** Findings were classified into three key themes. 1) Usability/functionality issues. These included: audio not playing on select Android devices, prolonged video buffering when the internet or cellular connections were limited, and intermittent issues with the Fitbit monitors integrating with the activity tracking feature. 2) Enhanced individual-level tailoring. Participants expressed the desire for: a) personalization of app features (home page, activity trackers) and text messages, and b) the option of uploading pictures and to share more in-depth personal information (i.e., neighborhood of residence, brief biography) on their profile pages. 3) Overall impressions of the intervention. Participants expressed that the intervention was useful and relevant, and motivated them to be physically active.

**Conclusions.** The Smart Walk intervention was refined based on the usability trial results and is currently being tested in an 8-month randomized controlled trial (n=60). Results from this trial emphasize the importance of conducting usability and acceptability testing for mHealth interventions prior to larger-scale implementation.
Engagement and churn within an app-based physical activity intervention

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E & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose The success of a smartphone application (app) is contingent on usage, commonly operationalised in terms of frequency of engagement and churn (percentage of users who have abandoned the app). This study aimed to examine participant engagement and churn with an app-based physical activity intervention.

Methods Three hundred and one inactive Australian adults were randomised to either a social and gamified (n=141), or basic (n=160) physical activity app. Demographic characteristics (sex, education level, age, body mass index) were collected at baseline and levels of physical activity were assessed via accelerometry and the Active Australia Survey. Participant interactions with their app were captured in a real-time data log (days of step logging) over the 100-day intervention. Survival analysis was used to examine the number of days until churn occurred (30 days non-use) and Cox regression was used to determine predictors of churn.

Results The average daily users engaging with the app remained high (above 70%) in both groups until week ten and then began to decrease, and more rapidly for users of the basic app. By week twelve the average number of daily users dropped to 62% and 54% for the gamified and basic groups, respectively and to 36% and 22% by the final week (week fourteen). Churn was significantly lower in the gamified group, with a median time until churn of 93 days (95% CI 88.9 to 97.1), compared to 85 days (95% CI 81.1 to 88.9) for the basic group (χ² (1) = 9.4, p=.002). Cox regression indicated that being older decreased the likelihood of churn (HR .55, 95% CI .38 - .80, p=.002), whereas having a BMI classified as obese was associated with an increased probability of churn occurring (HR 1.44, 95% CI 1.0, 2.1, p=.048).

Conclusion Engagement with the app was generally high across the intervention period. Participants in the gamified group churned later than those in the basic group, perhaps indicating that the gamified app was more appealing to use. Demographic characteristics were related to churn, whereby older users were less likely to churn and users with obesity were more likely to churn, regardless of which app they used.
Prostate and colorectal cancer patients and survivors choice of a physical activity program delivery channel: effects on use, appreciation and motivation

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e & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: OncoActive is a computer tailored physical activity (PA) program for prostate and colorectal cancer patients and survivors (CPS). This self-help program stimulates and guides CPS increasing PA. It consists of three personalized advices, a pedometer and an interactive website. The advices are delivered online and in print. Users choose their preferred delivery channel or use both. Goals were to 1) gain insight in the effect of the chosen delivery channel on use and appreciation of OncoActive and the extent to which the program influenced motivation to be physically active; 2) to assess whether the use, appreciation and motivation differed between subgroups.

Methods: This study was part of a RCT in Dutch adults diagnosed with colorectal (40.2%) or prostate (59.8%) cancer who underwent treatment with a curative intent or successfully completed treatment. Participant were randomly assigned to the program or control group and received questionnaires at baseline (T0), after three (T1), six (T2) & twelve months (T3). We included the OncoActive group (N = 249). Based on the most used delivery channel, participants were assigned to the online (N = 99) or print (N = 125) group for the analyses.

Results: Most participants have read the advices completely or partly, either online, on paper or both; for example the first online advice was read on only paper by 43%, only online by 11% while 47% read both. Pedometers were highly used (80.9%) and proposed exercises reasonably (53.3%). Percentages of use were higher in the online group as well as appreciation and motivational impact of the advices. The perceived influence of the program elements on motivation to be active was significantly higher in the online group. Age was positively related to appreciation (B = 0.023, p < .05) and motivation for PA (B = 0.012, p < .05). High education was negatively related to appreciation (B = -0.600, p < .01), motivation (B = -0.376, p = .00), and usage (B = -0.553, p < .05) compared to low education.

Conclusions: Delivery channel and participants' characteristics influence use, motivation and appreciation of OncoActive, with users of online materials being more positive.
Web-based intervention using behavioural activation and physical activity for adults with depression (The eMotion Study): Pilot Randomized Controlled Trial

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E- & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Physical activity is a potentially effective treatment for depression and depressive relapse. However, promoting physical activity in people with depression is challenging. eMotion is a Web-based intervention combining behavioural activation and physical activity promotion for people in the community with symptoms of depression. The objectives were to assess the feasibility and acceptability of delivering eMotion to people in the community with symptoms of depression and to explore outcomes.

Methods: People with elevated depressive symptoms were recruited from the community and randomised to eMotion or a waiting list control group for 8 weeks. eMotion is a web-based, modular intervention that supports people to use key behaviour change techniques to re-engage in routine, pleasurable, and necessary activities, with a focus on physical activities. Feasibility data were collected as well as data for the primary (depression) and secondary outcomes (e.g. physical activity) at baseline and 2 months post-randomisation using self-reported web-based questionnaires and wrist-worn accelerometers. Delivery fidelity (e.g. logins, modules accessed, time spent) was tracked using web-usage statistics. Exploratory analyses were conducted on the primary and secondary outcomes.

Results: 62 participants were recruited. The mean baseline score was 14.6 (SD 3.2) on the 8-item Patient Health Questionnaire depression scale (PHQ-8). 52 participants provided accelerometer-recorded physical activity data at baseline showing a median of 35.8 (interquartile range [IQR] 0.0-98.6) minutes of moderate-to-vigorous physical activity (MVPA) recorded in at least 10-minute bouts per week. The median number of logins, modules accessed, and total minutes spent on eMotion was 3 (IQR 2.0-8.0), 3 (IQR 2.0-5.0), and 41.3 (IQR 18.9-90.4), respectively. Acceptability was mixed. Exploratory data analysis showed that PHQ-8 levels were lower for the intervention group than the control group at 2 months post randomisation (adjusted mean difference -us;3.6, 95% CI -us;6.1 to -us;1.1).

Conclusion: It was feasible to deliver a web-based intervention combining behavioural activation and physical activity to inactive populations. Subject to some minor refinements, eMotion is now ready for testing in a full-scale trial. The intervention showed promise in reducing depression and provides valuable information for estimating sample sizes for a larger trial.
Compliance and challenge-specific trends in a real-time team-based intervention to promote stepping and stair-climbing activities

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Objective: This study aimed to investigate day-to-day compliance and challenge-specific trends in stepping and stair-climbing throughout a 6-week real-time mHealth intervention.

Methods: Staff and students from the National University of Singapore were recruited between 2015 and 2016. All participants received physical activity (PA) wearables (Fitbit™ Charge, ChargeHR) and were allocated to control or intervention group. The intervention participants were randomized to 4 teams to use an mHealth suite (comprising smartphone applications supported by a web-based data management system). The study was organized into 3 phases which ran during the weekdays: Baseline (1st week), Intervention (2nd to 7th week) and Free-living (8th week). Intervention consisted of 6 weekly stepping or stair-climbing challenges integrated with behavioural change techniques delivered in real-time through the mHealth suite. 'Completers' (i.e. participants who provided complete covariates and PA data at baseline and end of intervention) were included for further assessment. Main outcome was participants' compliance to using PA wearables measured by number of valid (=1,500 steps/day) person-days aggregated across the 40-day study period. The mean proportion of valid person-days across the 40 days was compared between two groups using the 2-sample t-test. Challenge-specific activity levels were described as steps/day (for stepping challenges) or floors/day (for stair-climbing challenges).

Results: Among the 40 eligible participants allocated to intervention (n=20) and control (n=20), 24 participants (Intervention: 11; Control: 13) were completers. The completers had median age of 28 years and majority of them were female (62.5%) and Chinese (83.3%). Over the 40-day study period, there was a significant difference in the mean proportion of valid person-days, favouring the intervention group (0.92 vs. 0.83; p-value<0.001). Challenge-specific activity levels varied between the two groups. During the stepping challenges, the steps/day [median (25th-75th percentile)] for the intervention and control groups were 10,005 (8,807-10,387) and 9,434 (9,107-10,131), respectively. During the stair-climbing challenges, the floors/day were 18 (16-20) and 13 (12-18) for the intervention and control group, respectively.

Conclusions: This mHealth-based real-time intervention showed potential in improving compliance to using PA wearables among the targeted population as well as in increasing activity levels. Future studies with larger sample and long-term follow-up are needed to corroborate our findings.
Objective: The purpose of this study was to evaluate wear time and accuracy of a consumer-based physical activity tracker worn for up to one year, among participants taking part in a complex intervention feasibility study aimed to investigate novel tools for long-term maintenance of lifestyle change.

Methods: Sixteen people (5 women) with obesity (mean body mass index 35.6±smn;5.3) aged 57-74 years (mean age 66.1±smn;5.8) with sedentary lifestyle and elevated cardiovascular risk, participated in a 6-month feasibility study including exercise, nutritional counselling, and behavior change group sessions. Objective measures for physical activity were collected using an ActiGraph wGT3X-BT, worn on the right hip, for one week at baseline and one week after intervention end. A Polar M430 pulse watch was worn on the non-dominant wrist during the entire intervention period, and for an additional six months after. Steps and physical activity intensity were compared between the Polar and ActiGraph devices. The first valid day (wear time>10 hours) available for both the ActiGraph and the Polar device was used. Pearson correlation was performed for sedentary behavior, light-, moderate-, and vigorous physical activity, as well as for moderate-to-vigorous physical activity (MVPA) and number of steps.

Results: From the available 365 days of tracking, mean number of valid days were 293±smn;86. Half of the participants had less than 30 non-valid days, spread throughout one year of recording. The correlation for light intensity physical activity and steps were 0.69 (p=0.005) and 0.94 (p<0.001), respectively. There were no significant correlations for sedentary behavior, moderate physical activity, or MVPA between the Polar M430 and ActiGraph.

Conclusions: In this study, adherence to wearing the Polar consumer pulse watch was high. Compared to the ActiGraph, the Polar only produced accurate results for steps and light activity intensity. This is partly in contrast with earlier findings, which also reports a strong correlation for MVPA, and a moderate correlation for vigorous, moderate, and sedentary behavior. Results indicate that it is feasible to use a consumer-based activity tracker to measure physical activity for a longer time period, but further research is required to determine device accuracy.
The START App: Development and evaluation of a mobile application to optimise behaviour change in inactive employees participating in a motivationally-embellished peer-led walking intervention

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Objective: We evaluated the use of an app we specifically built to support inactive office employees to increase their walking during a 16-week randomised control trial (the START trial). This is the first app integrating Self-Determination Theory principles of motivation-supportive communication with 13 purposefully chosen behaviour change techniques. We aimed to explore the acceptability of the app and examine if weekly app engagement positively predicted weekly changes in step counts.

Methods: Insufficiently physically active employees (M age = 44.75 ± 9.78 years, female=31 male=6; M BMI = 29.12 ± 6.14) from the experimental arm of the START trial had access to the app. A mixed methods design was used to evaluate the app, including surveys (User Mobile App Rating Scale), app usage data (retrieved from a server), step counts (measured via Fitbit Zips), and individual interviews (n=11). App engagement was operationalised as number of times participants entered their daily steps on the app (i.e., a self-monitoring exercise) and number of planned walk activities they logged on the app. Mixed linear modelling and inductive thematic analysis were used to analyse quantitative and qualitative data, respectively.

Results: Walkers rated the app quality favourable (M=3.68 out of 5). Some of the main interview themes were confidence in achieving goals, being motivated when feeling "lazy", and motivational messages being inspiring. Participants reported that specific app functions (entering daily step counts from Fitbit, reminders, and motivational messages) assisted in fostering goal achievement, particularly at the beginning of the intervention. The number of times participants entered their step counts on the app on a weekly basis was positively related to weekly step counts recorded by the Fitbits (beta = 156.11 [95% CI= 14.15-298.08]; p=.03). There was no association between logging planned walking activities and weekly step counts.

Conclusions: The app was largely perceived favourably by the participants. Daily entering of step counts on the app could support physical activity behaviour change. The START app may be a useful component of walking interventions designed to increase walking in the workplace, because unlike many other apps, it targets specific means to support participants' self-determined motivation for behaviour change.
Unravelling mobile exercise interventions: A critical examination of the technical and practical implementation of persuasive strategies

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Purpose: It is not well understood why some mobile physical activity (PA) interventions effectively support PA and others do not. In this paper we argue that this lack of understanding is grounded in the enormous variety of evaluated mobile exercise interventions, not only with regard to the utilization of different combinations of persuasive strategies but also their diverse technical and practical implementations. Therefore this review aims to examine to what extent the implementation of persuasive strategies might influence the effectiveness of mobile exercise interventions.

Methods: A snowball and grey literature search had been performed. First, we identified which persuasive strategies are likely effective by examining previous reviews of traditional and mobile exercise interventions on persuasive strategies. Next, we identified mobile PA interventions (i.e. interventions based on wearable technologies, SMS messages and/or mobile applications) that evaluated these persuasive strategies in the context of mobile PA interventions generally confirmed the effectiveness of these strategies. As hypothesized, the way persuasive strategies are being implemented in mobile interventions can influence its effectiveness. For example, the effectiveness of rewarding with points is shown to be dependent of what is being rewarded, i.e. rewarding 'each step' or rewarding a 'step goal achievement' resulted in a different outcome. And, using an algorithm to determine an adaptive, tailored and assigned goals is likely more effective than a static assigned goal.

Conclusions: By exploring the different forms of implementation of persuasive strategies in mobile PA interventions this paper sheds light on the gap between theory-based strategies and its application in mobile interventions. To advance the research field, future studies should pay closer attention to the practical and technological implementation of persuasive strategies, as this influences the study results.
Attitudes towards using apps for physical activity promotion among adults aged 50 years and above: Results of the BEWAPP study

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Objective: International studies have examined different aspects of attitudes toward the use of evidence-informed apps for physical activity (PA) promotion among adults aged 50 years and above. In Germany, little is known about attitudes towards such apps in this population. The aim of the focus groups conducted with smartphones owners aged 50 years and above was to gain insights into attitudes, acceptance, and utilization preferences of smartphone applications (apps) for PA promotion.

Methods: Focus groups were conducted with users and non-users of PA and fitness apps following an interview guide. Factors influencing use were discussed, as well as attitudes towards using a specific evidence-informed PA and fitness app (i.e., Health Mate). Interviews were transcribed and analyzed following structured qualitative content analysis.

Results: Overall, experienced users of PA and fitness apps rated the use of such apps slightly more positively than non-users. Users and non-users of PA and fitness apps stated that they would like an app which was easy to use with only a few features for PA promotion. Manual entry of PA data was rather disliked and focus group participants preferred automated tracking. Feedback for self-monitoring of PA and social comparisons were considered helpful for PA promotion and for reaching personal PA goals. However, there were concerns about data safety. Features of the evidence-informed app Health Mate (e.g., feedback, badges) were appreciated by different participants to a varying degree.

Conclusions: PA and fitness apps were appreciated by both users and non-users aged 50 years and above but with caution. Minimal user effort seems essential for motivating the use of B&F apps among both users and non-users aged 50 years and above.
Validating heart-rate measures of two activity trackers in a laboratory and free-living setting

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Purpose: Using high-end and low-cost wrist-worn trackers to monitor heart rate has become increasingly popular. However, the validity of heart-rate data obtained from wrist-worn consumer fitness trackers was only assessed in laboratories with small sample sizes using mainly costly devices. We investigated the validity of heart-rate measures of a well-established and a low-cost consumer tracker in the laboratory and free-living setting.

Methods: In the laboratory, participants underwent a cycling protocol while wearing the popular Polar A370 and the low-cost Tempo HR. The chest-strapped Polar H10 served as criterion. Hereafter, participants wore the devices throughout waking hours of the next day during which they completed at least one 10-minute bout of moderate-to-vigorous physical activity (MVPA). We extracted 1-second data from Polar H10 and Polar A370, and time matched them with the 10-second data from Tempo HR. We calculated Pearson- and intraclass correlation coefficients (ICCs), mean absolute errors (MAE) and mean absolute percentage errors (MAPE) between the criterion and the trackers. We estimated accuracy of the trackers to identify time points in the MVPA heart-rate zone (=50% of maximum heart rate).

Findings: Of 57 people screened 55 joined the study (mean age: 30.5 years). Laboratory phase: Tempo HR showed moderate agreement with the Polar H10 (ICC 0.51), while errors were somewhat large (MAPE 13.0%). Polar A370 showed moderate to strong agreement and small errors when compared to Polar H10 (ICC 0.73, MAPE 6.4%). Tempo HR identified 75.9% of all MVPA heart-rate time points while Polar A370 detected 86.8%. Free-living phase: Tempo HR showed moderate to strong agreement with the Polar H10 (ICC 0.71), and errors were close to the acceptable cut-off of 10% (MAPE 10.2%). Polar A370 showed strong agreement (ICC 0.83) and reasonably small errors (MAPE 7.1%). Tempo HR identified 72.1% of MVPA heart-rate time points, while Polar A370 detected 92.4%. Overall, agreement was lower and errors larger in the laboratory versus the free-living phase. Some patterns based on participant characteristics were observed.

Conclusions: Both trackers showed reasonable accuracy in the free-living setting. This is encouraging as these trackers are designed to function well in the real world.
Glucose variability and mood in the free-living environment: Combining continuous glucose monitoring and ecological momentary assessment in adolescents

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e & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Adolescents with diabetes are at elevated risk for mood disorders. Glycemic variability may influence mood; however, findings are limited to lab studies. No prior studies have investigated time-varying relationships between glucose and mood as they occur in free-living settings. Therefore, the aim of this study is to assess the within-day associations between interstitial glucose levels and mood during the daily lives of healthy youth.

Methods: Participants (N=11, mean age=13.0±1.18 years old, 18.2% male, 45.5% Hispanic, 63.6% healthy weight) wore a continuous glucose monitor for 7-14 days. During the same time period, participants reported on current moods (positive affect, negative affect, stress, and fatigue) up to 7 times per day via ecological momentary assessment (EMA). Mean glucose levels across the time intervals between EMA prompts were calculated. Within- and between- subject terms for glucose values were generated using person- and grand- mean centering, respectively. Linear multilevel models with autocorrelated residuals assessed the within-subject association between mean glucose level occurring since the previous EMA prompt and reported mood at the current EMA prompt. Models controlled for age, sex, ethnicity, maternal education, body mass index percentile, weekend vs. weekday, and between-subject glucose. EMA-reported dietary intake, physical activity, and sedentary behavior were tested as confounders.

Results: Participants provided 204 glucose-matched EMA reports of mood; glucose ranged from 78.63 to 155.40 mg/dL. On occasions when glucose was higher than one's own mean, higher positive affect was subsequently reported (βa=0.007, p=0.020). Variation from one's own mean level of glucose was unrelated to subsequent negative affect (βa=-0.004, p=0.131), stress (βa=0.002, p=0.504), and fatigue (βa=-0.003, p=0.176). Dietary intake, physical activity, and sedentary behavior did not confound the above associations.

Conclusions: This is the first study providing evidence that within-day glucose fluctuations may relate to subsequent changes in mood among healthy youth. Investigation as to whether similar associations appear in individuals with type 1 and type 2 diabetes may provide insight into the disproportionate prevalence of mood disorders in youth with diabetes.
Dietary pattern recognition in Twitter: A case example of before, during, and after a natural disaster

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Objective: While there is widely available information on what foods and drinks should be on hand to prepare for a natural disaster, little is known about what foods/beverages (F&B) are common during natural disasters. The goal of this study was to track high frequency F&B mentions before/during/after Hurricane Florence for quantifying dietary patterns in Twitter.

Methods: A listing of common F&B (n=200) was created from the top food sources of energy, fat, protein, and carbohydrates in the US. A sampling of >150,000 tweets containing #HurricaneFlorence or "Hurricane Florence" were collected during the six days before and after two days during Hurricane Florence using Crimson Hexagon, a Twitter data provider. Descriptive statistics were used to examine the top most frequently mentioned F&B (top mentioned threshold defined as > 4 mentions/day for each F&B item which equated to 10% of the foods mentioned) and whether F&B were top sources of energy or macronutrients.

Results: More than 32,000 mentions of F&B were collected in our sample. Considering the threshold, we found 20, 18, and 24 F&B mentions pre-, during, and post-hurricane, respectively. Most commonly tweeted food groups were the same at all time points: Beverages (20% pre, 28% during, and 17% post), Meats (20% pre, 22% during, and 38% post), Eggs/Beans/Seeds (15% pre, 11% during, and 8% post), and Fruit (15% pre, 17% during, and 17% post). Of the F&B mentioned, 32%, 39%, 18%, and 32% were top sources of energy, protein, fat, and carbohydrate, respectively. One food (pie) was categorized as a top contributor across all energy and macronutrient categories, three F&B mentions (turkey, chicken, and poultry) were common across three energy and macronutrient categories, and two F&B mentions (dairy and oil) were common across three energy and macronutrient categories. The top five most commonly mentioned F&B overall were gin, rum, tea, ham, and liver.

Conclusion: Foods mentioned on Twitter during Hurricane Florence were commonly energy-, protein-, and/or carbohydrate-dense. Social media may be a unique way to detect dietary patterns and help inform recommendations for what foods are appropriate during natural disasters.
Food in the Spotlight - an online tool for consumers

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E & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective:
The Childhood Obesity Surveillance Initiative (COSI) showed that many children in Austria are overweight or obese. A starting point to tackle these problems is helping consumers in improving their food choices. The online tool "Food in the Spotlight" was developed for consumers (specifically parents) to make comparing nutritional information of food products easy. "Food in the Spotlight" creates the foundation for cooperation with food manufacturers and increases the incentives for implementation of reformulation strategies.

Methods:
The Austrian Agency for Health and Food Safety (AGES) published "Food in the Spotlight", which is optimized for mobile devices, on www.lebensmittellupe.at in September 2018. Firstly, brands and products of carefully selected food groups were identified via online research. Product information such as nutritional information, age of suitability, ingredient list, filling quantity and packaging design were recorded from manufacturers' websites or from photos taken in drug stores and food retailers. The data were collected following a standardized method developed for EU Joint Action on Nutrition and Physical Activity (JANPA).

"Food in the Spotlight" is supported by the Federal Ministry of Health and co-funded by the financial means of the Austrian Pharma Framework Contract.

Results:
Consumers can choose among groups of food products. For selected products, contents of sugar, salt, fat, energy and additional information are displayed. Products can be sorted by nutrient content (e.g. sugar content from low to high).

Our quantitative analysis found considerable variations for all nutrients in all groups (e.g. Pizza: 11-55 g fat per pizza or Breakfast Cereals: 0.3-43 g sugar per 100 g). However, there are alternatives in all groups with lower amounts of sugar, salt and fat.

It was also shown that breakfast cereals with a packaging design appealing to children (e.g. mascots, cartoon-style imagery) contain significantly more sugar (P<0.001) per 100 g than breakfast cereals marketed to the general population.

Conclusions:
Providing easily accessible nutritional information can make comparing products for consumers less time-consuming and more convenient.

The assortment of food products is subject to constant and rapid changes. To provide current data to consumers via online media or mobile apps, cooperation with food manufacturers is necessary.
A population health information management system to monitor change in the food environment in health facilities

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Objective: Electronic technology offered the New South Wales (NSW) Ministry of Health an innovative way to assess the food environment in health facilities. We aimed to design, develop, and deploy an easy-to-use, reliable, electronic tool (e-tool) to support local implementation, and state-wide annual monitoring of ‘Healthy Food and Drink in NSW Health Facilities for Staff and Visitors Framework’ (Framework) launched in June 2017.

Methods: An iterative design and development process was undertaken. This involved; observing a paper-based monitoring process; a literature scan of validated electronic tools to assess retail and vending in health facilities; and, drawing lessons from NSW Health programs. Organisational guidelines for local implementation, technology and infrastructure were considered, and implementation champions sought to represent the contractual and nutrition user requirements of property managers and health professionals. Concurrently, a new food and drink benchmark underpinned the development of a set of key practices to monitor the benchmark. Key practices were tested using the e-tool for inter-rater reliability (IRR).

Results: An off-the-shelf customer relationship management system was identified as the preferred e-tool. The resulting e-tool, PHIMS-N, was launched in Feb-2018 across NSW. A PHIMS-N associated application enabled non-nutrition expert users to collect data against key practices using a tablet device. These data, and data relating to 612 NSW Health facilities, 100+ retailers with food and drink operations in 941 food outlets are managed and reported on in PHIMS-N to support local implementation.

Following a training program, the inaugural annual survey was undertaken by field-officers over 2-weeks, completion rate was 100%. IRR testing showed 10/13 practices had substantial agreement (kappa >0.70) (n=135 paired surveys).

Conclusions: PHIMS-N is a highly novel, easy-to-use e-tool to reliably and systematically monitor change in the food environment against a set of key practices whilst also supporting local implementation.
A web-based intervention to promote healthy diets for toddlers: The Food4toddlers study

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Objectives:
Eating habits are established during early childhood and track into adolescence and later in life. Eating habits have a large public health impact e.g. by influencing childhood obesity worldwide. Effective, evidence-based interventions promoting healthy eating habits in the first 2 years of life is therefore warranted. The aim of this study was to assess baseline description of food choice among toddlers by targeting parents.

Methods:
A 6-month e-Health intervention called Food4toddlers was developed, with the extensive user involvement of health care nurses and parents of toddlers. The intervention website included recipes, information, activities, and collaboration opportunities. To evaluate the intervention, a two-armed pre, post-follow-up randomized controlled trial was recently conducted in Norway. Parents of toddlers (n=404) were recruited via social media (Facebook) and 298 provided baseline data (parent questionnaire) of their toddler (mean age 10.9 months). After baseline measurements, participants were allocated to an intervention or control group. Follow-up measurements are planned at 18 months, 2 years, and 4 years. Bivariate correlation analyses were performed to assess associations between food choice motives and both feeding practices and child diet. The present study presents results at baseline.

Results:
At baseline, the children's mean daily intake of fruit servings was 2.85 (SD= 1.60) and vegetables 3.15 (SD= 1.59). The food choice motives that the parents ranked highest was sensory appeal (5.35, SD= 0.96), health (5.15, SD= 0.92) and convenience (5.09, SD= 0.96). Price was ranked lower (4.26, SD= 1.39) and familiarity (2.71, SD= 1.21) was the least important food choice motive. The most frequently used feeding practice was encouraging balance and variety (3.57, SD= 0.46), modeling (3.29, SD= 0.69) and shaping the environment (3.08, SD 0.78).

Conclusions:
Preliminary results at baseline show that the intake of fruit and vegetables among toddlers are lower than the dietary guidelines. Sensory appeal was ranked high among the parents while prize was ranked lower. Insight into toddler's dietary habits may contribute to interventions promoting a healthier lifestyle.
“Quick and easy meals for the kids”: Perceptions of processed foods among low-income and immigrant parents

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E & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Highly-processed foods make up a significant portion of children's diets and offer an actionable target for nutrition education campaigns. Parents, as principal household food purchasers, are key influencers of child eating patterns. Parent-aimed guidance on processing may help to limit highly-processed foods in children's diets, but little is known about parent understanding and perceptions of processed foods. This study sought to determine how parents conceptualize processed foods in terms of classification and healthfulness.

Methods: Six focus groups with lower-income, racial/ethnic minority and immigrant parents of 4th-6th graders (n = 37) were conducted. Parents were asked to discuss their views on vocabulary related to food processing, classification of foods according to their processing level, the healthfulness of select foods and criteria for choosing snacks for their children. Focus groups were audio-recorded and transcribed verbatim. Analyses were performed using NVivo 12 (QSR International).

Results: Thirty mothers and seven fathers participated in the study. Roughly two-thirds (62%) were immigrants, and the majority (38%) identified as Hispanic, followed by Non-Hispanic black (24%). Participants associated highly processed foods with convenience, packaging, and added ingredients (sugar, salt, and preservatives); homemade versions were perceived as healthier and more time-consuming. Immigrants were more likely to describe processed food as home-cooked and "ready to eat." Parents cited their child's preferences and healthfulness as their main criteria for choosing snacks.

Conclusions: Parents' conceptualization of processed foods varied by immigrant status, suggesting that cultural background may influence attitudes about processing. A universally accepted definition of food classification by processing level is necessary to effectively communicate the link between processing and healthfulness to parents.
The evaluation of an educational portion size app, ServAR, for pregnant women

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Objective: Hyperglycemia in pregnancy increases the risk of adverse pregnancy outcomes. Modifying consumption of types and amounts of foods rich in carbohydrate helps regulate blood glucose levels. Pregnant women need knowledge regarding which foods contain carbohydrate and appropriate serving sizes. The aim of this study was to evaluate the acceptability and usability of ServAR, an app with nutrition information relating to carbohydrates and general nutrition during pregnancy, along with an augmented reality component to guide portion control. In addition, the effectiveness of ServAR in improving the carbohydrate and standard serve size knowledge of pregnant women was assessed.

Methods: An online survey assessed carbohydrate knowledge and knowledge of Australian Guide to Healthy Eating standard serve sizes of carbohydrate foods among pregnant women. An optional face-to-face session two weeks later involved participants being provided with ServAR and encouraged to use it to assist everyday eating choices. A follow-up survey was sent to all women 4 weeks after baseline, with those women who attended the face-to-face session also sent a process evaluation survey at 12 weeks. The survey examined the acceptability, usability and self-assessed change in eating habits and portion size awareness after using ServAR.

Results: Responses were received from 186 pregnant women and 97 completed the follow-up survey. ServAR was provided to 47 women and 40 completed the process evaluation survey. There was a significant difference between groups in favour of the ServAR group for carbohydrate quantification knowledge (2.126; 95% CI 0.264, 3.988; p=0.025) at follow-up, however identification of carbohydrate-containing foods and standard serve size knowledge of tested foods did not change between groups. Of the 40 pregnant women who completed the process evaluation survey, 80% strongly agreed or agreed that ServAR made them more aware of how much food they ate, and 72.5% strongly agreed or agreed that ServAR was easy to use.

Conclusions: ServAR has shown potential to educate pregnant women about knowledge relating to carbohydrate quantification and to increase portion size awareness. Further development and evaluation of ServAR is needed in order to increase engagement with the app and therefore improve carbohydrate and standard serve size knowledge.
Limited engaging and interactive online health information for adolescents: A systematic review of Australian websites

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Purpose: Non-communicable diseases (NCDs) are one of the most significant health challenges facing today's adolescents. Interactive and high-quality online health information is an essential tool to help solve this global challenge. We aimed to evaluate the interactivity and quality of websites, which provide adolescent-specific information and support on NCD risk factors.

Methods: Websites were found by a systematic search using the advanced search tool and incognito mode in Google. We included websites that were: (i) Australian based; (ii) authored by government bodies or public health organisations; (iii) contained information relevant to NCD risk factors, namely, smoking, nutrition, alcohol, physical activity, mental health, and overweight and obesity; and (iv) contained information specific to adolescents. We excluded websites that were (i) not written for the public; (ii) opinion pieces or news articles; (iii) documents; or (iv) advertisements. We followed a content analysis approach. We evaluated content quality and readability using a modified DISCERN tool and the Flesch-Kincaid tool, respectively. We assessed interactivity using a purpose developed 24-instrument tool.

Results: We included 69 websites for evaluation, with six focused on smoking, 22 on nutrition, 15 on alcohol, 11 on physical activity, six on mental health and nine on health and obesity. Mean score (±smn; standard deviation, SD) quality score (/75), were 53.4 (±smn;11.1) for smoking, 49.6 (±smn;13.6) for nutrition, 58.4 (±smn;11.0) for alcohol, 54.8 (±smn;12.6) for physical activity, 50.0 (±smn;10.4) for mental health and 51.6 (±smn;12.2) for health and obesity. The mean score (/100) for readability level of adolescent-specific websites was 62 (±smn;7.5). Websites which specifically targeted parents had a lower mean score of 54 (±smn;11.3) and websites with no specific target audience scored 41 (±smn;12.5). Mean interactivity score (/24) was 13 (±smn;2.0) for all chronic disease risk factors. We found no correlation between content quality and interactivity.

Conclusions: Our review found no websites that were both of high quality and contained interactive elements. Moreover, websites directing content specifically to adolescents themselves are scarce. Given the plethora of online health information from non-credible sources, we recommend government, and public health organisations invest in co-designing interactive and high-quality online health information with adolescents.
A year in the life of tech developers for behavioral nutrition and physical activity research: An assessment of requests made and future needs

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Objective: The purpose of this study was to detail the technology feature requests of investigators engaged in mHealth/eHealth physical activity (PA) and/or nutrition (Nutr) research at a southeastern university over the course of one year. In addition, future technology needs were assessed among PA/Nutr researchers.

Methods: Nutr- and/or PA-related features implemented by the technology development group for the USC TecHealth Center and the Arnold School of Public Health over 2018 were classified into categories (Intervention, Assessment, Data management, Recruitment/Retention), with corresponding sub-categories (e.g., texting, surveys, wearables). To assess future technology needs, a survey was administered to faculty, staff, and graduate students conducting technology-based PA/Nutr-related research (current or upcoming). Descriptive statistics characterize the findings.

Results: The 33 requests for features were from 5 funded projects, averaging 6.6 requests per project. Most of the features that needed to be developed to fulfill specific research aims of projects were related to Intervention (n=13; 39%). Within Intervention, the most commonly requested features were texting (23%), web app development (23%), and data visualization/dashboard summaries (23%). Assessment accounted for 18% (n=6) of tech-development requests; with 86% of these for surveys and 14% for Ecological Momentary Assessment. Recruitment/Retention features made up 21% (n=7) of tech-development requests, split equally across tracking databases, texting/email notifications, and web app development. Lastly, data management comprised 21% (n=7) of project requests developed, with 71% of those for database development and 29% for wearable data collection. The survey was completed by 22 faculty, staff, or graduate students. Future requests for technology features included several services that had been provided in the previous year including texting/email for intervention (41% of respondents) or recruitment/retention (41%), online surveys for assessment (36%), and databases for participant tracking (50%).

Conclusions: PA/Nutr researchers conducting tech-related research mainly requested features related to intervention delivery, especially for texting, web app development, and data visualization/dashboard summaries, although most projects requested multiple features. While these areas continue to be priorities identified for upcoming research, expanding tech needs are anticipated. Thus, ongoing assessment is required to ensure that staffing and infrastructure effectively support the needs of tech-based PA/Nutr researchers.
P1, P1.47

Development and evaluation of a personalised web-based diet and physical activity intervention based on motivational interviewing and self-determination theory: MyLifestyleCoach

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Objective: Unhealthy dietary patterns and insufficient physical activity (PA) are associated with negative health outcomes, such as cardiovascular diseases, type 2 diabetes, cancer, and overweight/obesity. This makes the promotion of healthy dietary and PA behaviours a public health priority. We developed a web-based computer-tailored (CT) dietary and PA promotion intervention "MyLifestyleCoach". To achieve effective and persistent behavioural change, this innovative intervention is tailored to individual characteristics by making use of the self-determination theory (SDT) and motivational interviewing (MI). According to SDT, autonomous motivation is more likely to arise when the context supports the basic psychological needs for autonomy (choice), competence and relatedness. Communication techniques of motivational interviewing (MI) were used to guide participants towards behavioural change. Here, we describe the intervention development process and the course of evaluation.

Methods The MyLifestyleCoach (NTR7549) intervention consists of two modules: I Move, an existing effective computer-tailored intervention to promote PA, and I Eat, which is aimed at promoting healthy eating. The Intervention Mapping protocol was used to develop the I Eat module. Development of the I Eat module was informed by the previously developed I Move. Both modules were integrated and formed the comprehensive MyLifestyleCoach programme. A randomised controlled trial (RCT) consisting of an intervention and waiting list control group will be used to evaluate the effectiveness of the intervention on diet and PA. Self-report measures take place at baseline, 6 months and 12 months after baseline.

Results: For the RCT, we are recruiting 1200 Dutch adults aged 18 - 70 years and who have access to the Internet. Recruitment will be finished by the end of January 2019.

Conclusions: MyLifestyleCoach is one of the first interventions to translate and apply SDT and techniques from MI in an online CT intervention targeting both PA and dietary behaviour. The results of the RCT will provide insight into the short- and long-term efficacy of MyLifestyleCoach and will result in recommendations for the implementation and promotion of healthy eating and PA among adults in the Netherlands.
What characteristics predict module choice in a web-based diet and physical activity intervention?

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e & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Improving user engagement is an important challenge in the field of e-Health promotion programs. Tailoring an intervention to participants' preferences, e.g. by giving participants a choice which modules to follow, may increase engagement in the program, motivation for behavioural change, and possibly increase intervention effects. So far, little is known about what characteristics predict these module choices. Therefore, we examined to which extent advice based on current physical activity (PA) and diet behaviour, personal and psychosocial characteristics predict module choice (PA/diet).

Methods: Preliminary data from the baseline measurement (T0) of the MyLifestyleCoach RCT intervention group were analysed. In total, 457 Dutch adults (58% female; mean age 49 ±14 years) completed the T0 questionnaire and the opening session of MyLifestyleCoach. In this session, they received advice on diet and PA regarding where there was room for improvement according to the Dutch guidelines (three advice options: strong, light and not advised to follow the module). At the session's end, they chose which module(s) they would like to follow (PA, diet, both or no module). Measurements included self-reported diet and PA, demographic information and several psychosocial constructs. Individuals could participate when they were between 18 and 70 years and had Internet access.

Results: A multinomial logistic regression analysis showed that compared to choosing no module and when all other predictors are held constant being male (OR: 0.50), having a higher age (OR: 0.87) and being more committed to eating more healthily (OR: 0.97) decreased the odds of choosing the diet module, whereas being more committed to PA (OR: 1.20) increased the odds of choosing the diet module. A higher BMI (OR: 1.2) increased the odds of choosing both modules. Receiving no or a light advice to change PA (both ORs: 0.9), decreased the odds of choosing the PA module compared to receiving a strong advice.

Conclusions: This study shows that several demographic and psychosocial constructs, as well as behaviour-based advice, are related to module choice in an online intervention. Future research is necessary to examine whether providing participants with a choice would lead to more commitment, less drop-out and more intervention effects.
The Supporting MuMS study: development of a text-message library to support weight loss and maintenance of weight loss in the postpartum period.

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Purpose: Many mothers regain weight in the postpartum period with often little support provided to help them during this time. Time pressures as well as other barriers limit their ability to partake in community interventions thus alternative approaches to reaching this target group are required. Using text messages as a method to deliver interventions may be promising. The purpose of this study was to develop a library of text messages to support weight loss and maintenance of weight loss in the postpartum period.

Methods: Text message development was informed using the underpinning theory of HAPA1 alongside reviewing the literature on BCTs (Behaviour Change Techniques) associated with effectiveness in weight management interventions2 and qualitative research on women's experiences with weight management in the postpartum period. Mothers' discussion forums were also searched for guidance on tone and style of messages. Messages were developed by the research team and refined through an iterative process of feedback through PPI.

Results/findings: Overall development of the intervention took 12 months. In total 634 messages were created. During this period the messages were co-created with PPI involvement which involved several cycles where a core team of four PPI women reviewed all messages, as well as opportunistically consulting with mother and toddler groups at key stages of message development. PPI provided feedback on text message content, tone, language, length, including links and the frequency of messages they would like to receive. Messages focused on healthy eating and physical activity and included motivational messages, emojis, mums' tips and humour, where appropriate. Key BCTs incorporated into messages included goal setting and self-monitoring, particularly in the weight loss phase with coping planning and relapse prevention particularly used in the weight maintenance phase.

Conclusions: A library of text messages, with embedded BCTs, to support weight loss and maintenance of weight loss in the postpartum period was produced using an iterative design and refinement process with the target group and based on the latest evidence for behaviour change. The acceptability of this intervention as a way to support weight management in the postpartum period will be tested in a pilot randomised controlled trial.
Are web-based interventions for physical activity and fruit and vegetable intake behaviours effective? Two RCT studies in China

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E- & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: This research aimed to evaluate the effects of an 8-week web-based intervention on physical activity (PA) and fruit and vegetable intake (FVI) behavior change in two Chinese samples, including university students in Study 1 and patients with coronary heart disease in home-based rehabilitation in Study 2.

Methods: Based on the Health Action Process Approach, eligible participants in each study were assigned into 1 of 2 groups: (1) intervention group: first 4-week on PA and subsequent 4-week on FVI; (2) the waiting control group. Study 1 included three web-based self-reported measurements: at the beginning of the intervention (T1, n=493), at the end of the intervention (T2, n=337) and at a 1-month follow-up after the intervention (T3, n=142). Study 2 included two web-based assessments: at the beginning of the intervention (T1, n=114) and at the end of the intervention (T2, n=83). ANOVAs and ANCOVAs were performed using SPSS 24.0.

Results: For Study 1, significant time x group interactions revealed superior intervention effects on FVI; motivational (risk perception, outcome expectancies, self-efficacy), volitional (action planning, coping planning, social support), and distal (intention, habit) indicators of FVI; and PA behavior changes, with $\eta^2$ ranging from .08 to .20. In addition, the intervention effect was seen in the improvement of quality of life (QoL) (F3,492=1.23, $\eta^2=.03$, $P=.02$). For Study 2, the intervention outperformed the control condition for PA, FVI, internal resources (combination of intention, self-efficacy, and planning) of PA and FVI, and an external resource (social support) of FVI, with $\eta^2$ ranging from 0.06 to 0.43. Furthermore, the intervention effect was seen in the improvement of QoL (F1,79=16.36, $\eta^2=.17$, $P<.001$). Moreover, internal resources for FVI mediated the effect of the intervention on the adoption of a healthy lifestyle (the synthesis of PA and FVI) (R2adj=.29, $P=.001$), indicating that if the intervention increased the internal resource of behavior, the adoption of a healthy lifestyle was more likely.

Conclusion: Both studies provide evidence for the efficacy of a web-based multiple health behavior intervention among university students and patients with coronary heart disease in China. Objective measurement approaches should be warranted in future.
P1, P1.52

The effectiveness of strategies to improve user engagement with digital health interventions to improve risk factors for chronic disease: A systematic review.

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e & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

E- & mHealth (SIG)

Purpose: Poor user engagement with digital health interventions (DHIs) (digital, mobile and wireless technologies to support health objectives) is an issue globally, as intervention exposure is a pre-requisite for intervention effectiveness. There is a lack of guidance on the specific strategies that can be employed to increase engagement with new technology to ensure the public health benefits of such innovations are achieved.

The primary aims of the review are to assess the i) effectiveness of strategies to improve user engagement with DHIs to improve risk factors for chronic disease; and ii) methodological quality of studies examining the effectiveness of strategies to improve user engagement with DHIs to improve risk factors for chronic disease.

Methods: MEDLINE, Embase, PsycINFO, CINAHL, CENTRAL, Scopus and Academic Source Complete were searched to identify relevant studies. Included studies were required to: evaluate the use of strategies to improve user engagement with DHIs to improve diet, physical activity, overweight/obesity, tobacco or alcohol consumption; report a quantitative measure of DHI engagement (objective usage or subjective experience); and employ a randomised controlled trial design. Study characteristics, intervention details, and outcomes will be extracted. The methodological quality of studies will be assessed using Cochrane's Effective Practice and Organisation of Care risk of bias criteria. Findings will be narratively described with regard to study characteristics. Where studies are sufficiently homogeneous (as assessed using I²; statistic) and report a comparable outcome measure, meta-analysis will be performed.

Results: The database search yielded 9631 publications. Of these, 50 studies (reported across 82 individual publications) met the inclusion criteria. Data extraction is in process. Preliminary results relating to study characteristics, strategy effectiveness, and study risk of bias will be presented.

Conclusions: This review will be the first to explore the effectiveness of strategies to increase user engagement across a range of DHIs, targeting modifiable health risks for chronic disease (diet, physical activity, overweight/obesity, tobacco and alcohol consumption). Findings will provide a deeper insight into the quality of evidence in this emerging field and identify strategies to be embedded within and outside of DHI research trials to increase the public health impact of such technologies.
Dispelling perceptions of self-reported physical activity measurements in the workplace

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e & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

E- & mHealth (SIG)

Objective: Reducing sedentary behaviour is a modern-day health imperative because of the known risk. Desk-based employees' work contributes to sedentariness through environments that promote prolonged bouts of sitting. In recent years, point-of-choice prompt software delivered through work computers to elicit movement breaks have been suggested to ameliorate this effect. Nonetheless, the applicability of much of the published research on this issue is problematic, due to an over-reliance on self-report data and the inherent limitations of this form of data collection. Thus, to determine the veracity of the claims we used a commercially available pedometer to objectively measure movement in the workplace along with self-reported perceptions of workplace movement when workers were exposed to a prompt at the point of decision making.

Method: From a larger cohort study, a random selection of participants (N=29) were randomly assigned to an intervention group (n=14) that were regularly prompted to engage in movement breaks, or a control group (n=15) that did not receive exposure to this intervention. All participants wore the FitBit One pedometer for 3 weeks of data collection. Participants also completed the Occupational Physical Activity Questionnaire survey before and after the 3-week experimental period. The Fisher's Exact test and linear regression were used to examine changes (baseline to follow-up) in self-reported occupational physical activity and steps between the control and experimental group.

Results: Between baseline and follow-up, the experimental group self-reported a significant percentage decrease in sitting ($\beta_a=-6.90$, $p=0.01$), and a significant percentage increase in walking ($\beta_a=3.77$, $p=0.02$) at work, compared to the control group. There were no significant differences in percentage of time spent standing at work ($p=0.14$) and total steps taken during the workday ($p=0.62$) between the experimental and control groups, from baseline to follow-up.

Conclusions: The experimental group exhibited a significant increase in self-reported perceptions of walking during work. Yet, this was not supported by the total steps recorded by the pedometers. This study supports evidence from previous observations that self-reports of workplace physical activity are plagued by over-estimations of employees' perceptions of healthy behaviour change.
Moderator analysis of enjoyment on FLEX app and automatic evaluations towards exercise

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E- & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Flex, is an app designed on evaluative conditioning and gamification principles. It is made up of four games intended to promote exercise to Australian adults by targeting automatic evaluations (non-conscious biases). A real-world randomised controlled study was conducted over two days to determine if engagement; assessed via enjoyment, usage, gaming performance and preference, moderated the effects of FLEX on automatic evaluations towards exercise.

Methods: Consenting participants downloaded the freely available FLEX app from app stores and were randomised into FLEX experimental, containing 70% exercise stimuli, or control group, containing no exercise stimuli. Participants were instructed to play the games 18 times and then complete an implicit association test (IAT), which tested their automatic evaluations of exercise relative to sedentary behaviour. Participants also completed demographic, user experience and enjoyment questionnaires. Linear regression was used to examine the interaction between the intervention and engagement moderators on 24-hour IAT scores. Statistical analyses were performed using Stata version 15.0.

Results: 288 participants were randomised into either the FLEX experimental (n=141) or control (n=147). All participants completed the initial IAT and enjoyment questionnaire. At 24-hours follow-up, 33 participants dropped out of the study resulting in retention of 255 participants in FLEX intervention (80% female, Mage=32.83, SD=10.83). Overall IAT score for FLEX intervention at 24 hours was (MIAT=0.79, SD=0.41) and enjoyment score was (MEnj=37.12, SD=8.05). For those in the control condition, enjoyment moderated the effect on automatic evaluations, such that those who enjoyed it more, experienced a larger change in IAT scores than those who did not. Limited evidence was found to suggest that game usage, performance or preference impacted a change in IAT scores in either condition.

Conclusions: Flex was shown to enhance people's automatic evaluations of exercise, but this effect seemed to not be impacted by engagement. However, gaming on an app may have construct-irrelevant impact on IAT scores, given that those who enjoyed Flex in the control condition showed significance enhanced IAT scores. In line with dual-process models, FLEX and similar apps, have the potential to change people's automatic evaluations towards health behaviours and offer innovative solutions to existing health problems.
Enhancing physical activity and healthy aging among recent retirees (REACT): A randomized controlled trial

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e & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective
Despite of its well-known health benefits, majority of the older adults do not meet the physical activity recommendations and spend their days in sedentary activities. More information is needed how to motivate older adult to be more active. The purpose of Enhancing physical activity and healthy aging among recent retirees (REACT) randomized controlled trial (NCT03320746) is to provide cost-effective way to promote physical activity and reduce sedentary time among older adults. This is done by examining the efficacy of wearable technology based intervention among recent retirees. This study will be the first physical activity trial targeted to time window right after retirement.

Methods
Overall 235 recently retired Finnish men and women will take part to this study (retirement date between 1.1.2016-1.1.2019). Baseline measurements will be completed by Dec 2018 and the follow-up continues until Jan 2020. Participants randomized in the intervention group (allocation ratio 1:1) are requested to use IT based activity trackers (Polar Loop 2, Polar, Kempele, Finland) for 12 months. The primary outcome of interest is wake-time physical activity measured with wrist-worn tri-axial ActiGraph wGT3X-BT accelerometer at baseline, 3, 6, and 12 month time-points. Secondary outcomes are changes in objectively measured sedentary time, sleep, and parameters of metabolic health (body composition, lipid profile, fasting plasma glucose, HbA1C, and inflammatory markers). The feasibility of the intervention will be evaluated at each follow-up time points by questionnaire and at the end of the intervention by conducting focus group interviews.

Results
The baseline characteristics of the REACT study population and the preliminary results from the feasibility study will be presented in the ISBNPA Annual meeting.

Conclusions
Intervention that succeeds in motivating older adults to increase physical activity after retirement transition may have the potential to make an important long-lasting effect on active and healthy aging.
Smartphone-based application (Google Fit) may be effective and preferred over usual walking prescription in improving functional capacity among sedentary college students

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Motivation and behavior change (SIG)

Background: Physical activity promotion in adolescents has been found to be associated with improved psychosocial well-being and academic performance, however, the compliance is questioned. Recently smartphones have proved to be a potent means for promoting physical activity. Thus far, no study has compared smartphones and traditional walking prescriptions in improving functional capacity in adolescents.

Objective: The main aim of this study was to compare traditional ACSM based and smartphone application based (Google FIT) walking prescriptions on functional capacity in less active college students.

Methodology: Thirteen adolescent collegiates with a step count less than 7500 steps/ day were recruited for this study. They were randomly allocated to one of the two intervention groups, ACSM based walking group and smartphone application based walking group. The pre and post-intervention maximal oxygen uptake (VO2 peak) were measured through open calorimeter (K5, Cosmed, Italy). Wilcoxon sign rank test was used to compare pre and post VO2 peak values within the groups and Mann Whitney U test was used to compare the same values between the intervention groups, at a level of significance of 0.05.

Results: The tests were successfully completed by all participants. VO2 peak improved by 2.79 ml/Kg/min (9.56%) and 2.38 ml/Kg/min (8.51%) from baseline within both ACSM and SMART groups at a significant level (p = 0.032). However, mean maximal oxygen uptake was not statistically different among the groups (p = 0.237). Compliance was found to be 3% greater in the SMART group than the ACSM based walking group.

Conclusion: Smartphone-based physical activity promotion is as effective as routinely administered traditional exercise prescription. Long-term compliance is better with smartphones than traditional exercise prescription.
Using social media to enhance the impact of a weight loss intervention delivered in professional Australian Football League settings (Aussie-FIT)

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Objective: The objective of this study was to explore social media use in the context of a weight loss programme delivered in Australian Football League settings to promote healthy lifestyles in men.

Methods: A randomised controlled trial was conducted with 130 overweight/obese (BMI>28) middle aged men (35-65 years old), who participated in the Aussie-Fans In Training (Aussie-FIT) programme (M age=45.78, SD=8.01; M initial weight=111.42 kg, SD=18.23 kg; M initial BMI=34.48, SD=4.87), with even split to intervention and wait-list control groups. Aussie-FIT added innovation to the original Football Fans in Training (FFIT) programme by offering men the option to join closed private Facebook groups. In addition, participants received Fitbits (provided as a self-monitoring tool) that they could connect to the online Fitbit platform and compare themselves and interact with other men. Men’s use of both platforms was explored quantitatively through evaluation surveys and user/non-user comparisons, and qualitatively via survey comments, and specific questions from individual and focus group interviews. Interviews were conducted with men who completed the first 3-month program, and were analysed using a Thematic Framework Approach, applying components of Self-Determination Theory as an analytical lens.

Results: Most men joined the Facebook groups (n=107) and registered their devices with the Fitbit platform (n=109 connected users); however, only some remained active users (Facebook n=48 for posting/commenting users and Fitbit n=58 syncing users). There were no significant differences in the main outcome (i.e., objectively measured weight loss) comparing active versus inactive users. Emerging findings from interviews revealed that the men who used social media appeared to benefit from connection with other group members and experienced feelings of relatedness through use of Facebook to share advice, provide encouragement, and practical information; most active Fitbit users mentioned supportive competition for step counts.

Conclusions: Social media has promise as an effective way of enhancing men’s engagement in the Aussie-FIT programme and it was perceived as a useful means of increasing intervention engagement for some, but not all participants. Future research could explore individual and content- or platform-specific factors that moderate the effectiveness of social media as a means to enhance engagement in behaviour change programmes.
A novel dissemination tool forecast and footprint report in a randomized control trial: eB4CAST in Get Fruved USA


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E- & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Dissemination and implementation science tends to have a large gap of time between research and given programs being used in practice. Likewise, dissemination tools to alleviate these issues are limited, and have a limited history for being tested for usability and understanding. The objective of this study was to gain feedback on a tested dissemination tool, eB4CAST, in an obesity prevention program, Get Fruved, to provide intervention sites with a summary of their data.

Methods: Three teams were recruited to design visual eB4CAST infographic reports for Fruved RCT sites. Both experts in the community-based intervention programming field (n=14) and RCT sites (n=15) were asked to participate in this study. Upon sites receiving an eB4CAST forecast report, site leads and experts were given a Qualtrics survey of 12 likert item and 9 open ended questions to provide feedback on the appeal, understanding, and clarity of the data available on the reports. Averages of scores and summative analysis of open-ended questions were used.

Results: For all questions, on a likert scale of 1 (strongly disagree) to 10 (strongly agree), all participants rated each area above an average score of a minimum of 7. Open ended questions showed positive responses including reports being clear, visually appealing, and aiding in understanding of the program. However, three suggestions stating that there were certain point systems on data that were unclear, that national averages should be added, to personalize the reports more to the school, scales needing benchmarks, and that the report was lengthy and took time to read.

Conclusions: The eB4CAST dissemination tool was action driven by relaying data and information on the Get Fruved program that empowered leaders to tell the impact to their target population. Acceptance of the eB4CAST reports were found appealing with data-driven relevancy. Overall, utilizing infographics to report data and information in a visual simplified form is a feasible way to disseminate and communicate in a cost-effective manner.
17046

P1, P1.205

Game of Stones: a feasibility trial of a narrative Short Message System (SMS) and financial incentive intervention to support weight loss in men with obesity

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E & mHealth, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: UK men are more likely to be overweight or obese than women and are underserved by current evidence-based weight management programmes. Systematic review evidence suggests that men often require different interventions to women. The aim of this study was to test the feasibility and acceptability of 'Game of Stones' in a pilot randomised controlled trial. Game of Stones provides a novel approach where narrative SMS support men to use evidence-based behaviour change techniques to lose weight through following the weight loss journey of the main protagonist over 12 months. Additionally, some receive a financial endowment incentive, informed by loss aversion theory, which involves securing money by achieving weight loss targets at three, six and 12 month appointments.

Methods: Adult men with BMI =30kg/m2 and/or waist =40 inches were recruited via community venues or GP practices and randomised to three groups;

i) Narrative SMS only
ii) Narrative SMS and incentive
iii) Wait list control

Strategies to optimise retention included offering appointments flexibly (e.g. after work or at convenient venues) and appointment reminder texts. At three, six and 12 months weight and waist circumferences were measured objectively alongside self-reported questionnaire data (e.g. study satisfaction and intervention helpfulness ratings) and qualitative interviews (n=83) guided by the framework approach.

Results/findings: The pre-specified target of 105 men from across the socioeconomic spectrum were recruited within 4 months. Retention (79/105; 75%), study satisfaction (mean scores of 77.0-87.3/100) and SMS helpfulness ratings (mean scores of 3.3-3.4/5) demonstrated acceptability at 12 months. Polarised views on the narrative SMS were expressed during interviews, including extremely positive, indifferent and some strongly negative views. Incentives were acceptable, but men often did not report them as motivational and emphasised that improving their health was their primary incentive. Attendees lost some weight at 12 months in both control (-1.00%, SD5.31) and SMS only (-1.51%, SD4.65) groups, with higher weight loss in the SMS and incentives group (-3.51%, SD5.83).

Conclusions: The narrative SMS and financial incentive interventions were acceptable and feasible to deliver. Based on participant feedback, some intervention components could be refined to improve retention in a definitive multi-site randomised control trial.
Health.edu - sport-related health competence of secondary school students

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Implementation and scalability (SIG)

Objective: The aim of the Ottawa Charter; to enable people to increase control over, and to improve their health, is recovered in Physical Education (PE), targeting at students' sport-related health competence (SrHC). SrHC means, students can take over responsibility for their own health and are able to practice sports autonomously and sustainably in a health enhancing manner. To build up corresponding capacities of teachers and schools, participatory approaches are promising. Therefore the Health.edu study (BMBF grant 01EL1421D) aims to develop students' SrHC via a one-year cooperative planning process, where different stakeholders (PE teachers, students, principals, scientists) conceptualized PE lessons targeting the promotion of SrHC.

Methods: Evaluation followed a mixed-methods design. Efficacy of intervention was assessed using a randomised control group pre-post-test study design including four intervention (IG) and four control schools (CG) with two PE teachers each. Students' SrHC was measured by a standardized questionnaire (Tropfer, 2017). The sample includes 223 students (11-17 years, M=14.66, SD=17; 55% female). Data was analyzed by a one-way ANCOVA and Cohen's d. Program development and implementation was evaluated via qualitative analyses of standardized field notes of cooperative planning protocols (N=19) and pre-post problem-centered interviews of eight IG teachers.

Results: While controlling for covariates, students in IG had a significantly greater score of SrHC_post in contrast to CG (F1,227=16.47; p=.000; ?²=.068). Significant mean differences of pre- and post-test data for SrHC showed up for three IG schools (d = 1.3 / 1.0 / 1.3), but SrHC improvement in the fourth IG school was not significant and less than in the CG schools. Qualitative analyses showed, that a high improvement of students' SrHC was accompanied by interventions, where involved stakeholders had a salutogenetic-based understanding of health, implemented measures had a high-quality compatibility with current sport didactical competence discussion and the cooperative planning process was highly supported by principals.

Conclusions: Results show that a participatory approach with cooperative planning is successful in improving students' SrHC, but the role of principals and the beliefs of teachers should be taken into account.

Active Women over 50 RCT: Preliminary results

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective
Physical inactivity can impact health across the lifespan and is of global public health significance. Some age-related disabilities can be prevented with adequate physical activity in earlier life, yet physical activity uptake in middle age is generally sub-optimal. The purpose of this study is to test the impact of a low-cost, scalable education session with follow-up email support on objectively-measured physical activity in women aged 50 years and over.

Methods
Recruitment is complete for a randomised wait-list controlled trial. Participants are female university and healthcare staff who were randomised to receive the intervention immediately, or after 4 months (wait-list control group). The intervention is a one-hour workshop-based education session with follow-up email support and loan of an activity tracker (Fitbit) for 3 months. The control group receive the workshop after completion of follow-up measures. Primary outcome is the proportion of people achieving =10,000 daily steps at 3 months post randomisation, measured with Actigraph GT3X accelerometer. Secondary outcomes include the proportion of people achieving national guideline-recommended physical activity levels, average self-reported hours of weekly physical activity (International Physical Activity Questionnaire), perceived benefits of and barriers to exercise participation (Exercise Benefits and Barriers Scale), physical functioning (function component of the Late Life Function and Disability Instrument), and mood (Positive and Negative Affect Schedule).

Analyses will be pre-planned, conducted while masked to group allocation and will use an intention-to-treat approach.

Results
Data collection is ongoing, with 105/128 participants completing participation to date. Preliminary results show that at follow up, 49 (100%) intervention participants had investigated or implemented one or more of the resources/strategies suggested at the workshop, and planned to increase their physical activity over the next 6 months. Thirty-seven intervention participants (76%) set physical activity goals, of which 33 people (89%) partially/fully achieved them by follow-up.

Conclusions
Preliminary results show the education session was well-received by participants, who were motivated to improve their future physical activity. The intervention impact on primary and secondary outcomes is yet to be determined, but if found effective, there is scope to translate these findings to the broader community by exploring different settings and resource delivery.
Do symbols on university food outlet menus promote healthier choices at the point-of-purchase?

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Implementation and scalability (SIG)

Objective Public health education to change dietary behaviour has been a major focus of obesity prevention in recent years. Research shows that many consumers want nutrition information, but either they cannot find it, or is perceived as not useful, or difficult to use. The aim of this repeated measures, comparison group, quasi-experimental study was to test the hypotheses that nutrition education using simple "symbols" on food outlet menus would increase sales of labelled, healthier options and the increased sales of targeted healthier foods would persist over time. Methods: Two carefully matched university food outlets serving approximately the same number of food items per day and offering similar foods at similar prices were selected. Existing menu items from both outlets were analysed and selected based on the National Food and Health Policy criteria, to target with symbols in the experimental food outlet. An information banner was placed at the food outlet that read "Look for the "?" for your healthy options" and tick symbols were placed next to targeted foods only on the experimental food outlet menu. Daily food sales of targeted and non-targeted menu items at both the experimental and the comparison site (with no symbols) were collected at multiple time points before, during and after the intervention. Data was also collected via customer surveys to determine whether customers were aware of the symbols and how many reported that the symbols influenced their purchase. Results: No differences were observed in the sales data between the baseline and intervention period at the experimental outlet. However, 65% of respondents noticed the healthy symbols and banner and of those, 21 % reported the symbol influenced their purchase. Majority (86%) believed having healthy options identified would influence their purchase in the future. Conclusions: The study demonstrated that implementing a simple point-of-purchase intervention university-wide is feasible and would be very well-received by university students and staff but further research is needed to evaluate its impact on increased purchases of targeted healthy food items.
A mixed methods systematic review of the barriers and facilitators to implementation of menu labelling interventions

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Objective: In response to the obesity epidemic, a number of public health strategies have been developed to improve dietary patterns at a population level. One such strategy includes menu labelling which aims to nudge people towards healthier food choices. However, with more countries implementing menu labelling policies, issues relating to implementation have arisen. The aim of this mixed methods systematic review is to synthesise the empirical evidence on the barriers and facilitators to implementation of menu labelling interventions.

Methods: Peer-reviewed and grey literature were searched using specialised search engines, databases and public health organisation websites. Screening reference lists, citation chaining and contacting authors of all included studies were undertaken. No restrictions were applied to study design, language or publication year. At least two independent reviewers performed study selection, data extraction and quality appraisal. The 'best fit' framework synthesis approach is currently being used to synthesise the evidence. This involves a combination of deductive coding, using the Consolidated Framework for Implementation Research (CFIR) as the a priori framework, and inductive analysis, using secondary thematic analysis. The overall process will assist in the construction of a new evidence-based conceptual model, which will be assessed for bias and a sensitivity analysis performed.

Results: Of the 2,806 articles identified, 17 studies met the eligibility criteria (8 quantitative, 7 qualitative, 2 mixed methods). Barriers and facilitators were classified into each of the five CFIR domains. The most common constructs identified were: 'relative advantage' (e.g. impact on business competitiveness and sales), 'consumer needs and resources' (e.g. perceived consumer understanding and demand), 'external policy & incentives' (e.g. anticipated future menu labelling policy, enforcement and regulation), 'compatibility' (e.g. standardised recipes, menu space), and 'access to knowledge and information' (e.g. ability to source nutrition information, access to staff training). A conceptual model is currently being constructed which will identify the relationships between constructs based on relevant theories and evidence from the primary research studies.

Conclusion: Findings from this review will provide guidance to support researchers, policy-makers and other stakeholders involved in the design of strategies to enhance the adoption, implementation and sustainability of menu labelling interventions across countries world-wide.
Evaluation of the healthier dining programme conducted in an institute of higher learning in Singapore: A cluster-randomized trial – rationale, design, implementation and preliminary findings

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

PURPOSE

In Asian urban environments, eating out tends to be very common. Improving quality of out-of-home cooked food is complicated by the large number of small independent food vendors. The Singapore Healthier Dining Programme (HDP) was introduced to institutes of higher learning in 2014. It aims to promote healthy eating behaviours among staff and students through increasing availability and accessibility of healthier foods and beverages. Food vendors were trained and encouraged to use competitively priced healthier oil blends, wholegrain rice and/or lower sodium salt, and offer ≤500 calorie meals and less-sugar beverage options. We aimed to evaluate effects of the HDP on (i) changes in consumers' out-of-home food behaviours and dietary quality; and (ii) consumers' and food vendors' food-related attitudes.

METHODS

Project CHEW (Choosing Healthier Eating options at Work and school), a cluster randomized trial, was conducted to evaluate the HDP. Four canteens and two food courts across one university campus were randomized via permuted blocks to the HDP intervention or control arm. Pre-intervention and post-intervention data were collected in October 2014 and April 2015 respectively. Consumer participants aged ≥18 years (n=408) who frequently dined at these six eating places were interviewed. Food frequency questions and 7-day out-of-home food diaries were administered to record information on energy, saturated fatty acids and brown rice intake. Attitude towards healthy eating was assessed using 4-point Likert scale questions. Process evaluation was conducted through training observations, monthly plate counts and environmental audits, and pre- and post-intervention interviewer-administered food vendors' questionnaires (n=76) to assess fidelity, dose delivered, dose received, reach, cost and context of the implementation.

FINDINGS/DISCUSSION

Preliminary process evaluation observations suggest that close collaboration between program implementers and food vendors is imperative for increasing HDP implementation fidelity. Stronger food vendor engagement and support for using healthier ingredients and serving ≤500 calorie meals are key to increase healthier options' availability (dose delivered). Food vendors' nudging can help increase awareness and demand of healthier options (reach and dose received). An iterative design process might facilitate program fine-tuning, monitoring and sustaining healthier options' availability. Insights gained from our evaluation can help inform future school-based food interventions implementation.
Evaluating the implementation of a multi-level, multi-mode community nutrition education intervention to address diet quality and adiposity amongst low income populations

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Objective: The United States Department of Agriculture provides funding for community nutrition education (CNE) for low income families across the United States. Program guidance calls for multi-level public health approaches incorporating direct education and modifying policy, systems, and environments (PSE). This study evaluates the implementation of such a model for a CNE program through the Supplemental Nutrition Assistance Program Education (SNAP-Ed) and the Expanded Food and Nutrition Education Program (EFNEP) in Illinois. Objectives include identifying the multi-mode CNE network, evaluating multi-level program implementation across the network and the reach of the intervention for intended audiences.

Methods: A CNE network was identified in three target geographic regions in Illinois with inclusion criteria being organizations serving low income families with a food, nutrition, or health focus. Using convenience sampling, low income women (age 18-64) were recruited from the target regions through eligible partner organizations. Participant surveys identified utilization of network sites and program implementation data determined reach of the CNE intervention.

Results: The baseline CNE network across the three regions consisted of 211 total sites. During the 15 month study period, the CNE intervention was implemented in 128 (60%) of the network sites. Mean number of network sites used by the participants (n=112) was 3.21 (SD=1.70), most frequent being schools, social service, and early childhood centers. Using program data, approximately 84% of participants (n=298) were reached by at least one component (directly, through child, or PSE) of the CNE intervention, with the child's learning environment being the most frequent site type. 20% of participants directly attended at least one education session.

Conclusions: Identification of a CNE network can be beneficial for detecting gaps in implementation of multi-level, multi-mode interventions serving low income families. Results of this study indicate the CNE intervention was implemented across a considerable portion of the network, with the majority of the sample reached through PSE and child education components. Findings suggest that participants' use of the network is moderate. However, by matching family network use with network intervention sites, programs can efficiently maximize intervention dose when faced with limited resources.
Demographic and weight history characteristics associated with willingness to initiate weight management interventions

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objectives: Poor uptake of weight management interventions limits their public health impact. Little is currently known about individual characteristics that are associated with initiation of weight management interventions. The purpose of this analysis was to determine if demographic and weight history characteristics are associated with reported willingness to initiate two weight management interventions. Methods. Participants were adults with BMIs = 25 kg/m2 who were not currently enrolled in weight management interventions and were recruited via an online panel aggregator. In a web survey, participants self-reported demographic characteristics and weight history and were asked to report whether they would initiate a hypothetical web-based comprehensive behavioral weight loss intervention. Participants who indicated that they would not initiate this intervention were then asked if they would initiate a low-burden weight gain prevention intervention. Logistic regression analyses were conducted to examine the predictors of willingness to initiate these interventions. Results. Participants (n=836) were 74.8% female, 64.8% white, and had a mean age of 44.3 (SD=14.9) and a mean BMI of 33.0 (SD=7.0). In a multiple logistic regression model, participants who were Black (OR: 2.71; 95% CI: 1.80-4.18), non-Hispanic (OR: 3.17; 95% CI: 1.91-5.35), who had a bachelor's or higher degree (OR: 1.81; 95% CI: 1.33-2.47), and who had tried to lose weight in the past year (OR: 1.91; 95% CI: 1.40-2.62) were more likely to report willingness to initiate a weight loss intervention. Among those who did not want to initiate a weight loss intervention (n=384), participants who were female (OR: 2.00; 95% CI: 1.19-3.43) and who had a lower BMI (OR: 0.95; 95% CI: 0.95-0.98) were more likely to be willing to initiate a weight gain prevention program. Presence of obesity comorbidities and ever having joined a weight loss program were not associated with willingness to initiate either intervention type. Conclusions. Results demonstrate varying likelihood to initiate weight management interventions across demographic groups and according to weight histories. Targeted strategies may be needed to engage individuals with a range of demographic characteristics and weight histories into weight management interventions.
Objective
The Active Healthy Kids Global Alliance is a network of researchers, health professionals and stakeholders who are working together to advance physical activity (PA) in children and youth from around the world. There is a need for gathering and translating high quality knowledge on children, youth and PA to guide practice, program and policy development.

Methods
10 indicators for PA amongst children and youth are included in the 2018 Report Card. A national committee, consisting of members with different areas of expertise related to PA among children and youth, graded each indicator on the basis of a structured consensus process. Designated committee members were asked to collect, analyze and present best available evidence on specific indicators and suggest an grading. The presentation and preliminary grade formed the starting point for joint committee discussions to establish consensus for each indicator.

Results
Indicator assessment were based on national surveys related to health and/or PA behaviors, scientific literature and government reports/legislative documents. While 7 of the 10 indicators were assigned a grade in the 2018 Report Card, research and monitoring gaps remain that, if addressed, would better inform the process. Firstly, methodological challenges related to objective versus subjective measures are observed. Secondly, quality data is missing on a total of three core indicators. Thirdly, current data do not sustainably cover the entire age range.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Overall Physical Activity</td>
<td>D-</td>
</tr>
<tr>
<td>Organized Sport Participation</td>
<td>A-</td>
</tr>
<tr>
<td>Active Play</td>
<td>INC</td>
</tr>
<tr>
<td>Active Transportation</td>
<td>B+</td>
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<tr>
<td>Sedentary Behaviours</td>
<td>D+</td>
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<tr>
<td>Physical Fitness</td>
<td>INC</td>
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<tr>
<td>Family and Peers</td>
<td>INC</td>
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<tr>
<td>School</td>
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## Conclusion

The 2016 Danish Report Card on PA for children and youth showed that Denmark performed rather well on strategic and political levels, but the impact on the individual level were somewhat scanty. This indicated an implementation gap between the governmental and individual level. Two years later, the implementation issue remains the perhaps greatest challenge – alongside the need for more comprehensive and methodologically solid studies to better address and grade the full range of indicators.
Purpose:

There is limited research targeting multi-level barriers and facilitators on school-based parental support programmes, especially regarding parental perspectives. This study aims to describe parents' and teachers' perceptions on organisational and personal level barriers and facilitators to implementation of a school-based parental support programme to prevent childhood overweight and obesity in areas with low socio-economic position and a high variation in family cultural backgrounds.

Methods:

Data collection, analysis, and interpretation were guided by the Consolidated Framework for Implementation Research (CFIR). Data was collected through focus groups with 14 parents and eight teachers, and individual interviews with two teachers in the intervention group of the Healthy School Start II trial. Data were analysed using qualitative content analysis in a deductive step using the three CFIR domains, inner- and outer setting, and personal characteristics, followed by an inductive analysis.

Results:

The theme "being on the same page, getting burdened teachers and parents to work on common ground" was found. Among teachers, barriers and facilitators were related to the school work structure and tasks, involvement from other staff and school leader, the practical school work day, perception of high family needs, but low parental interest, challenging resources in the families, and teacher's personal knowledge, interests, and opinions about health and food. For parents, barriers and facilitators were related to the perceived family needs, family resources, parental consensus on healthy behaviours and cooperation in the family, school involvement in health issues and the intervention, and parental knowledge of health.

Conclusion:

The findings indicate a need for interventions to facilitate parents' and teachers' work on common ground, with activities suitable for a stressful and burdening work day and everyday life. This could be achieved by integrating novel evidence-based practices within school routines to facilitate school staff's work with health promotion rather than increasing the burden. In addition, programme activities should be suitable for parents' stressful lives, be adapted to a variation in cultural norms, and include activities to increase parental consensus to promote health. Furthermore, strategies to increase involvement from parents in families with high needs and low resources are needed.
Keeping health-related online platforms for professionals sustainable. A mixed methods study

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Online professional learning platforms are promising, as they connect professionals of any region, at any moment, with any other colleague in an interactive way. The HEPCOM platform (Promoting healthy eating and physical activity in local communities) shares tools that support the planning and structuring of health promoting activities for youth in Europe. To date little is known about how to keep platforms sustainable. The aim of this study was to list factors that are perceived as most important by health/educational professionals involved in online platforms and provide in-depth insight in how sustainability can be promoted.

Methods: A mixed method design was applied. First, from a literature search in PUBMED, Google Scholar, Web of Science, Proquest and Eric, 11 papers with 54 factors were retrieved and categorized as general platform-, content-, communication-, visitor- and context-related factors. Next, a questionnaire study was conducted among 17 professionals. Participants rated the importance of each factor on a 7-point Likert-scale. The relative importance of each factor and the consensus between professionals regarding this importance were calculated using the median scores and the interquartile deviations (IQDs) using IBM SPSS Statistics 21. Finally, 12 individual interviews were carried out with professionals involved in online health or educational platforms. The interviews were recorded and transcribed verbatim using thematic coding (e.g. experiences and strategies per factor).

Results: In the questionnaire study high consensus was reached on eighteen factors from all five categories. Three factors appeared crucial in the interviews: finding longer-term funding, user-friendliness and creating a sense of belonging.

Conclusions: Platforms should consider aspects of sustainability and use a planned approach to address these factors right from the first steps of platform development. Gaining longer-term funding is challenging and should be considered from the start of a project by collaborating with other websites and platforms. User-friendliness can be promoted by developing simple platforms, with a clear set-up and high-quality tools. Establishing a sense of belonging can be supported by branding and supporting a platform with face-to-face networking activities. Involving visitors and stakeholders is crucial.
Scale-up: Adapting an effective older adult physical activity intervention to achieve impact at the population level

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Background: Physical activity is an important, modifiable lifestyle factor for healthy aging. It helps prevent and manage diseases. Despite the irrefutable benefits of being active, older adults remain the least physically active Canadians. To counter this trend, physical activity interventions for community-dwelling older adults have been implemented in many places and demonstrated promising results, but very few were effectively scaled-up (expanded beyond research settings while retaining effectiveness). During scale-up, adapting interventions to the local environment to improve `fit' is critical to success, yet we know little about how to best adapt effective interventions for implementation at scale. In 2015 the British Columbia (BC) Ministry of Health released a physical activity strategy; older adults were identified as a priority. Thus, we engaged government and community stakeholders to co-design and implement a scalable physical activity intervention (Choose to Move, CTM) for older adults. CTM effectively enhanced physical activity and mobility at small scale (2016-17; 56 programs). It will be scaled-up across BC in 2018-2020 and provides us an opportunity to study effective adaptation for implementation at scale.

Objective: We aim to describe a process of adaptation, and the resultant adaptations to CTM, prior to its scale-up across BC.

Methods: We adopted a 9-step adaptation process: 1) identify stakeholders; 2) conduct needs assessment; 3) develop prototype of recommended adaptations; 4) validate prototype with stakeholders, 5) create adapted program; 6) pilot test adaptations, 7) modify adapted program, 8) implement adapted program; and 9) evaluate effectiveness of adapted program. Here we describe steps 1-6 and organize the data within Stirman et al.'s (2013) adaptation coding system.

Results: The adapted CTM model includes content, context, and training adaptations. To address the need for more 'opportunities to socially connect' among CTM participants we: added more group meetings, reduced phone check-ins, and adapted provider training to integrate social connectedness for older adults.

Conclusions: Flexible, adaptable models are more likely to be successfully implemented at scale and have equal impact as smaller effectiveness trials. There is a desperate need for studies that describe adaptation processes to support replication and scale-up of health promotion interventions.
A teacher delivered, matauranga Maori enhanced high-intensity interval training program for young adolescents: Pau te Hau randomised controlled trial feasibility results

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: To determine the feasibility of a generalist teacher delivered, matauranga Maori enhanced, high-intensity interval training (HIIT) exercise programme, termed 'Pau te Hau,' in lower socioeconomic area schools.

Methods: Eight intermediate level schools (students 11-14 years) from lower socioeconomic areas volunteered to participate, then two classes within each school were randomised to either the intervention or control, spanning ~16 weeks (ANZCTR: ACTRN12618000301268). A total of 355 students (12.9±smn;0.6 years, M=184, F=171) completed baseline testing (recruitment rate 86%). The intervention class teachers participated in a one day workshop instructing them how to deliver twice weekly, brief HIIT sessions within usual class time, including options based on traditional Maori narratives in order to facilitate cultural and curriculum connection. Teachers received a set of heart rate monitors (Polar H10) for monitoring of target intensity, and instructional resources. The control classes continued with their usual curriculum. The acceptability of the intervention was assessed using small group interviews with students, and individual semi-structured interviews with teachers. Intervention compliance was determined using: peak heart rate (HR) achieved in sessions (target peak 90% of maximum); session numbers delivered (target 28 total), and; observations of delivery based on the SAAFE (Supportive, Active, Autonomous, Fair and Enjoyable) framework.

Results: 19.9±smn;7.6 (M±smn;SD) sessions were delivered by teachers over the 16 weeks. Heart rate peaks on average over all sessions were 89.9±smn;3.2%. The intervention teachers reported high levels of satisfaction with Pau te Hau, despite some reservations prior to commencement. Positive aspects of the intervention included the engagement of most students in sessions, simplicity, variety, and their perceptions of students' achievements with improved fitness, and personal health awareness. Almost all student participants were positive about participating in Pau te Hau, identifying feelings of confidence and attainment as the term progressed despite some initial familiarisation with intensity. SAAFE observations indicated good intervention fidelity, but incorporation of the matauranga Maori components were not consistently utilised by most teachers. No adverse events occurred.

Conclusions: Pau te Hau is feasible and well accepted by teachers and students, but incorporation of Maori narratives needs more support and direction for greater utilisation.
The connection between preparation and participation in municipal sporting events: How to prepare in one year to increase participation?

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Implementation and scalability (SIG)

Sporting events have been used as a catalyst to get people to start exercising. The objective of this study was to understand what municipalities do to prepare for sporting events and how it relates to the rate of participation, in order to determine the best way to prepare. Questionnaires were given to 115 municipalities that participated in the Sasakawa Sports Foundation's Challenge Day in 2016 and 2017. The questionnaire asked about the types of organizations that helped with publicity and implementations, as well as the number of programs that people could participate in on the day of the event. Six municipalities that saw a remarkable rise in participation in the following year were extracted and asked about what they did to prepare and specific examples of how they increased participation, using a semi-structured interview method. An analysis of the data showed that there was a significant increase in participation, from 58%±18% in 2016 to 63%±16% in 2017. Furthermore, in both years, many organizations helped to publicize Challenge Day and helped with implementations, and participation was significantly higher in municipalities that had help with implementations. While the connection between the number of programs on the day of the event and participation was not significant, the negative correlation between them did suggest the necessity of choosing programs carefully. When programs were administered in a way that invited participants other than local residents, workers, and students, participation was significantly high. Interview responses were divided into four categories: (1) Ways to get organizations to help with publicity/implementations, (2) Specific examples of initiatives to increase participation, (3) Ripple effects from Challenge Day, and (4) Precautions to be taken when administering Challenge Day. The questionnaire and interview results were compared with each other and found to be consistent. In regard to the Challenge Day sporting event, the results revealed the importance of getting implementary help from many organizations, selecting programs carefully, and running programs that allow people from outside the municipality, as well as specific ways to achieve those things. These findings can help to improve preparations for Challenge Day.
The assessment of movement competence using the Bruininks-Oseretsky test, second edition at Czech school children

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Introduction: A sufficient level of movement competence (MC) is a significant health and psychosocial factor. Overall, there is a strong consensus that MC is positively associated with all health-related variables (Robinson et al. 2015). A lower level of MC in childhood is reflected in physical activity participation and engagement in physical activity later in life (Loprinzi et al. 2012). The Bruininks-Oseretsky test of motor proficiency, 2nd version (BOT2), is considered the most comprehensive diagnostic tool. The aim of this pilot study was to estimate a cross-cultural validity of the BOT2 in a sample of Czech school children.

Methods: The research sample was made of 83 school children (43 girls and 40 boys) of average age 10.15 ±1.66 years. For the estimation of a MC we used the BOT 2, 2nd version - complete form with German normative criteria.

Results: The results of our tested group show that the group's MC is in the lower part of the average level in the area of total motor composite (standard score 46.4±11.8). On average, the weakest performance was recorded in the area of fine manual control. The group's results were below average in this area (standard score 42.1±12.1). More in-depth analysis showed that the weakest subcomponent of the area of fine manual control was fine motor precision (scale score 10.1±5.5).

The second weakest result of the area of motor composite was manual coordination (standard score 45.3±11.4). The rest of components in composite score profile was analyzed and placed in the average level. The group's most successful area was the component concerning strength and agility (standard score 51.2±12.9).

Conclusion: As a pilot study the project indicated that the BOT2 can be valid for the Czech school children regarding the body coordination, strenght and agility assessment only. It is not valid for the assessment of fine manual control and manual coordination.

7 children from the overall number of 82 children were diagnosed with severe insufficiency in some of the subcategories, which requires necessary motoric intervention. 13 children were diagnosed with mild insufficiency, which requires motoric intervention aimed at specific area of motoric behavior.
20638

P1, P1.225

The partnership challenges experienced by Regional Sports Assemblies promoting physical activity to less active populations in Australia

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

**Implementation and scalability (SIG)**

Objective: We investigated the partnership-related challenges that Regional Sports Assemblies (RSAs) experience while working with intervention developers and community partners, to implement and scale-up physical activity interventions for less active people living in rural and regional communities.

Methods: In this Concept Mapping study, we used the Concept Systems Global MAX™ web platform to collect and analyse data from 31 management and program delivery staff representing all nine RSAs in Victoria (Australia). Participants brainstormed the partnership-related challenges their organisations experienced, grouped the brainstormed challenges into like-minded concepts, and rated each challenge according to how important it was and how much support their organisation needed to manage it. Multidimensional scaling, hierarchical cluster analysis, and mean importance (0=least, 5=most) and support (0=most, 5=least) ratings for each challenge were used to generate visual representation (point maps, cluster map and go-zone) of the results.

Results: Participants grouped the 46 brainstormed challenges around six clusters or overarching themes: Co-design for regional areas (4 challenges); Financial resources (3 challenges); Localised delivery challenges (4 challenges); Challenges implementing existing SSA products (9 challenges); Working with clubs (8 challenges); and Partnership engagement (18 challenges). The Co-design for regional areas cluster of challenges was rated as both the most important (mean rating=4.22) and requiring the most support (1.72). The individual challenge rated as most important was Lack of volunteer time (4.56), while the challenge requiring the most support to manage was Communication with State Sporting Associations who are driving products in regional areas without engaging local clubs or RSA/s/Local Government Authorities (1.46).

Conclusions: The key challenges identified in this study highlight that RSAs find themselves in the middle of a four-way relationship between intervention developers, local community partners with access to people and facilities, and intervention implementers. To enhance the implementation and scale-up of these interventions, all members of the partnerships should focus on 1) Working together to develop interventions and implementation strategies that meet the needs and contextual constraints of all stakeholders, and 2) Communicating effectively so that all stakeholders understand and agree what the partnerships are striving to achieve, and the role of each partner.
Adoption of faith-based physical activity program in a micropolitan community

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Implementation and scalability (SIG)

Objective: A community led coalition identified a faith-based walking program as a potential evidence-based strategy to increase physical activity in a Midwest micropolitan community (pop. ≈ 23,000). The objective of this study was to report on the rate of adoption among local churches, reach of the walking program, and the amount of accumulated physical activity as a result of the program.

Methods: The 12-week faith-based program encourages walkers to increase physical activity, spiritual growth, and cultural awareness through a virtual walk that begins in the churches' home community and ends in Jerusalem by Easter. Each individual tracks their steps and minutes walked each week. Individual totals are added to the church total. All area churches were invited (n=19) via email or phone to attend an informational meeting about the program. Adoption was defined as the number of churches adopting the walking program from the total number of churches. Reach was defined as the proportion of church members participating in the walking program divided by the total church membership. Miles per participant and by congregation are being tracked.

Results: Leaders from 11 churches attended the program informational meeting and 10 (90.9%) leaders who attended the informational meeting agreed to offer the walking program. The overall church adoption rate was 52.6% (10/19). Among adopting churches, there were 1,053 registered participants including 954 adults and 99 children aged 18 years or younger. Seven of the churches provided church membership and participation data, overall 8.4% of church membership initiated the walking program. Reach ranged from 5.4% to 13.1%. Accumulated physical activity as a result of the program will also be reported.

Conclusions: Faith-based physical activity programs, when identified and selected by the community members may present a feasible, and more sustainable, way to promote physical activity within local micropolitan communities. The present study, implemented under real world conditions, produced moderate rates of adoption among community churches reaching approximately 5% of the community population. Nearly all churches that had attended the information session participated in the program. Increasing the availability of information sessions could increase church adoption of faith-based physical activity programs.
Evaluation of Fundamental Movement Skills (FMS) interventions via the UK Medical Research Council (MRC) Process Evaluation guidance: A systematic review

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Fundamental Movement Skills (FMS) interventions are widely used to improve FMS proficiency and its health-related outcomes for children and adolescents. Previous reviews reported that the efficacy of FMS interventions are highly variable and interventions have limited scalability and sustainability. An identified limitation of the existing reviews of interventions is the lack of reporting around process evaluation. This review aims to establish the current state of the evidence related to process evaluation in FMS interventions using the UK Medical Research Council (MRC) guidance, which advances the understanding of the 'true' intervention effects and the translatability of the research into health promotion practice.

Methods: We searched 7 electronic databases for controlled FMS interventions targeting typically developing youth (5-18 y) measuring at least one FMS outcome published until Feb 2019. Title/abstract screening and full-text screening against inclusion/exclusion criteria will be conducted independently by two reviewers, with disagreement resolved through consultation with a third reviewer. All included studies will be subject to a two-phase analysis. The following procedures will be conducted by the lead author with 100% being double checked for consistency by a second reviewer. Phase 1: Deductive coding guided by the MRC guidance will be used to establish the extent of reporting process evaluation in FMS interventions. Intervention studies reporting process evaluation measures identified in this phase will proceed to Phase 2. Phase 2: Process evaluation measures in the following domains: implementation, mechanism of change and contextual factors will be extracted and analyzed to investigate their associations with FMS intervention outcomes. Relevant data will be sought by contacting authors if not reported explicitly in an article. Study quality will be assessed using Cochrane Collaboration's risk of bias tool.

Results: After de-duplication, 4605 abstracts were identified. The review commenced in Feb 2019, with an anticipated completion date in Feb 2020. Preliminary results will be outlined during presentation of this abstract.

Conclusions: This is the first study to examine and synthesize evidence on process evaluation to provide useful recommendations for the development and evaluation of FMS interventions. Our review also serves as a call to action for better practice in reporting FMS interventions.
P1, P1.228

Effective elements of care-physical activity initiatives for citizens with a low socioeconomic status

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

PURPOSE Care-physical activity (care-PA) initiatives involve collaborations between the primary care and the sports sector, with the aim to stimulate PA among citizens at risk for lifestyle related diseases. Preliminary results of Dutch care-PA initiatives specifically designed for adults with a low socioeconomic status (SES) indicate that these initiatives are successful in lowering body weight and enhancing quality of life among participants. Insights into the elements that make these initiatives effective would be useful for the development and implementation of new initiatives. Therefore, this research aims to unravel the effective elements of care-PA initiatives for low SES adults.

METHODS Concept Mapping (CM) was used as a tool to identify and cluster the effective elements. Nineteen Dutch health promotion experts participated in the CM procedure. First, each expert individually listed as many elements as they thought were of critical importance to the effectiveness of care-PA initiatives. Next, the researchers asked each expert to cluster all the gathered elements, and to score them on importance. Then, CS Global MAX software was used to perform multidimensional scaling and a hierarchical cluster analysis to develop a cluster map. Finally, during a group meeting with 11 of the experts, the cluster map was presented, discussed, and refined.

RESULTS The experts came up with 125 unique effective elements of care-PA initiatives for low SES citizens. After the statistical analysis and refinement during the group meeting, 113 unique effective elements were clustered into 11 clusters: 1) intersectoral collaboration, 2) local embedding, 3) barriers experienced during the programme, 4) customisation of the programme to the target population, 5) accessibility of the programme, 6) recruitment of participants, 7) competencies of the professionals, 8) approach of the professional, 9) methods within the programme, 10) actions within the programme, and 11) social support.

CONCLUSIONS The findings provide a valuable overview of the effective elements of care-PA initiatives for low SES citizens. The results can be used to develop and implement additional care-PA initiatives targeted at low SES citizens, and may eventually help to reduce health inequalities between low and high SES citizens.
Implementation of a community-based approach aimed at changing the environment and physical activity and nutrition behaviour to reduce overweight in youth

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Implementation and scalability (SIG)

Objective: The purpose of this study was to evaluate the implementation progress of a Dutch community-based approach (based on the EPODE-approach) aimed at changing the environment and physical activity and nutrition behaviour to reduce overweight in youth. Local program managers are encouraged to invest in five preconditions (political commitment, public and private partnerships, social marketing, monitoring and evaluation, linking prevention and healthcare). These preconditions enable communities to create an integrated approach and with that an healthier environment. The hypothesis is that program managers are able to implementation this approach by means of the support of the National Coordination Office.

Methods: In 2018 130 program managers were invited to complete an online survey about implementation of the five preconditions (response rate 50%). In 2016, the same survey was also completed by the program managers (n=107, response rate 58%). In order to determine improvements in implementation over time only communities who filled out the survey in 2016 and 2018 were included in this analysis (n=33). Data were analyzed by means of a Chi Square test using SPSS.

Results: Results show that in two years communities did not make significant progress on political commitment, public and private partnerships and linking prevention and healthcare. In those two years more communities were able to significant improve the understanding of the needs of their target group such as families with low socio-economic position (14 to 86%), parents with children aged 4-12 years (8 to 77%) and children (4-12 years (16 to 67%) and 12+ years (16 to 47%)). Understanding of the needs of the target group is an essential part of Social Marketing. In 2018 also significant more communities performed an evaluation to report results (15 to 48%). Barriers were the lack of structural budget and time for implementation and political intersectoral collaboration.

Conclusion: These results give insight in the complex implementation of a community-based approach aimed at changing the environment and improve sustainable and healthier lifestyles. It takes time and effort to create an integrated approach, whereby political commitment is build, public and private partnerships are made and intersectoral collaborations in the field are common.
Use of the PRACTIS guide to assess implementation progress of professional sports club-initiated type 2 diabetes prevention programmes: Cities Changing Diabetes in Leicester, UK

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Purpose: Leicester is the first UK city to join the Cities Changing Diabetes global network which aims to stem increases in urban type 2 diabetes (T2D) globally. Programmes are stakeholder driven, engage overlooked ("hard to reach") communities but are not primarily research studies. Instead, pragmatic real world evaluation is undertaken alongside sustainability promotion. In order to inform and operationalise our work this paper plots the progression of two Leicester Cities Changing Diabetes programmes against the PRACTIS implementation guide.

Methods: Two bespoke behaviour change programmes for those at risk of T2D are leveraging the brand, commitment and community outreach personnel of Leicester city's five professional sports clubs (soccer, rugby, cricket, basketball, hockey): Leicestershire County Cricket Club's 'Walking Cricket' for over-50s and Leicester City Football Club's 'Healthy Goals' reaching older South Asians. Both programmes are into their second rounds (Spring 2019) and have been adapted based on quantitative and qualitative data. Implementation and sustainability progress was plotted (February 2019) against the PRACTIS implementation guide's four iterative steps: (1) Characterise the parameters of the implementation setting; (2) Identify and engage stakeholders; (3) Identify contextual barriers and facilitators to implementation; (4) Address potential barriers to effective implementation.

Results: Aligning with PRACTIS steps: (1) Programme implementation setting (place, people, provision, principals) have been well defined. (2) Stakeholders critical for sustainability have driven the programme. (3) Contextual barriers include club capacity in providing personnel. Training past lay participants as coaches and community advocates will overcome this barrier. Facilitators to implementation include aligning prevention work with city health priorities, having all clubs sign a "diabetes pledge" (November 2018) and addressing gaps in the clubs' community reach. (4) Barriers are assessed regularly through ad hoc conversations with professional sports club staff and formally at the City Council's Strategic Alliance for Physical Activity whose members include elected officials and public health planners.

Conclusions: Based on the four PRACTIS steps it is clear that a contextually relevant approach has been taken. Typically researchers translate evidence based research into practice. Instead we are pragmatically evaluating new practices to enhance their evidence base and promote implementation and sustainability to overall improve urban T2D.
Body dissatisfaction in adolescence: investigating potential side effects of the cluster randomized healthy high school trial

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Many young people are concerned about their body image. It is important that physical activity (PA) and dietary interventions do not have a negative impact on body image. The Healthy High School (HHS) study was developed to promote well-being among Danish high school students by 1) preventing stress and 2) improving sleep, 3) sense of community, 4) regular movement and 5) regular meals. During the needs assessment many high school students mentioned the need to look perfect. Therefore, we highlighted wellbeing and energy as potential benefits of the HHS dietary and PA interventions strategies instead of weight loss, calorie counting or calorie burning. Still, the increased focus on regular movement and healthy meals makes it relevant to investigate whether the HHS intervention increased body dissatisfaction among participants. The purpose of the present study is to explore this unintended side effect.

Methods: The HHS study was designed as a cluster-randomized controlled trial. Thirty Danish high schools were randomized to the intervention (n=15 schools) and control group (n=15 schools) (5201 students in total). The intervention included 1) curricular activities, 2) a smartphone app 3) school environmental changes and 4) a peer-led innovation workshop aiming at inspiring students to initiate and participate in activities that focused on increasing movement and sense of community. Students completed baseline and follow-up questionnaires at the beginning (August 2016) and the end of the school year (May 2017). Body satisfaction was assessed by the question: "On a scale from 1 (very unsatisfied) to 10 (very satisfied), how satisfied are you with your body?". We used multilevel linear regression analysis including baseline body satisfaction, BMI, sex and immigrant background as covariates.

Results: At baseline, the mean body satisfaction score was 6.54 and 6.52 for students at intervention and control schools, respectively. At follow-up, there were no statistically significant differences in body satisfaction between students from intervention and control schools (ßa; = 0.10, CI 95%: -0.09 - 0.32) (available cases analysis).

Conclusions: This study did not show any effect of The HHS study on students' body satisfaction. Intention to treat analysis will explore the importance of missing data.
Implementation and scalability (SIG)

Purpose: The purpose of this implementation research study was to examine the utility of different physician referral and engagement processes for improving reach (i.e., number, proportion, and representativeness of participants) for a rural, evidence-based, technology-delivered weight management program with counseling support.

Methods: Five primary-care physicians were randomly assigned to a sequence of 4 referral strategies: point of care (POC) referral with active telephone follow-up (ATF); POC referral, no ATF; electronic health record registry-derived letter referral with ATF; and letter referral, no ATF. POC referrals were made during a typical clinic visit. For registry-derived referrals, physicians screened a list of patients with a BMI >=25 and approved patients with no contraindications for participation in a weight loss program to receive a personalized referral via mail.

Findings: A total of 568 of a potential 996 referrals were made over 8 weeks and 88 patients enrolled in the program (58% female). Participants were representative of the racial and ethnic characteristics of the region, but appeared to have a higher proportion of male participants when compared to typical community weight loss programs. Of the 490 potential letter referrals, all were completed, 178 (36%) patients were screened, and 56 (11%) enrolled. Of the 506 potential POC referrals, 78 (15%) patients were referred, 48 (9%) were screened, and 12 (2%) enrolled. Patients receiving ATF were more likely to be screened (53% vs 5%; p<.05) and enrolled (16% vs 5%) when compared to those without ATF.

Finally, we found variations in proportion and number of enrollees based on referrals as the denominator (POC with ATF, 49%, n=24; POC no ATF, 28%, n=8; letter ATF 16%, n=33; letter no ATF 8%, n=23).

Conclusions: The letter referral with ATF appears to be best for enrolling a larger number of rural patients in a weight-management program, but resource costs in the large volume of telephone calls may make POC referral with ATF more attractive to small rural clinics.
An integrative, systematic review exploring the research, effectiveness, adoption, implementation, and maintenance of interventions to reduce sedentary behaviour in office workers

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Implementation and scalability, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose:
Previous systematic reviews of interventions targeting sedentary behaviour (SB) in office workers have focused reporting on indicators of efficacy. In this review, the RE-AIM framework is utilised to report on additional indicators that have the potential to inform and improve further implementation and translation of interventions targeting sedentary office workers. The review aims to gain an understanding of the proportion of RE-AIM indicators that are reported in the literature to identify whether gaps in reporting exist, which indicators are under-reported and which existing methods may be useful in collecting data on under-reported indicators.

Methods:
An integrative, systematic review approach was used to facilitate the inclusion of both qualitative and quantitative articles. Articles were included if they involved adult office workers, were conducted in an office setting, and changes in sedentary behaviour had been measured as a primary outcome. Five electronic databases were searched yielding 7234 articles, with 75 articles (61 individual interventions) meeting the inclusion criteria. The Covidence program was used to aid the blinded, double screening process and analysis was conducted with a validated RE-AIM coding sheet across 28 indicators.

Results/findings:
Reach indicators were the most frequently reported of the RE-AIM dimensions, which were reported on average 59% of the time. Efficacy/effectiveness was the second most reported dimension at 49% reporting across all of the indicators. Implementation indicators were reported an average of 44% of the time, with indicators of adoption and maintenance reported as the lowest at 13% and 8%, respectively.

Conclusions:
The results of this review indicate that, within interventions targeting SB in office workers, there is an imbalance in the reporting across indicators of the RE-AIM framework. Evaluating all interventions across RE-AIM indicators may be an essential first step in the effective translation of interventions as we move towards understanding intervention effectiveness under real-world conditions. Additionally, minimal reporting of indicators of adoption and maintenance fuels arguments that a more pragmatic "practice-based" approach to intervention design may be warranted. In light of the significant gaps in reporting, the research team have created specific recommendations to facilitate improved future reporting of office-based SB interventions.
Cultural adaptation of a high school-based intervention to a vocational school setting to increase physical activity and sense of community – the Young & Active study

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Objective/Purpose: To describe and evaluate the process of cultural adaptation of the high school-based Young & Active intervention (YA) to a vocational school setting.

Methods: Cultural adaptation was conducted in three phases: 1) needs assessment, 2) preliminary adaptation design, and 3) pilot study. The pilot study was conducted in two Danish vocational schools involving five programs, and 136 students aged 15-17. We evaluated the implementation of the adapted intervention using mixed methods. Key process evaluation concepts: Participant responsiveness, appreciation and context. Students received a two-session peer-led innovation workshop. Student questionnaires assessed appreciation, participant responsiveness, demographics, and PA. Participant observations were used to gain knowledge on context and participant responsiveness. Students (focus groups) and their teachers (individual interviews) were interviewed after the workshop to investigate participant responsiveness and appreciation. Quantitative data were analyzed using chi-square tests and ANOVA, and qualitative data (field notes and interview transcripts) were coded according to the process evaluation concepts and emerging themes.

Results/findings (preliminary): Key modifications of YA from high schools to vocational schools included: a narrowed objective and focus, changes in workshop content, and allowing for more customization and local adaptations. Students' overall appreciation scores of the workshop sessions were 7.7 (SD 1.6) (session 1) and 7.8 (SD 2.0) (session 2) out of 10. Appreciation varied by subgroups; especially students from a small town, male students and physically active students liked the workshop. Qualitative findings: the educational and local organizational structure of vocational schools, teacher motivation, and the physical and social school environment influenced implementation of YA in vocational schools. Further, YA was generally very well received among students though some did not comprehend the project purpose, and some felt uncomfortable in workshop activities.

Conclusions: This study contributes with comprehensive knowledge about a potentially fruitful arena for PA promotion and how to adapt an intervention from one youth setting to another. The results will guide further adaptation of the intervention to test the effect of the intervention in a larger trial and improve future implementation and effectiveness in promoting PA and sense of community in Danish vocational schools.
A qualitative investigation into the post-16 gap of physical activity: The role of PE

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Early care and education, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose
Adolescence is a critical time for establishing life-long health habits, such as physical activity (PA) (Pearson, 2009). Several reviews have illustrated a shift in life course, particularly between ages 15 to 16, which may have implications for PA participation during later life (Niven et al., 2009).

In the UK, an estimated 60% of young people do not participate in structured activities post compulsory education: a phenomenon labelled the post 16 gap (Honeybourne et al., 2004). Despite these figures there is a paucity of qualitative evidence investigating why young people participate, or fail to participate, in PA, and how life stage transitions impact PA levels (NICE 2007).

Aim: This study investigates why young people discontinue participation in exercise, sport and PA, whilst analysing reasons for this post compulsory education decline.

Methods: Twenty-four respondents were divided into five focus groups. Requirements were that individuals were in the Post 16 phase of compulsory education. A semi-structured topic guide was developed to establish perceptions of PA and experiences of Physical Education (PE) and PA within formal education. Each focus group was digitally recorded with the key themes highlighted using NVivo using thematic analysis.

Findings: Several key barriers and facilitators of participation in PA were identified. The barriers and facilitators cited by respondents are similar to those described by those who previously expressed a dislike for participating in core PE (Allender et al., 2006). Previous negative experiences within PE contexts were perceived as a major barrier to continued PA.

Respondents perceived that PE teachers focused primarily on physically capable students, leading to feelings of incompetence in others.

Conclusions: Despite an attempt to emphasise Health and Wellbeing in the school curriculum it seems that adolescents equate PA to competitive sporting games. Access to individualized activities, were more likely to promote participation, particularly in those who had just left compulsory education. There is a need for Physical Educators to place more emphasis on sustainable, personalised PA, diminishing perceived emphasis on sporting games. Further implementation of contemporary pedagogical models following current trends within the fitness industry, may enhance PA promotion in post-16 adolescents.
Is active commuting to school associated to health-related quality of life in Spanish children? The PREVIENE Project

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Early care and education, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Research suggests that physical activity plays a role to improve health-related quality of life (HRQoL). However, the association between different domains of physical activity, such as active commuting (i.e., mainly walking or cycling) to and from school (ACS) and HRQoL is still unknown. This study aimed to describe the ACS patterns and its association with HRQoL in a sample of Spanish children, and separately by gender.

Methods: A total of 490 students (girls=241, aged 8.46±smn;0.32 yr.), belonging to 14 public schools from Granada (Spain) participated in this study. HRQoL was measured using the Kid-KINDL-R Questionnaire, a valid and reliable tool for children. The HRQoL score was obtained for each of the 6 dimensions of the questionnaire in a range of 0 to 100. Children self-reported their usual mode and frequency of commuting using questions from the validated PACO questionnaire. Active commuters were considered if students performed at least =4 weekly ACS trips. The standardized cut points from each KID-KINDL-R dimension were applied. A t-student test was carried out to analyse the mean differences of the HRQoL dimensions between active and passive commuters for the whole sample and by gender.

Results: Overall, a 45.9% of girls and 51.8% of boys actively commute to school. There were significant differences in the HRQoL dimensions between active and passive commuters for the whole sample (p<0.05), finding differences in girls (p<0.05) but not in boys. Active girls scored higher in the physical well-being (p= 0.042), emotional well-being (p=0.036) and family dimensions (p= 0.011) compared to passive girls.

Conclusions: ACS was associated with higher levels of HRQoL only in girls. Active girls presented better score in the physical well-being, emotional well-being, and family dimensions than passive girls. Intervention programs focus on the improvement of the quality of life, should take into account ACS behavior to achieve better benefits.
A comparison of measurement methods to assess food provision within long day care (early childhood education and care) centres

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Early care and education, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: One in five Australian children aged 2-4 years are overweight or obese. Dietary patterns and food preferences developed during childhood often track into adulthood. Approximately 50% of Australian children, aged 0-4 years attend formalised childcare and current guidelines recommend children receive 50% of their daily nutritional intake in this setting. Existing measurement methods used to assess childcare food provision are time-consuming, labor intensive, costly and not feasible on a large-scale level. The aim of this review was to determine current measurement methods utilised at a service level, specifically concerning food provision, menu evaluation, food wastage and how these compare against weighed food measurement, which is the current "gold standard"

Methods: A systematic literature search was conducted using MEDLINE, Scopus, CINAHL, Web of Science, and The Cochrane Library. Inclusion criteria: articles published between January 2000 and October 2018; articles written in English; studies conducted in long day care centres; studies including a measurement method used at the service level, specifically about food provision, menu evaluation, food wastage. Exclusion criteria: articles which focused on children's individual dietary intakes; food provision from other sources; settings other than long day care; studies that did not measure food consumption.

Results: The search identified 62 studies with six meeting the inclusion criteria. The following measurement methods were used within the studies: dietary observation (n=2), digital photography and weighed measurement (n=1), visual plate waste scale method (n=1), online menu evaluation (n=1) and plate wastage using a Plate Waste-Ingestion index (n=1). Key study limitations included high cost, implementation time and training of staff.

Conclusions: Studies assessing measurement methods within long day care centres are currently in preliminary stages. Further research is required to determine if other measurement approaches are feasible on a large scale and these should be compare to the current gold standard.
Foods offered to children in after-school programs are not meeting dietary recommendations: An observational study of healthy eating environments

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Early care and education, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: One quarter of all school-aged children in Australia are overweight or obese. After-school programs (ASP) have a unique opportunity to provide positive food environments to children (5-12 years). Limited research has been conducted on the food environments in Australian ASP. The aim of this study was to explore healthy eating environments via observing foods offered and staff behaviour across two local health districts in New South Wales (NSW).

Methods: A cross-sectional study design explored healthy eating environments within 50 ASP across two local health districts in NSW, Australia. Each ASP was visited Monday to Thursday, on two non-consecutive days from May -October 2018. Foods offered were captured via direct observation and photographs. These foods were categorised into five core food groups and compared with Australian Guide to Healthy Eating (AGHE) for children 4-8 years. The total offering was determined and expressed as a percentage. Staff behaviour was captured using Systems for Observing Staff Promotion of Physical Activity and Nutrition (SOSPAN) and short interviews with program directors captured contextual information on program practices.

Results: Over 102 site visits, 390 staff and 3,321 children were observed. Fruit (91%) and water (71%) were observed almost daily (n=102). Refined grains (65%) and discretionary items (49%) were offered more frequently than vegetables (29%) and whole grain (31%) foods. Staff sat and ate with children 18%, healthy eating was actively promoted 11% and nutrition education observed on 4% of observation days. Children were involved in food preparation activities 7% and cleaning after snacks 67% of observation days. Ninety-two percent (n=60) of program directors reported having less than 4hrs/yr of professional development in nutrition, 18.5% (n=57) used educational content to promote nutrition and 5.8% (n=55) indicated their snack menu was assessed annually using nutrition calculators.

Conclusion: ASP may not be providing children with healthy food environments. Although positive behaviours were observed through the regular provision of fruit and water, discretionary items and refined grains were frequently offered. There were limited observations of positive role modelling from staff. Additional healthy eating training should be provided to assist staff engage children in experiences and conversations around healthy eating.
P1, P1.81 Home-based health outcomes of a childcare-based nutrition intervention: pester power examined

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Early care and education, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Early care and education (SIG)

Purpose: Childcare-based nutrition interventions are prime opportunities to impact a large number of children over an extended period of time. Parent-targeted interventions also have potential but have higher attrition rates, are less cost effective, and are condensed over shorter time periods. For childcare-based nutrition interventions to be optimally effective, health outcome changes must be found at both school and home. We Inspire Smart Eating (WISE) is a weekly school-based nutrition curriculum that preschool teachers implement across eight months. The objective of this presentation is to determine if children's talking to parents about the intervention (i.e., pester power) is associated with home-based health outcomes.

Methods: Pre- and post-intervention parent interviews were conducted by trained research assistants. Interviews were the same at both time points allow for statistical control of baseline values. Three post-intervention health outcomes were examined: increase of fruit and vegetables (target food intake), decrease of sugary treats and fast food (junk food consumption), and improvements in parents' behavior in facilitating and/or reinforcing positive nutritional habits (parenting practices). Pester power was the mean of three items about the frequency of children's behaviors related to the intervention (e.g., "How often did your child ask for WISE foods?").

Results: To measure the impact of pester power, three hierarchical regressions were used to predict target food intake, junk food consumption, and parenting practices at post after controlling for baseline values of these outcomes and the pre-test value of child's willingness to try new foods. Baseline levels and child willingness explained a significant portion of the variance across all outcomes: target food (R² = .30), junk food (R² = .22), and parenting practices (R² = .42). Pester power added a significant increase in variance explained beyond baseline measures for target food intake (R²change = .04, Fchange = 13.86, p<.001) and parenting practices (R²change = .03, Fchange = 12.38, p<.01), but not for junk food consumption.

Conclusions: Pester power was predictive of improvement in target food intake and parenting practices across a school year for the WISE intervention. Pester power may be a common mechanism across interventions that can be leveraged to promote change.
Active games as an educational tool to increase physical activity in first grade children: main results of a feasibility study

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Early care and education, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose:
The high prevalence of physical inactivity in children constitutes a considerable risk to their health. Most common interventions to increase physical activity are implemented in schools. In this context, we developed and pilot tested a physically active academic program for low-income students in 1st grade attending public schools, named "Active Breaks". Its objective was to increase moderate to vigorous physical activity (MVPA) during 15 minutes on daily basis through culturally appropriate games linked to the learning objectives of every subject.

Besides the development of the set of games and their implementation, we identified barriers and facilitators to its use as an educational tool according to teachers and students' perception and experiences. This was important to elaborate the final recommendations of this strategy.

Methods:
A qualitative approach was use to study the perception of the participants in the project. 14 in depht semi-structured interviews were conducted to teachers and 4 group interviews adapted to children, in the case of students. Each interview were transcript and analyzed using the Grounded Theory approach.

Results/findings:
From the teacher's experience, some categories were important to the implementation of the game as a learning tool. This can be barriers and facilitators depending on the context. For example, the infrastructure, teaching hours, children's personalities, teaching methods and workload, were related to the school's educative project and to the way teachers relate to it.

A successful implementation is characterized by the support and active commitment from the school administration, allowing modifications in the planning of class without increasing the workload, accepting more dynamic teaching methods and facilitating the use of places at any moment, among other measures, allowed the incorporation of this material in the children's routine. When this commitment did not exist, the active games were perceived as loss of learning time and disorder.

Conclusions:
Providing an educational material that is flexible enough to be adapted to different realities, but with clear guidelines that do not require greater preparation for teachers, was perceived as a positive contribution to traditional classes and to the increase of movement in the children.
Relationship between non-parental childcare and diet, physical activity, sedentary behaviour, and sleep – A systematic review of longitudinal studies

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Early care and education, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: The rising prevalence of childhood obesity is a global public health concern. Evidence suggests that exposure to non-parental childcare before age six years is associated with development of obesity and obesity-related behaviours, such as diet and activity behaviours (physical activity, sedentary behaviour, and sleep). However, the current evidence base is inconsistent, and most comes from cross-sectional studies, which makes it difficult to identify the direction of causation in any association. This review identified and synthesised the published research on the longitudinal associations between non-parental childcare during early childhood, diet, and activity behaviours.

Methods: Seven databases were searched using a predefined search strategy. Results were independently double-screened through title/abstract and full-text stages according to predefined criteria. Included studies were tabulated, and evaluated for risk of bias using the United States Department of Agriculture's Nutrition Evidence Library Bias Assessment Tool.

Results: Of 18793 references screened, 13 studies met the eligibility criteria and were included in the review. Eight studies reported on diet outcomes, three on physical activity, three on sedentary behaviour, and one on sleep. These presented results on 89 different childcare:outcome associations. Of 63 associations testing diet outcomes, 37 (59%) were null, and the remainder mostly showed inconsistent patterns. There was an indication of a potential association of Head Start providers (vs others, including parents) with positive dietary behaviours. Of 26 associations testing activity behaviour outcomes, 22 (85%) were null, and the remainder showed inconsistent patterns. Risk of bias varied between studies, but most studies (92%) did not report or use valid and reliable outcome measures, and outcome assessors were not blinded (or unclear if blinded) to participants' exposure status (77%).

Conclusions: The scarce available literature indicates little and mixed evidence of a longitudinal association, particularly for activity behaviours. However, this is likely to reflect an absence of research, rather than evidence of no effect. There is an urgent need for observational studies investigating the longitudinal effects of non-parental childcare on diet and activity behaviours, to assess potential lasting effects and mechanisms; whether and how effects vary across different providers; and differences by intensity, duration, and population sub-groups.
The ToyBox Pre-School Obesity Prevention Intervention for use in Scotland: Results of a Feasibility Cluster Randomised Controlled Trial (cRCT)

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Early care and education, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: The ToyBox intervention was successful at increasing physical activity and reducing sedentary behaviour in pre-school children across Europe. The intervention involves teacher-led activities over 18 weeks which aim to increase physical activity, reduce sedentary behaviour, and promote healthy snacking and water consumption. We adapted the Toybox Europe intervention for preschools in Scotland using a co-production approach. This study aimed to test the feasibility of our adapted intervention in children attending preschools in relatively deprived areas of Glasgow, Scotland, who are considered hard to reach.

Methods: The feasibility cRCT involved six preschools (three intervention, three control); control was usual curriculum. Participants were 3-5 year old children attending preschools in Glasgow, UK, and their parents. Outcomes of interest were recruitment rates, willingness to be randomised, attrition rates, questionnaire completion rate and acceptability of measurement methods. Measurements were taken at baseline and 18 weeks; anthropometry, physical activity, sleep and sedentary time using the activPal accelerometer (wear time = 7 days; 3 days considered valid), body composition via bioelectrical impedance analysis (BIA), and measures of diet and home screen time via parental questionnaire.

Results: Cluster level recruitment rate was 9% (11/112 preschools) and the individual level recruitment rate was 18% (42/231 children). 36 children (16 girls) provided at least one valid measure at baseline and follow-up (attrition rate = 16.6%). All clusters were willing to be randomised. Anthropometric measures were acceptable and feasible. Parental questionnaire response rates were low (20%). 61% of the sample provided valid accelerometer data at baseline, 27% for baseline and follow-up. BIA was not feasible due to poor participant compliance with protocol.

Conclusions: Recruitment rates of both preschools and children was lower than anticipated compared with Toybox Europe. However, for those children who took part, the adapted intervention and the measurement methods appeared acceptable and feasible. An ongoing process evaluation will help identify ways in which recruitment of preschools, and recruitment and retention of participants, can be maximised in areas of deprivation.
A systematic review and meta-analysis of school-based educational interventions to improve body composition in adolescents

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**Abstract**

**Background:** Adolescence is a transitional period marked by critical changes in behaviours and body composition that place adolescents at an increased risk of becoming overweight and obese. Health education in school can improve health behaviours by encouraging critical thinking about these issues. To develop sustainable interventions to prevent obesity, it is necessary to understand which intervention elements are effective.

**Objective:** To answer the question, are school-based educational interventions effective in improving BMI and preventing overweight and obesity in adolescents?

**Methods:** We carried out a systematic review and meta-analysis of published intervention studies. In October 2016, we searched MEDLINE, PsycINFO, CINAHL, and ERIC. Two independent researchers assessed titles and abstracts, and extracted data and assessed risk of bias in the included studies. Review inclusion criteria were: a) health education intervention studies conducted in schools in high-income countries that included a control group b) participants aged 10-19 years, c) studies reporting BMI/ BMI Z-score at baseline and follow-up.

**Results:** Searches identified 29,174 publications, of which 312 studies full texts were selected as potentially meeting inclusion criteria. Twenty-five studies met the inclusion criteria. Most (n=18) were delivered by teachers in classroom settings, followed by researchers, schools nurses and students. Additional methods used in the intervention included out of class components, physical activity sessions, digital interventions and parent involvement. Eleven of the included studies were effective in improving BMI or BMI Z-score at follow-up periods ranging between 2 months and 2 years post-intervention. Intervention features associated with effectiveness were the provision of training for teachers prior to intervention, and involvement of parents or families. Data from 13 of the 25 studies were included in a meta-analysis, using a random effects model given the high level of heterogeneity (I² = 65.1%). The overall pooled estimate of change in BMI Z-score in the intervention group, compared with the control group was statistically significant [ßa=−0.10, 95% CI (-0.14, -0.05); p<0.001].

**Conclusions:** This systematic review demonstrates that school-based educational interventions have the potential to prevent obesity in adolescence. Mediating factors associated with effectiveness included providing training for teachers prior to the intervention and involving parents or families.
Community Bike Shops: A Link between Cycling Infrastructure and Access to Health

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective
People who live in urban areas with inadequate access to transit services are often from marginalized demographic groups whose limited mobility options also limit their employment opportunities, access to medical and social services, and recreational opportunities. In these transit deserts, active transport through cycling can play a critical role if residents are provided assistance with bike ownership and maintenance. Nonprofit, community bike shops, where residents can obtain donated or rebuilt bikes at low cost or through sweat equity and can gain access to bike maintenance help, instruction, and tools, can fill in this transit gap and help participants increase their physical activity and help alleviate socio-economic inequities. The purpose of this study was to examine community bike shops and analyze their histories, goals, organizational structures, demographics, community programs, and connections to improved active transport and health.

Methods
Twenty community bike shops (14 US cities, 10 states, and 5 regions) were selected. Direct observation, tours, and interviews with staff, volunteers, and participants were the primary methods used. Bike shop histories, goals, organizational structures, programs, and community engagement were researched through data from their websites. Annual reports were collected when available. Demographics from the 2017 US Census Bureau for each bike shop's zip code were analyzed.

Findings
Bike shops were created through a variety of means (individuals, local advocacy groups, schools, businesses, and city governments) and resourced through a variety of means (grants, donations, volunteers, business philanthropy, and other organizations). All bike shops were non-profit and dependent on volunteers; several hired paid staff. Goals included allowing participants to obtain a bike or bike parts at low cost or through volunteering; offering bike repair and maintenance instruction; providing bike safety education; fostering community engagement; and teaching marketable job skills. Bike shops served communities with higher percentages (than national averages) of people living in poverty, people reliant on public and active transport, and people from minority populations.

Conclusions
Nonprofit, community bike shops provide services critical to promote and support active transport which are otherwise missing, thus helping participants to maintain a work life and have increased access to health care and physical activity.
Environmental factors influence physical activity among Hispanic families: Comparing two countries

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Socio-economic inequalities (SIG)

Purpose: Obesity has become a pressing issue for Hispanic populations in the United States (U.S.) as well as for the Mexican population in Mexico with prevalence steadily increasing over the last quarter century for both adults and children. A common contribution to obesity risk is lack of physical activity (PA). Only 33.4% of Hispanic adults are meeting the recommended levels of PA. Therefore, we seek to understand how environmental factors and beliefs impact PA engagement for Hispanic families in Mexico and those in the U.S.

Methods: Four bilingual and bicultural trained research assistants conducted focus groups in Mexico (San Luis Potosi) and the U.S. (Illinois). The 33 participants ranged in age from 18 to 72 years. Twenty-one mothers were married, most participants have not completed above a high school education in Mexico (82%) or in the U.S. (94%) with 33% attaining up to 6 years of education. Most participants were full-time stay at home mothers (59%), with a higher percentage (75%) of working mothers in the U.S. compared to Mexico (24%). Two researchers immersed themselves in the data searching for meanings and patterns, producing initial codes, sorting codes into themes, finding concrete ideas, and ensuring fit with the data to support the themes.

Findings: Analyses revealed several topics of discussion related to beliefs and barriers that played a role in family PA engagement: 1) walking is the most common form of PA for families in both countries; 2) parents believe people of all ages and genders can and should be physically active, but there are differences in access, opportunity and ability; 3) major barriers to engaging in PA are different for those living in Mexico [safety concerns] or in the U.S. [weather constraints].

Conclusion: These findings have implications for behavioral interventions and understanding new areas of concern for Hispanic families trying to manage healthier lifestyles. The most common barriers reported to engaging in PA are environmental safety concerns, especially safety in outdoor spaces and neighborhoods. Therefore, engaging community networks and resources can be a way to combat these barriers to promote PA in all settings.
Socio-economic inequalities in the associations between frequency of cooking dinner, diet quality, and food security

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Home cooking is recommended to improve diet quality, which remains low overall and lower among low-income populations compared to higher income groups. Evidence also suggests that cooking skills are protective against food insecurity. In this study, we describe how cooking frequency is associated with diet quality and food security, overall and stratified by socio-economic status (SES) in the United States (US).

Methods: We use data from the 2007-2010 National Health and Nutrition Examination Survey (n=9,504) among adults (aged =20 years with 2 days of valid dietary recall data) to examine the association between cooking frequency (cooking dinner in the last 7 days), diet quality (Healthy Eating Index-2015 (HEI) scores), and food insecurity (18 question USDA food insecurity scale). We use linear regression models adjusted for fast food, ready to eat food, and frozen food intake, and socio-demographic and socio-economic measures. We estimated models overall and stratified by income to examine differences in the association between cooking and diet quality, and cooking and food insecurity based on SES. All models used survey weights to provide nationally representative estimates.

Results: Cooking frequency shows a clear, positive, linear relationship with higher HEI score overall and among low- and high-income adults. Overall, in fully adjusted models, compared to cooking 0-2 times/week, cooking 3-4 times/week was associated with 1.58 higher HEI (p<0.05), cooking 5-6 times/week was associated with 1.96 higher HEI (p<0.01), and cooking 7+ times/week was associated with 2.25 higher HEI score (p<0.001). However, among low-income adults, cooking 7+ times per week was associated with smaller increases in diet quality than among high-income adults (low-income: 1.37 (p<0.05) HEI increase; high-income: 3.55 (p<0.01) increase. Cooking 3-6 times/week was associated with higher food security status, whereas cooking very little or very frequently (7+ times/week) was associated with lower food security.

Conclusions: Cooking dinner at home more frequently is associated with better diet quality overall, and among both low- and high-income adults in the US, though the strength of that relationship is stronger among high income adults. More research is needed to understand the relationship between cooking frequency and food security.
Socioeconomic dietary disparities according to migration status among adolescents in Belgium

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objectives

Little information about social disparities in adolescent dietary habits is available. In adults, studies have underlined changes in immigrant dietary habits due to a partial and progressive adoption of the host country lifestyle resulting in acculturation. Moreover, interactions between migration and socioeconomic characteristics have been found regarding health outcomes. This study examined the socioeconomic disparities in dietary habits among adolescents according to their migration group. We hypothesized that immigrants have healthier dietary habits than natives, and that food consumption frequencies gradually increase or decrease with the generation of migration due to the acculturation process.

Methods

Data came from the 2014 cross-sectional Health Behaviour in School-aged Children survey in Belgium. Food consumptions were estimated using a self-administrated short Food Frequency Questionnaire. In total, 19,172 adolescents aged of 10-19 years were included in the analyses. Due to a statistical effect modification of migration status with several covariates, analyses were stratified by migration status. Multilevel multiple binary and multinomial logistic regressions were performed for fruit, vegetable, fish, dairy, crisps and fries, and sugar-sweetened beverages (SSB) consumptions. Covariates were gender, age, family affluence scale (FAS), family structure, parental working status, siblings, and school region.

Results

Overall, immigrants had better consumption to health of healthy foods and more frequent consumption of unhealthy foods. Indeed, 32.4% of first-generation immigrants, 26.5% of second-generation immigrants and 16.7% of natives consumed fish =two days per week. Compared to a high FAS, adolescents with a low FAS were more likely to consume SSB =once a day (vs. <once a week: natives aRRR = 1.65 (95%CI: 1.39-1.96); second-generation immigrants aRRR = 1.51 (1.14-1.99); NS in first-generation immigrants). Immigrants from schools in Wallonia were less likely than those in Brussels to consume crisps and fries =once a day (vs.<once a day: second-generation immigrants aOR = 0.54 (0.38-0.76); first-generation immigrants aOR = 0.61 (0.41-0.89); NS in natives).

Conclusions

The migration gradient observed here underlines a process of acculturation. Narrower socioeconomic disparities in immigrant dietary habits compared with natives suggest that these habits are mostly defined by the culture of origin. Nutrition interventions should better consider cultural components of dietary habits.
Home-prepared food, dietary quality and socio-demographic factors: a cross-sectional analysis of the UK National Diet and Nutrition Survey 2008-16

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Evidence suggests eating home-prepared food (HPF) is associated with increased dietary quality, while dietary quality varies across socio-demographic factors. Although it has been hypothesised that variation in HPF consumption between population sub-groups may partially account for variation in dietary quality, evidence is inconclusive. This study aimed to examine the association between HPF and dietary quality using an innovative measure of HPF consumption. It also sought to determine whether HPF consumption and its association with dietary quality vary across socio-demographic characteristics.

Methods: Cross-sectional analysis of survey data (N=6364, aged=18), including 4-day food diaries. Dietary quality was defined as accordance with the Dietary Approaches to Stopping Hypertension (DASH) diet. HPF consumption was estimated from content and preparation location variables in food diaries. Logistic regression was used to determine the association between HPF consumption and DASH accordance. Interaction terms were introduced to test for effect modification by socio-demographic variables (household income, education, occupation, age, gender, ethnicity and children in the household). Linear regressions were used to determine the association between consumption of HPF and the same socio-demographic variables. Regressions were mutually adjusted for socio-demographic variables.

Results: Consumption of HPF showed a small association with DASH accordance (OR=1.2 per 10% increase, 95% CI 1.1-1.3). This association was different for Asian participants (p<0.01), with the association being negative but non-significant (OR=0.8, 95% CI 0.6-1.0). There was no evidence of effect modification by other socio-demographic variables. Consumption of HPF did not vary significantly between most sub-groups. Small increases were associated with being female (27.1 v 25.8%, p<0.01) and having a university degree compared to no qualifications (27.8 v 25.6%, p<0.01). Larger variation was associated with ethnicity, with Black and Asian participants consuming substantially more HPF than White participants (37.8 p<0.01 and 34.4 p<0.01 v 25.9%).

Conclusions: While eating more HPF is associated with a small increase in dietary quality across most of the population, for most groups variation in HPF consumption is minimal and the effect of HPF on dietary quality does not vary. While HPF may be a small part of the puzzle, it appears other factors drive socio-demographic variation in dietary quality.
Hunger in vulnerable families in Southeastern Europe: Associations with health and violence

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Food insecurity is a major public health concern, especially in families with children. Hunger can influence the healthy development of the child and has also been shown to be associated with other determinants of child health, such as violence within the family and maternal (mental) health. While the majority of research has been conducted in high income countries with vulnerable populations, less is known about the circumstances in low-and-middle-income countries in Southeastern Europe. This study explored the experience of hunger in vulnerable families in FYR Macedonia, Republic of Moldova and Romania, and examined relationships with maltreatment and other health indicators.

Methods: Data from the feasibility phase of the RISE study was used. Families (N=140) in the three countries were recruited for a parenting intervention targeting child behavioural problems. Participants reported on three hunger questions (In the past 30 days, did you 'run out of money to buy food for your home', 'cut the size of meals or skip any meals because there is not enough food in the house', 'or any of your children go to bed hungry because there is not enough food to eat'?); household assets; child and family maltreatment; and parental health.

Results: Overall, 31% of families experienced at least one form of hunger in the last month. Hunger was significantly related to other indicators of low SES such as lower adult educational and literacy level, more children in the household, and lack of household assets (5% had no access to water, 9% had no fridge). Worse family functioning (e.g. cannot turn to each other for support in crisis), current intimate partner violence (victimisation and perpetration), and more instances of child neglect were significantly associated with family hunger. In families experiencing hunger, mothers showed significantly higher scores on depressive symptoms, anxiety, stress, lower emotional support, and worse general health.

Conclusions: Results indicated that hunger in families with children showing elevated child behavioural problems in Southeastern Europe was associated with more family maltreatment and poorer (mental) health. In adapting parenting interventions to address child behaviour problems, hunger and its association with health and violence should be considered.
Food insecurity among Canadian youth and young adults: Insights from the Canada Food Study

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Objective: Food insecurity affects 1.3 million Canadian households, with 12% of households experiencing compromised food access due to financial constraints. Youth and young adults are especially vulnerable to food insecurity, in part due to socioeconomic instability corresponding with their lifecourse stage. This study focuses on the critical phase of emerging adulthood, and explores sociodemographic and self-reported health measures as correlates of food security status.

Methods: Data were drawn from the first wave (2016) of the Canada Food Study, a study of youth and young adults aged 16-30 years (n=3,000) from five urban centers (Toronto, Edmonton, Halifax, Montreal, Vancouver). Participants were recruited using face-to-face intercept sampling and completed online surveys. Comprehensive household food security data were collected using the Household Food Security Survey Module. Multinomial logistic regression was conducted to examine associations between food security status and age, sex, city, race/ethnicity, parental status, body mass index, educational/employment status, income adequacy, household size, and perceived general health, diet, and mental health.

Results: Twenty-percent of participants were characterized as living in moderately food-insecure households, and almost one in ten lived in severely food-insecure households. Respondents who found it very difficult to make ends meet were significantly more likely to be classified as moderately (adjusted odds ratio [AOR]=20.4, confidence interval [CI]:11.1-37.5) or severely food-insecure (AOR= 101.3, CI:41.1-249.8) compared to those who found it easy/very easy to make ends meet. Respondents who reported poor health had 7.1 times higher odds of severe food insecurity (AOR= 7.1, CI:2.4-20.6). Respondents who reported poor diet quality were more likely to be moderately (AOR = 2.2, CI:1.1-4.2) and severely food insecure (AOR=2.6, CI:1.1-6.4) compared to participants reporting very good/excellent diet quality. Respondents who reported poor mental health were more likely to be classified as severely food insecure (AOR= 2.1, CI:1.03-4.2) compared to those who reported very good/excellent mental health.

Conclusions: The findings highlight young adulthood as a vulnerable period for food insecurity, as a higher proportion of this sample lived in food-insecure households compared to the Canadian average. Policies should address factors that underlie financial instability and insecure food access among young people, especially those from marginalized groups.
Effect of a 2-week gratitude diary on food portion selection patterns

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Effect of a 2-week gratitude diary on food portion selection patterns

Objective: Prior research has revealed that subjective feelings of socioeconomic insecurity can stimulate increased energy intake. We sought to examine whether increased feelings of gratitude may conversely contribute to reduced energy intake given prior studies linking gratitude with increased psychosocial well-being. Here we examined the influence of a gratitude-promoting experimental intervention on food portion size selection patterns.

Methods: One hundred and eighty-nine participants were randomly assigned to keep daily diaries reflecting on things one is grateful for (GRAT n=95) or on neutral events - control (CON n =94) over a 2-week period. Intended portion sizes for diverse foods were assessed on a computerized portion selection task involving diverse foods before and after the intervention period.

Results: After controlling for participants' attitudes towards the daily diary writing (i.e. whether they liked it or found it a hassle), GRAT resulted in a post-intervention decrease (p<.004) in intended portion sizes (lower energy) across a variety of food items among males, but not females (p<.130).

Conclusion: These findings suggest that, particularly among males, the experience of gratitude may encourage judgments and intentions to reduce caloric consumption.
Earning less than you deserve. The effect of personal relative deprivation on food choice

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Objective: The relation between objective national-level income inequality and obesity has been well established. Recent studies suggest an association between individual-level perceptions of inequality and health behaviours. Building on experimental research that showed that feelings of personal relative deprivation (PRD, i.e., the sense that one is unfairly deprived of a deserved outcome relative to others) increases the preference for immediate rewards rather than long-term benefits, we aimed to test whether PRD results in a preference for palatable snack-type foods.

Methods: A between-subject design was used in two online studies, participants were recruited via Prolific Academic. A pilot study (N = 172) was conducted to test whether we could induce feelings of PRD. The manipulation involved a card game in which half of the participants (PRD condition) were led to believe that they were deprived of earned points relative to an opponent. In the main study (N = 280), points earned (in reality, for all participants the same amount) were used as resources for a food shopping task. All participants chose 3 out of 8 products (4 were rewarding snack-type foods, in a pretest these were perceived as more palatable and less healthy than the other 4 neutral foods). ANCOVA was performed to test the effect of condition on the number of rewarding foods chosen. Explorative analyses included moderation effects of PRD-Scale (trait), BMI, Power of Food, and hunger. The study was preregistered on Open Science Framework.

Results: The PRD condition indeed experienced more PRD than the control condition, p < .001. No main effect of condition on food choice was found, p = .628. Trait PRD interacted significantly with condition, p = .008. Simple slope analyses showed that the PRD condition chose more rewarding foods than the control condition when trait PRD was high, p = .022. The manipulation appeared to affect food choice for those already feeling deprived.

Conclusions: This research indicates that it is not necessarily the objective amount of resources, but rather the perception of being relatively deprived of resources, that lead to unhealthy food choices. Our next step is replication in a lab using non-hypothetical food choice.
Longitudinal evaluation of nutritional and financial impacts of a community resource center and healthy grocery store in a low-income neighborhood in the United States

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Socio-economic inequalities (SIG)

Objective:
The Up Town neighborhood of Toledo, Ohio, United States (U.S.) has limited access to grocery stores and many residents live in poverty. A local healthcare foundation established a community resource center in early 2016 that offers residents job training, classes on personal finance and nutrition, and a healthy grocery store. The objective of this study was to evaluate the 2-year longitudinal changes in financial and nutritional outcomes following the creation of the resource center in Up Town.

Methods:
Participants within a one-mile radius of the resource center were recruited (April to October of 2016) at public sites and prospectively followed. After 24-months, 222 participants remained (48% retention; most attrition resulted from the transient population and/or losing contact with participants). Outcomes were framed within the Social Ecological Model and assessed via self-administered surveys, including health status, body mass index, household income, economic strain, food security, fruit and vegetable (FV) intake, neighborhood FV availability, economic perceptions, and knowledge/skills. Paired samples t-tests were used to examine differences between baseline and 24-month follow up (alpha level = 0.05). Qualitative data were also collected via semi-structured interviews and focus groups.

Results:
Participants' ages ranged from 19-79 (average of 44 years), they were mostly female (69%), with high school education (54%), and lived below the U.S. federal poverty level (67%). Half of the sample was non-Hispanic black (50%) and 38% non-Hispanic white. Significant changes: 18% decrease in economic strain (p<0.01), 8% increase in household income (p=0.01), and 13% decrease in FV intake frequency (p=0.02). Other findings were not significant. Qualitative themes related to residents' barriers, facilitators, and desires with regard to food access and job opportunities, and perceptions of changes in the neighborhood during the study. For example, barriers such as low transportation access emerged as a factor limiting participants' ability to achieve a positive nutritional outcome or financial stability.

Conclusions:
These initial findings from the impact evaluation indicated mixed progress/success of the intervention thus far. Findings illustrate how the impacts of this type of multi-component model may be limited by external factors. Also, the lessons learned from the evaluation can inform other similar efforts.
Low subjective socioeconomic status heightens taste-based perceptual sensitivity to the energy-density of beverages

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Objectives: Prior studies have suggested increased rates of energy-dense and sugar-sweetened beverage consumption among people of lower socioeconomic status (SES). Yet recent experimental studies have revealed that the mere perception or feeling of having inadequate SES compared to others can stimulate preferences and consumption of higher energy foods and meals independent of one's actual SES. Based on these observations, we sought to test whether the subjective experience of low SES, which may increase motivation to select and consume greater amounts of energy, may also produce heightened perceptual sensitivity to the energy density of beverages.

Methods: Participants (n=126) were randomly assigned to one of three between-subjects conditions (low SES, high SES, and control), in which feelings of socioeconomic security/insecurity (or control) were experimentally induced through social comparisons with others. Participants completed a taste test of 6 ice tea beverages that incrementally varied in energy density based on combinations of added sugar, maltodextrin, and a non-nutritive sweetener (Allulose) prior to (baseline) and after the experimental SES manipulation. During the baseline and post-manipulation taste tests, each of the beverage samples were evaluated on sensory properties associated with perceived energy-density.

Results: A SES condition x Beverage ANOVA on composite evaluations of sensory properties revealed a significant interaction of SES condition and beverage, such that participants in the low SES condition perceived beverages with high levels of energy density to be more energy-dense following the SES manipulation (compared to baseline evaluations). Additionally, participants in the high SES condition exhibited no change in perceived energy-density for any of the beverages following the SES manipulation.

Conclusions: These findings demonstrate that subjective signals of having deficient socioeconomic resources may produce taste-based perceptual shifts that increase sensitivity to the presence of energy in foods, potentially through heightened attentiveness to or expectations of sensory characteristics that signal energy. Such perceptual shifts may facilitate the discrimination and selection of energy-dense foods in the face of resource insecurity. Importantly, this study suggests socioeconomic disparities in selection of energy-dense or sugar-sweetened beverages may partially be attributed to shifts in perceptual sensitivity to energy associated with the subjective experience of low SES.
Practical nutrition knowledge mediates the relationship between socio-demographic characteristics and diet quality in adults: A cross-sectional analysis

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Purpose:
Dietary quality varies among different socio-demographic groups. Nutrition knowledge is a modifiable determinant of dietary behaviour and could mediate these associations. Recent evidence suggests that practical nutrition knowledge is more closely related to dietary behaviour as compared to factual nutrition knowledge. This study investigated the direct and indirect effects of socio-demographic factors on diet quality through practical nutrition knowledge about how to compose a balanced meal.

Methods:
A cross-sectional study where adult participants (n=8161) completed an online survey assessing a variety of lifestyle, health, and socio-demographic characteristics, including diet quality and practical nutrition knowledge (Practical Knowledge about Balanced meals, through the psychometrically validated scale PKB-7). The PROCESS macro for SPSS was used to conduct the mediation analyses of practical nutrition knowledge on the associations between the SD's and diet quality.

Results:
The mean age of the participants was 50.8 years (SD=11.6), approximately 75% were female and 63% reported a university education level. Being female, older, having a higher education level, and having a lower Body Mass Index (BMI) were associated with better diet quality. The mediation analysis showed that practical nutrition knowledge significantly mediated the associations between sex (a*b=0.54, 95%CI=0.39;0.70), and education level (TAFE: a*b=0.22, 95%CI=0.12;0.35 and University: a*b=0.48, 95%CI=0.35;0.64), and diet quality. Practical nutrition knowledge showed to suppress the association between age and diet quality (a*b=-0.03, 95%CI=-0.04;-0.03) and showed no significant effect on the association between BMI and diet quality.

Conclusions:
The findings in this study show that socio-economic inequalities in diet quality can partially be explained by differences in practical nutrition knowledge, and suggest that focusing public health efforts on increasing this specific type of knowledge might be promising. Future research can build on these findings by comparing the proportional contribution of practical versus factual nutrition knowledge, and could further investigate how tailored nutrition education efforts to increase practical nutrition knowledge can effectively increase diet quality in specific groups.
Number of different types of food provisioning strategies and adult food security status among U.S.-representative households

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Low-income households rely on a variety of strategies to manage food security (FS), but how use of different types of food provisioning strategies relates to FS in the context of Federal Poverty Guidelines (FPG) and Supplemental Nutrition Assistance Program (SNAP) is unclear. We aimed to determine the relationship between the number of different food provisioning strategies used and adult FS status by FPG and SNAP participation.

Methods: Data were from nationally-representative households (n=4,826) in the U.S. Department of Agriculture's (USDA) cross-sectional National Household Food Acquisition and Purchase Survey. The main household food shopper self-reported primary and alternative locations where they shopped (e.g. large grocery/supermarket, small grocery/specialty) and acquired food (e.g. garden, food pantry). Responses were categorized as =2, 3, or =4 different provisioning types. The USDA 30d adult FS module categorized household adults as having full FS, moderate FS, low FS, and very low FS. Multivariate-adjusted logistic regression models, stratified by SNAP participation and income relative to the FPG, tested relationships between number of food provisioning strategies used and adult FS status (P <0.05).

Results: Most households reported large grocery stores/supermarkets as their primary (95.6%) and alternate (77%) stores for shopping, and 69.2% of households had adults with full FS (14.8% moderate FS, 9.5% low FS, 6.5% very low FS). After adjustment, among non-SNAP households <100% FPG or between 100%-184.9% FPG, =4 food provisioning strategies compared to =2 was associated with lower odds of low FS (Odds Ratio (Confidence interval): 0.3 (0.1-0.6) and 0.4 (0.2-0.7), respectively). Among non-SNAP households =185% FPG, 3 or =4 food provisioning strategies compared to =2 was associated with lower odds of very low FS (0.3 (0.1-0.9)) and moderate FS (0.5 (0.3-0.7)), respectively. Number of food provisioning strategies was not associated with FS among SNAP households.

Conclusions: Greater than 2 different food provisioning strategy types was associated with lower odds of moderate, low, and very low FS among non-SNAP households, including low-income and eligible non-participating SNAP households. Increasing food provisioning strategy types may promote FS among low-income households.
Obesity risk in women of childbearing age in New Zealand: a nationally representative cross-sectional study

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective The global rise in obesity in women of a childbearing age (15, 49 years) is a major public health concern. Evidence shows that sociodemographic and behavioural factors such as ethnicity or physical activity, are related to obesity risk for this target population. However, while risk factors are said to be multilevel, within a socioecological model (SEM), questions remain about environmental-level risk factors such as greenspace. Moreover, few studies have explored multilevel interactions between different layers (i.e. sociodemographic, behavioural and environmental factors) of the SEM. For instance, between greenspace and area-level deprivation. This study therefore investigates the multilevel risk factors for obesity prevalence in women of childbearing age.

Methods: A nationally representative cross-sectional survey of New Zealand women (15-49 years) with measured height and weight were used (unweighted (n=3,625) and weighted analytical sample (n=1,098,372)). Risk factors included sociodemographic (e.g. age), behavioural (e.g. physical activity) and environmental-level risk factors (e.g. greenspace). Multilevel logistic regression weighted for non-response of height and weight data was used.

Results: This study showed that 31.8% of women of childbearing age (15-49 years) were obese. Meeting the physical activity guidelines (OR=0.66[0.54,0.80]), Asian (OR=0.15[0.10,0.23]) and European/other ethnicity (OR=0.46[0.36, 0.58]), and an increased availability of public greenspace (Q4 OR=0.55[0.41,0.75]) were related to decreased obesity risk. Older age (45-49 years OR=3.01[2.17,4.16]), Pacific ethnicity (OR=2.81[1.87,4.22]), residing in deprived (Quintile 5, OR=1.65[1.16,2.35]) or secondary urban areas (OR=1.49[1.03,2.18]) and increased private greenspace (Quartile 4, OR=2.01[1.44,2.80]) were related to increased obesity risk. When examined by rural/urban classification, private greenspace was only related to increased obesity risk in main urban areas. Interaction findings by area-level deprivation and public greenspaces were largely inconsistent.

Conclusion: Factors within each layer (i.e. sociodemographic, behavioural and environmental factors) of the SEM were related to obesity risk to some degree. This study highlights specific risk factors including, but not limited to public greenspace, which can be targeted to inform obesity interventions for women of childbearing age in New Zealand. The study therefore complements existing evidence which suggests multilevel interventions are critical for effective intervention.
The contribution of work and lifestyle factors to socioeconomic inequalities in self-rated health: a systematic review

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

**Socio-economic inequalities (SIG)**

Purpose: This study aimed to systematically review the literature on the contribution of work and lifestyle factors to socioeconomic inequalities in self-rated health among workers.

Methods: A search for cross-sectional and longitudinal studies assessing the contribution of work and/or lifestyle factors to socioeconomic inequalities in self-rated health among workers was performed in PubMed, PsycInfo and Web of Science, in March 2017. Eligibility and risk of bias assessment were performed by two independent reviewers. The median change in odds ratio between models without and with adjustment for work or lifestyle factors across studies was calculated to quantify the contribution of work and lifestyle factors to health inequalities. A best-evidence synthesis was performed.

Results: Results Of those reviewed, 3 high-quality longitudinal and 17 cross-sectional studies consistently reported work factors to explain part (about one-third) of the socioeconomic health inequalities among workers (grade: strong evidence). Most studies separately investigated physical and psychosocial work factors. In contrast with the 12 cross-sectional studies, 2 longitudinal studies reported no separate contribution of physical workload and physical work environment to health inequalities. Regarding psychosocial work factors, lack of job resources (eg, less autonomy) seemed to contribute to health inequalities, whereas job demands (eg, job overload) might not. Furthermore, 2 longitudinal and 4 cross-sectional studies showed that lifestyle factors explain part (about one-fifth) of the health inequalities (grade: strong evidence).

Conclusions: It emphasizes the importance to focus prevention on work factors, besides lifestyle factors, in order to reduce socioeconomic inequalities in self-rated health. Further longitudinal studies should be performed to determine which specific work factors contribute the most to socioeconomic inequalities in perceived health among workers.

Main messages:

- Socioeconomic inequalities in self-rated health among workers are for approximately one-third explained by work factors and for one-fifth by lifestyles behaviors
- Public and occupational health policy should focus on both work and lifestyle factors in order to reduce socioeconomic inequalities in self-rated health among workers.
Sustainability via Active Gardening Education (SAGE): The relationship of moderate to vigorous physical activity and food insecurity on cardiometabolic risk among primarily Hispanic mothers

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Purpose: Food insecurity (FI) is associated with overweight/obesity among Hispanic/Latino (HL) populations. Moderate to vigorous physical activity (MVPA) is a recommended method to prevent excessive weight gain among adults, reducing cardiometabolic risk (CMR). However, the extent MVPA is associated with CMR factors among HL mothers with FI is unclear. This study explored associations between MVPA, FI and CMR factors among primarily HL mothers.

Methods: A subsample of apparently healthy mothers wore accelerometers for 7 days to measure MVPA and completed sociodemographic and FI questionnaires (2017-2018). Body mass index (BMI), body fat percentage (BF), waist circumference (WC), and systolic (SBP) and diastolic blood pressures (DBP) were measured by trained research assistants. Unadjusted bivariate associations and simultaneous multiple regressions adjusted for age and education were performed.

Results: Mothers (N = 38) were 89.5% HL and had a mean age of 33.6±smn;7.9 years, with 51.9% classified as FI. Mean MVPA was 19.6±smn;21.3 minutes/day, with mean BMI 31.2±smn;5.4 kg/m2, BF 40.6±smn;5.7%, SBP 113.6±smn;10.4 mmHg, DBP 75.6±smn;9.3 mmHg, and WC 101.3±smn;13.4 cm. FI was positively correlated with BMI (r=.40, p=.013) and BF (r=.35, p=.031), but not WC, SBP, or DBP (ps>.05). MVPA was not correlated with CMR factors (ps>.05). FI mothers had higher levels of MVPA than food secure mothers (23.0±smn;26.8 vs. 14.9±smn;8.7 minutes/day), although differences were not statistically significant. After adjusting for age and education, MVPA was still not related to CMR factors (ps>.05), and FI was significantly associated with higher BMI (B=3.417, p=.021), and BF (B=2.837, p=.069), and WC (B=6.105, p=.083) trended toward significance; however, SBP or DBP were not (ps>.05).

Conclusions: This group of primarily HL mothers averaged weekly MVPA just below the national guidelines. Despite the small sample size, FI was associated with BMI and marginally associated with BF and WC, in the expected direction; however, study findings contradict scientific consensus on beneficial dose-response relationships of MVPA on CMR factors and weight. Findings may indicate that national PA guidelines may fall short with providing health benefits in FI HL mothers and demonstrates the need for further research to improve and/or maintain health in this understudied population.
Sedentary and physical activity behaviour in ‘blue-collar’ workers: A systematic review of accelerometer studies

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

PURPOSE: Understanding patterns of sedentary and physical activity (PA) behaviour in 'blue-collar' workers is an important prerequisite for effective interventions, and reduction of socioeconomic health inequalities. We conducted a systematic review of reported accelerometer data on these behaviours for non-office workers in 'blue-collar' industries.

METHODS: The databases Cinahl, Embase, Medline, PubMed and Scopus were searched for relevant studies to April 6th, 2018. To be eligible for inclusion in the review, studies needed to report accelerometer measured sedentary, sitting and/or PA behaviours in 'blue-collar' workers (³3;10 participants). We defined 'blue-collar' work to involve employment in a non-office occupational role (e.g. driver, electrician, or factory worker), within a broad spectrum of traditional 'blue-collar' industries that included agriculture, construction, cleaning, manufacturing, mining, postal and transport industries. Following study selection, reviewers independently extracted and cross-checked data on participant characteristics, study protocols, and measured behaviours during work and/or non-work time. Methodologic quality was assessed using a 12-item checklist.

RESULTS: Twenty studies, all from developed world economies, met inclusion criteria. The earliest was published in 2011, with the majority (n=18) published over the last three years (i.e. 2015-2018). The mean quality score for selected studies was 9.5 (SD 0.8) out of a maximum of 12. Combined, or specific (construction, transport [drivers], manufacturing, cleaning, postal) industry samples were analysed using a range of devices, positions and analytical techniques (accelerometer counts, METs categories, or inclinometry/pattern recognition algorithms). 'Blue-collar' workers were more sedentary, and less active, during non-work compared to work time (e.g. sitting 5.3 vs 2.8 hours/day; moderate-to-vigorous PA 0.4 vs 0.7 hours/day). Drivers were the most sedentary (work time 5.1 hours/day; non-work time 8.2 hours/day), with values 45% and 34% higher respectively than those reported in other 'blue-collar' workers.

CONCLUSIONS: Differences in work versus non-work exposure patterns highlight that translation of office worker sedentary and PA interventions to 'blue-collar' groups might lead to different health results, and thus be inefficient in reducing socioeconomic health inequalities. We also argue for consensus on common measurement and reporting methodologies, to better inform intervention efforts for priority, high risk workers.
Effect of socioeconomic status on knowledge and behaviors of active-living in youth

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Socioeconomic status (SES) may play an overarching role in youth physical activity, health and academic success. The primary purpose of this study was to examine the potential differences in physical activity and sedentary behavior outside of school, and knowledge about physical activity and fitness (PAF knowledge) between two schools with contrasting SES. The secondary purpose was to explore gender and grade differences in these outcomes.

Methods: The study took place in two public middle schools selected from the same school district in a southern U.S. state. The two schools had contrasting SES (53.0% vs. 94.9% students eligible for free or reduced meals in schools 1 and 2, respectively) and race/ethnicity composition (56.7% vs. 11.2% White, 38.5% vs. 82.1% Black, in schools 1 and 2, respectively). The sample (N = 656) consisted of sixth (n = 217), seventh (n = 237), and eighth (n = 201) grade students.

Results: School 1 showed higher physical activity outside of school (ΔM = .27, d = .26), lower sedentary behavior (ΔM = -.35, d = -.44), and higher PAF knowledge (ΔM = 8.3%, d = .54) than school 2. Noticeable differences were observed in after-school physical activity, evening physical activity, weekend physical activity, TV viewing, video games, computer use, cellphone use, and typical sitting habits (p < .01). Boys showed more favorable physical activity outside of school, lower sedentary behavior, but lower PAF knowledge than girls (p < .01). Throughout the middle school years, physical activity outside of school showed a decline trend but sedentary behavior and PAF knowledge showed an increasing trend (p < .01).

Conclusions: The findings indicate that school 1 (more than half White; mostly from medium SES families) showed more favorable physical activity, sedentary behavior, and knowledge results than school 2 (predominantly Black students from lower SES families). SES is a significant school-level characteristic that largely influences the determinants (i.e., knowledge and behaviors) of the active-living habit in youth. The knowledge and behavior differences between schools and by setting/context, gender, and age identified in this study point out areas for future disparity interventions in and outside of schools.
Intervening in the community to increase the health, wellbeing, social inclusion and employability of Men: Step by Step Project Protocol and Logic Model

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective
The Step by Step (SBS) Project is a European, multi-centre, community based intervention. SBS aims to provide a cost effective, community, group-based intervention primarily focused on men using the concept of the Men's Sheds movement as its' structure. The objectives of SBS are to increase the health, wellbeing, social inclusion and employability of men thereby addressing inequalities in utilisation of health and social service provisions by this population who are at high risk of ill-health, social isolation and insecure employment. The purpose of this paper is to describe the development of a logic model and how the co-created framework will be used for the delivery and evaluation of the SBS project.

Methods
Over the course of three joint meetings, representatives from eight stakeholder organisations met to discuss current best practice in community engagement and to co-create a male-centric, model of community driven service delivery. Staff involved in this process included community workers, public and private sector public health and health promotion specialists. The stakeholder organisations involved were from the Belgium, France, the Netherlands and the United Kingdom. The model development was co-ordinated by one stakeholder organisation and the final model was agreed as the delivery model. This was then translated into a logic model to aid identification of the aims, actions, assumptions, short-term and medium-term outcomes and the evaluation framework of outcome indicators.

Findings
The SBS community space will create an environment where men (shedders) can gather to share skills, knowledge and camaraderie with other shedders and leaders. Leaders will consist of those with skills expertise, organisational responsibility of the space and health champions (peer mentors trained in enabling health conversations). Outcome data will be collected at baseline and 12 months using a mixture of qualitative and quantitative methods.

Conclusion
The co-created model of service delivery will be an expansion of the original Men's Sheds movement which will engage this population in structured meaningful activities to improve their physical health, wellbeing, social integration and employability. By conducting an economic costing and comprehensive process evaluation the SBS project will have the potential to inform other future community interventions.
Disparities in BMI determined overweight and obesity by household income and race: Do BMI disparities represent disparities in excess adiposity?

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Children (6-19yrs) from low-income households are at higher risk for BMI-determined overweight and obesity, but this relationship varies by children's race/ethnicity. BMI, however, is a poor marker of excess adiposity in minority children. The objective of this study was to explore the relationship of household income and race/ethnicity with excess adiposity measured via dual-energy x-ray absorptiometry (DXA) and body mass index (BMI) determined overweight and obesity. Methods: A nationally representative sample of U.S. children from the National Health and Nutrition Examination Survey waves spanning 1999-2006 was included in this study. Separate logistic regression models were estimated with the percent of children with DXA-determined excess adiposity (i.e., ≥75th percentile for age and sex) and the percent of children determined to be overweight or obese by BMI as the dependent variables. Income-to-poverty ratio (i.e., low-income, middle-income, high-income) was the independent variable in both models. These models included children of all race/ethnicities and controlled for measurement wave, age, sex, race/ethnicity, and all race-by-income interaction terms. The main effect of the association between income-to-poverty ratio and DXA-determined excess adiposity was interpreted to examine the relationship between income and DXA-determined excess adiposity. This was then compared to the relationship between income-to-poverty ratio and BMI-determined overweight or obesity. Secondary analyses stratified by racial/ethnic group and controlling for wave, age, and sex were also estimated.

Results: A total of 9,857 (14.0 years, 52.8% male, 31.8% low-income, 52.1% middle-income, 15.9% high-income) children were included in the final sample. For DXA, children from high-income households were 0.63 (95CI=0.53, 0.71) and 0.57 (95CI=0.49, 0.67) times as likely to have excess adiposity compared to children in middle and low-income households, respectively. Similar findings were observed with BMI-determined overweight and obesity. Analyses restricted to individual racial/ethnic groups showed children from high income households were less likely to have excess adiposity compared to their low-income peers for White, Black, and Hispanic children. For BMI-determined overweight and obesity, this pattern differed for Black and Hispanic children. Conclusions: BMI may not be an appropriate measure for identifying income related overweight and obesity disparities for minority children.
Within-Family Social Capital: Links to Weight-Related Behaviors and Cognitions in Families with Young Children

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Purpose: Social capital is conceptualized as relations within groups of people (e.g., family, neighborhood, community). Greater within-family social capital (WFSC) is linked to children's academic success and lower incidence of unhealthy risk-taking behaviors, however WFSC's relationship to weight-related cognitions and behaviors remains unknown. Thus, this study explored these factors across WFSC levels of mothers with young children (ages 2 to 9 years).

Methods: Mothers (N=557) completed an online survey comprised of valid, reliable questionnaires assessing family relationships and weight-related behavioral and home environment measures. Mothers were assigned to tertiles based on WFSC score, calculated by summing these 5-point family relationship scales: mother: child verbal engagement (2-items, aha;=0.70), mother: child physical engagement (1-item), family conflict (2-items, aha;=0.87), family cohesion (3-items, aha;=0.87), and family meal frequency (3-items). WFSC scores could range from 5 to 25, with higher scores reflecting greater WFSC. ANOVA and Tukey post-hoc tests determined significant (p<0.05) differences in weight-related behaviors and cognitions among and between WFSC tertiles.

Results/Findings: Mothers were mostly white (60%) and aged 32.65±smn;5.53SD years. All tertiles differed significantly from each other for all scales used to compute WFSC, as anticipated. WFSC scores for low (n=178), middle (n=195), and high (n=184) tertiles were 16.40±1.65SD, 19.40±0.55SD, 21.95±1.15SD, respectively. Compared to high tertile mothers, low tertile mothers had significantly lower health status, milk intake, physical activity, and sleep duration along with greater depression severity, sugar-sweetened beverage intake, screen time, uncontrolled eating, and emotional eating. Low tertile mothers were more likely to pressure children to eat, offer food rewards, and permit children more screen time than high tertile mothers. Low tertile mothers also reported their children had significantly lower health status and physical activity and more emotional eating and food neophilia than high tertile mothers. Lowest tertile mothers reported significantly less 100% fruit/vegetable juice and milk usually available in the home than high tertile mothers. Space and supports for physical activity inside and immediately outside home environments increased significantly as tertiles increased.

Conclusion: Findings suggest greater WFSC is linked to healthier weight-related behaviors and home environments of families with young children. Nutrition education interventions should consider incorporating instruction promoting improved family relations.
The associations of educational level and socioeconomic areas with effects on of a structured lifestyle program for individuals with high cardiovascular risk

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Differences in socioeconomic status contribute to inequalities in physical activity pattern, food habits and quality of life, which all are leading causes to an increased burden of non-communicable diseases worldwide. Hence, there is a need for a greater understanding how these inequalities can be counteracted. The purpose of this study was to examine how the effects on physical activity, food habits, quality of life and cardiovascular risk of a one-year structured lifestyle intervention program associated with the participant's educational level and socio-economic area (SEA) of residence.

Methods: One hundred individuals (64% women) participating in a one-year structured lifestyle program for individuals with high cardiovascular risk were included in the study. Lifestyle habits and quality of life was self-reported, anthropometrics and cardiovascular risk factors measured, and Framingham 10-year CVD risk calculated at baseline and one year.

Results: Sedentary risk behaviour was improved in both non-university degree and low SEA group over one year, with a significantly greater improvement in daily activity risk behaviour in the low SEA group compared to the high SEA group. Abdominal obesity decreased significantly more in the non-university degree vs. university degree group over one year.

Cardiovascular risk and quality of life improved in both low and high educational and SEA groups, however, with greater discrimination when using educational level as dichotomization variable.

Conclusion: The results of the present study has clinical relevance, as suggesting that low socioeconomic status measured as both educational level and SEA of residence are no barriers for changing unhealthy lifestyle habits and decreasing cardiovascular risk after participation in a lifestyle program.
Gender-specific mediators of the association between parental education and adiposity among adolescents: the HEIA study

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

In order to tackle socioeconomic inequalities in adiposity, it is vital to identify the mechanisms behind such inequalities. The present study explored whether a broad range of behavioral and familial factors mediated the associations between parental education and indicators of adiposity among adolescents. Baseline data from a school-based intervention study among 11-year-old adolescents were used. Anthropometric outcomes, physical activity and sedentary time among adolescents were objectively measured. Other child behavioral variables and parental waist circumference were self-reported. Mediation analyses using joint mediator models were conducted. Among boys, maternal waist circumference (WC), paternal WC and TV viewing mediated 16%, 11.5% and 13% of the association between parental education and adolescent WC. The respective proportions when body fat percentage was used as the outcome variable were 22.5%, 16% and 21%. Among girls, maternal and paternal WC mediated 20% and 14% of the association between parental education and WC. The respective proportions when body fat percentage was used as the outcome variable were 14% and 10%. Other included variables did not play any mediating role. Parental adiposity is thus an important mediator of socioeconomic differences in adiposity in both genders. Among boys, reducing TV time would contribute to the reduction of social inequalities in adiposity.
Prevalence of total and domain-specific physical activity and associated factors among Nepalese adults: a quantile regression analysis

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose
Physical activity (PA) encompasses a range of activities that can be classified into key domains. A better understanding of drivers of domain-specific PA is essential for design of effective health interventions and policy. The objective of this study was to analyse the data from the WHO Non-Communicable Diseases Risk Factors: STEPwise approach to surveillance survey 2013 to determine the prevalence of total and domain-specific physical activity and associated factors among Nepalese adults aged 40 years and over.

Methods
A multi-stage cluster sampling technique was used to select 4200 adults aged 15-49 years proportionately from the three ecological zones (Mountain, Hill and Terai). The Global Physical Activity Questionnaire was used to assess total and domain-specific PA. Data from 2139 adults, aged 40 years and above, was analysed using quantile and multiple linear regression, adjusting for the complex sampling design.

Results
Only 4% of the adults did not meet the PA guidelines of at least 600 MET-minutes/week. Adults engaged in 6720 median MET-minutes per week of total PA and 4620 and 1680 median MET-minutes per week of OPA and TPA respectively. Total PA score was composed of 75% OPA, 24% TPA and 1% LTPA. Females had lower total PA than males at the 25th, 75th and 90th quantiles of the total PA distribution. Age had a negative monotonic association with total and occupational PA, with the highest decrease at the upper tails of the PA distribution. Lower total and occupational PA was associated with secondary or higher education, being retired or in unpaid employment, living in the Terai or in urban areas, non-smoking and being obese. Likewise, age, higher education, unpaid employment, urban residence, not consuming alcohol and being overweight were negatively associated with transport-related PA.

Conclusion
Increasing age, higher education, unpaid employment, unemployment or retirement, urban residence and higher BMI were associated with lower PA across all domains, and the association was stronger at the upper tails of the distribution. Exposure variables had dissimilar associations across the quantiles of PA distribution, and tailored interventions are required to increase or maintain the PA levels of different population sub-groups.
Effects of the Good Food does not need to be expensive programme

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Objective: Good Food does not need to be expensive (GF) is a Dutch nutrition education programme for people in debt repayment and/or people living in low SES neighbourhoods. In two sessions dieticians motivate and enable participants to improve the overall quality of their diets and to save money on groceries. The aim of this study is to report the effects on self-reported dietary intake and saving money on groceries, on determinants and sub behaviours.

Methods: A quasi-experimental control group design was applied with a baseline, post-test (1-14 days after GF) and follow-up test (after six months). Self-reported change on the use of margarine to prepare a hot meal, on eating healthy and on saving money on groceries were assessed dichotomously (yes/no) and with open-ended items (what). Determinants of healthy food intake and saving money on groceries (e.g. attitude) and sub-behaviours (e.g. reading food labels) were measured on five-point scales. Descriptive statistics and chi-square tests were used to assess the self-reported changes. Changes in determinants and sub-behaviours were assessed with linear regressions, with the post-test intake as outcome and baseline intake, background variables (e.g. gender) and condition (intervention/ control) as predictors. P-values below 0.05 were considered significant. All data were analysed with IBM SPSS Statistics 23.

Results: In total 131 adults participated in the intervention group and 106 in the control group. Post-test (PT) effects that persisted at follow-up (FU) are reported. Self-reported use of liquid butter to prepare a hot meal increased (PT: OR=3.05, P<0.001; FU: 1.95, P<0.05), while eating healthier (mostly on F&V consumption, general diets and structure) and saving money on groceries (promotions, brand awareness) increased. For the determinants, beneficial effects were found for attitude towards the costs of healthy foods (PT: βa=0.310, p<0.01; FU: βa=0.310, p<0.01). For the targeted sub behaviours reading food labels increased (PT: βa=0.665, P<0.001; FU: βa=0.623, p<0.01).

Conclusions: There are some indications that the programme was effective in changing self-reported behaviours, determinants and sub behaviours, however the pattern is not consistent for all outcomes. This intervention should preferably be embedded in a broader community approach.
Perceptions of the future purple line: preliminary qualitative findings of the Purple Line Impact on Neighborhood, Health and Transit (PLIGHT) Study

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: In America, nearly half of African-American and Hispanic adults are obese and the majority of these adults also fail to attain minimal recommended levels of daily physical activity. These obesity and physical inactivity trends are exemplified in Prince George's (PG) County, Maryland, a suburb of Washington, D.C. comprised with over 80% of African American and Hispanic residents. A new opportunity for active transportation (AT) in PG County leverages the expansion of the Washington Metropolitan Area Transit Authority System with the Purple Line (PL) light rail transit (LRT). Anticipated to begin operation in 2022, this 16-mile PL LRT with 11 stops in PG County will potentially provide a new opportunity for AT engagement. However, anticipation of the PL LRT is mixed with anxiety.

Methods: The Purple Line Impact on Neighborhood, Health and Transit (PLIGHT) Study recruited PG County residents for one-hour focus groups (FG) in June 2018 to gauge perceptions of AT and the forthcoming PL LRT. Data were digitally recorded using a semi-structured focus group guide, transcribed verbatim, manually coded, and analyzed using content analysis with NVivo 11.

Results: Two FG sessions were conducted [FG1 (n=8); FG2 (n=6)]. All participants were female, 93% African American and the majority were retired. While most participants did not use AT or have knowledge of the concept, some stated a consideration of AT for future transport needs such as, "you're making me rethink [my transportation form]if I'm gonna go to the mall… I just hop on the bus and go, it'd be fun". PL LRT positive perceptions included congestion reduction ("get some cars out the road"); addressing transit vulnerabilities ("[seniors] have anxiety of the Beltway"); connecting counties ("I do like…it joins um the Prince George's County and um Montgomery County"); and improving accessibility ("helping somebody get to doctor's appointment, get to a job"). PL LRT negative perceptions included eminent domain ("impact the neighborhoods"); gentrification ("people were being displaced"); noise ("I can hear the trains in the winter"); and costs ("shoot your taxes up").

Conclusion: Although this participant sample foresees PL LRT benefits, our findings substantiated the anticipated anxiety of many negative transit-oriented development by-products, particularly occurring in communities of color.
Nutrition for Schoolchildren’ Program for Slum Communities in Bangalore, India

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Introduction: Malnutrition affects millions of children worldwide and has been appalling in developing countries such as India. Schoolchildren of Parikrma Humanity Foundation (PHF) residing in slum communities of Bangalore were found to be stunted and wasted; at high risk of protein energy malnutrition and micronutrient deficiency that impair their physical well-being and cognitive development. This study is the first of its kind to develop, implement and evaluate a 3-years nutrition program to address high incidences of malnutrition among schoolchildren in Bangalore.

Methods: Convenience sampling was utilized by PHF staff to recruit over 700 parents, community development officers (CDOs), and teachers during the intervention period to undertake the 3 years nutrition program developed by the Singapore International Foundation (SIF) volunteers whom were qualified nutritionists in partnership with four PHF schools. Program evaluation was conducted via surveys, semi-structured questionnaires and focus group discussions administered through face-to-face interviews by the PHF staff. Post-program reports and feedback were completed annually by the SIF volunteers to improve program delivery.

Results: All participants especially parents strongly agreed that their participation in the nutrition program, have led to acquisition of new knowledge and skills (89%); application of culinary skills (77%); increased their confidence in building healthier families (86%); improved their own health (82%); benefited family's health (94%); and reduced expenses on medications (84%). Positive quotes given by the parents, CDOs, teachers and principals reinforced their continual support and commitment to the program. It has allowed them to understand key nutrition principles; impart culinary nutrient conservation skills; and act as positive role models to optimize the nutritional status of these schoolchildren.

Conclusion: The study displayed that the program was well received by all the participants and provided insights to build a more supportive environment for these malnourished children. Nutrition education was valuable in imparting knowledge and skills; and influencing parents, CDOs, teachers and principals to advocate and mobilise towards healthier communities in Bangalore. Continual support and active engagement by all key stakeholders of these schoolchildren is paramount to motivate, empower and inspire the local community towards better healthy eating practices.
Time trends (1995-2006) in dietary habits among adolescents in relation to The Norwegian School Fruit Scheme: The HUNT study

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Introduction: Most adolescents have a lower fruit and vegetable intake than recommended. The Norwegian School Fruit Scheme (NSFS) was implemented autumn 2007, proving adolescents with a free fruit or vegetable every school day. The present study examined changes in dietary habits between 1995-97 and 2006-08 and effects of the NSFS according to socioeconomic status and gender.

Method: The material consisted of participants in 8th to 10th grade who participated in the Young-HUNT1 (1995-97) and Young-HUNT3 (2006-08) surveys. To evaluate the NSFS, the date the Young-HUNT3 participants answered the questionnaire identified affiliation to the intervention (post-Sept 2007, n=1892) or control group (pre-Sept 2007, n=2855). To explore dietary habits over time, adolescents attending the same schools in Young-HUNT1 (n=4137) and Young-HUNT3 (n=4113) was included. To investigate NSFS effect over time, we constructed the groups parallel to control (n=2346) and parallel to intervention (n=1791) within Young-HUNT1. FFQ measured dietary consumption of fruit, vegetables, potato chips, candy and soda. Multilevel logistic regression was used in all analysis.

Results: Within Young-HUNT3, the intervention group showed an increased odds (1.7) of daily fruit consumption compared to the control group. Further, the NSFS seemed to have a positive effect on fruit consumption over time (p=0.018). Over time, the odds of daily consumption increased for vegetables (1.3 in 1995-97 vs 1.6 in 2006-08) and decreased for potato chips (0.6 in 1995-97 vs. 0.9 in 2006-08) between those with higher- and lower educational intentions. Compared to females, males showed an increased odds (1.7 in 1995-97 vs. 2.8 in 2006-08) of daily consumption of potato chips over time.

Conclusion: The NSFS seemed to increase adolescents' fruit consumption, regardless of gender and socioeconomic status, indicating that fruit and vegetable schemes may be effective in increasing fruit consumption among adolescents. Over time, results implied that the socioeconomic gap increased for vegetables and decreased for potato chips.
Influence of socioeconomic inequalities on dietary patterns and cardiovascular health among Spanish adolescents


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Purpose: The aim of this study was to assess the cross-sectional associations between socio-economic status and dietary patterns and cardiovascular risk (CVR) indicators in high school students.

Methods: 1066 adolescents (49% girls) aged 12.0 ±smn; 0.4 enrolled in a comprehensive program of health promotion (SI! Program) (http://programasi.org/en/scientific-study) at 24 high schools from Barcelona and Madrid (Spain), and were included in the analyses. Dietary patterns were derived applying cluster analysis based on the relative frequencies of consumption of a 43 items- self-reported food frequency questionnaire. Parental education and household income were considered as socio-economic indicators. Body Mass Index (BMI) z-scores and blood pressure z-scores were calculated according to CDC standards. Fasting glucose, and lipid profile were obtained from capillary blood samples. Linear and logistic mixed effects models were applied to account for the clustered design of the study.

Results: Compared to the high parental education group, students whose parents had low and medium education levels were more likely to be allocated to the processed dietary pattern and less likely to be allocated to the healthy dietary pattern. Likewise, the odds for presenting overweight or obesity were significantly higher for the adolescents in the low and medium parental education levels (Figure 1). Similar associations were found for household income, although the strength of the associations was slightly weaker (Figure 2). Adolescents in the low parental education and/or lower household income groups presented the highest z-BMI mean values compared to their counterparts. Significant differences were also found for HDL-cholesterol (lowest mean values in the low education/low income groups), triglycerides (highest mean values in the low education group) and diastolic blood pressure z-score (highest mean values in the low income group) (Table1).

Conclusions: Socio-economic status was associated with a number of CVR indicators in adolescents, namely BMI, HDL-cholesterol and triglycerides concentrations, and diastolic blood pressure, showing an overall less favourable profile for the adolescents in the lower socio-economic level. Additionally, dietary patterns were related to socio-economic inequalities. These findings reflect the need for a particular effort in health promotion interventions targeting individuals from lower socio-economic backgrounds.
Young children’s screen time across the week: an analysis of ‘old’ and emerging behaviors


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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Across the globe, many children live in a digitally enmeshed world. Television remains the most popular media screen but access to, and use of, mobile touch-screen devices by young children has grown rapidly since the 2000s. These behaviors puts youth in an increased risk for becoming overweight or obese, among other health problems. This study aims to characterize the use of different screen devices both on weekdays and Saturdays, according to children's sex and family socioeconomic status (SES) in a sample of Portuguese children.

Methods: Data from 6075 children (6-12 years old) was collected at a national level in 2016/2017. Through a questionnaire, parents reported the time their children spent watching television (TV), using the computer (PC), playing electronic games (EG), using tablets and smartphones. Screen time was used as the mean minutes per days. Also, following the recommendation of the American Academy of Pediatrics, TV time was divided as <2h/day and ≥2h/d and excessive screen time for other devices was set at ≥1h/d. SES was measured by father's educational level and classified into three groups: low, medium, and high. Adjusted logistic regressions were run to observe the association between sex and SES and excessive screen time.

Results: Screen time was not distributed uniformly across sexes and SES. TV was the predominant screen media among children, followed by tablets, both on weekdays (59.07 minutes and 15.58 min., respectively) and on Saturdays (133.53 min. and 40.77 min., respectively). Boys and children from lower SES had significantly higher odds of not following the screen media guidelines, compared with girls and children from higher SES. The biggest difference was found for EG on Saturdays, where boys had almost 6 times the odds of exceeding the recommendations.

Conclusions: This study provides a characterization of ‘old’ and emerging screen-based activities among children. New technologies, like tablets and smartphones, are becoming increasingly common among children and should be taken in account when studying sedentary behaviors. Present findings point for the need to reduce the excessive screen time among Portuguese children but gender and economic inequities should be understood and addressed in future interventions.
Differences in obesity and sport activity of Portuguese children: can the environment contribute to widening the gap?


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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Childhood obesity is a discriminant epidemic, disproportionately affecting girls and children with low socioeconomic status. Beyond individual and social factors, environmental attributes also have been implicated in the observed upward trend. This study aims to analyse gender specific associations between sport activity outside of school and obesity by verifying to what extent the local built environment contributes to the patterns found.

Methods: 2253 children aged 6.0, 11.0 years were assessed in 2016: 49.3% girls and 50.7% boys. Children's weight and height were measured, and age and sex-specific BMI cut-off points were used to define normal vs overweight/obesity. Children's organised sport activity (OS) was assessed by questionnaire and availability of local facilities for children's engagement in OS were analysed. Logistic regression models were used with adjustments for confounding variables.

Results: We found greater excess weight and obesity (25.1% vs 20.1%) and lower OS engagement (66.5% vs 73.8%) in girls. Obesity prevalence is significantly higher among girls who are not involved in OS, but this is not evident for boys. Logistic regression models showed greater impact of OS engagement on weight status for girls (OR for having a normal weight =1.434 in girls (p<0.05) vs 1.043 in boys (p>0.05). Additionally, local opportunities to engage in OS were scarce for girls.

Conclusions: The gender gap in children weight status and OS engagement might be fueled by an environmental mismatch that undermines girls' opportunities to play sports. The disadvantage in girls' opportunities for OS engagement must be addressed as a problem of social and environmental injustice, which may become a new but not minor form of gender-based discrimination. There should be more opportunities for girls to engage in their favorite sports as a mean to defy the obesity epidemic and to promote gender and social equality.
Physical activity teaching materials - Illustrations as tools for health promoting conversations in health services

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

**Socio-economic inequalities (SIG)**

**Keywords**
Health service, prevention, health promotion, physical activity, teaching material, illustrations

**Background**
Physical activity (PA) can promote health and wellbeing. PA can also be effective in prevention and treatment of diseases. Patients have high confidence in PA information given by health professionals. Health education is an important task for the health services. There is a need for simple and feasible, illustrated tools for health promoting conversations about physical activity.

**Method**
The purpose of this physical activity teaching material is to make it easier for health professionals to support patients in improving fitness and increasing their level of physical activity. The material consists of images concerning 12 topics regarding physical activity. It also includes a guide for health personnel with suggestions for themes, tasks and knowledge important to the participants as well as the healthcare supervisor. The material is being developed in collaboration with staff and participants in 10 Healthy Life Centers (HLCs). The HCLs service is based on national recommendations for physical activity and sedentary behavior, the guide for the content and quality of the HLCs and the experiences of participants and staff. The images have no text and can be used independent of language and social background. Illustrations and tasks can be used as a package or separately and in different situations, digitally or printed. The aim is to promote awareness and reflection towards behavioral change based on participants’ own situation and goals. Counseling is therefore based on principles from Motivational Interviewing.

**Results**
A pilot version is offered to HLCs, which are municipal health services that provide support for behavioral change and offer various exercise groups and individual or group based counseling. So far, 80 municipalities have subscribed to participate in testing and evaluation. The material will be completed on the basis of an evaluation after 3-6 months use.

**Conclusion**
The pilot material (illustrations and guide) is available for HLCs participating in the evaluation. The final material will be available to all health professionals and their partners at www.helsedir.no/folkehelse/frisklivssentraler autumn 2018.
Income and its effect on obesogenic behaviors: a narrative analysis

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Objectives: Obesity in children and adults is a public health epidemic. Physical activity (PA), sedentary/screen time, diet, and sleep are the major proximal obesogenic behaviors that contribute to obesity. Socioeconomic status (SES) has been shown as a major distal risk factor linked to obesogenic behaviors and, in turn, obesity. The objective of this study is to narratively review income as a proxy measure of SES and its relationship with obesogenic behaviors. We hypothesize that those who report higher income will engage in more healthful behaviors.

Methods: Searchers in Pubmed, Web of Science, Ovid, Embase and PsycINFO were conducted. For articles to be included in analysis, original studies had to contain data on the relationship between income and at least one obesogenic behavior. Subjects were to be "apparently healthy" to best generalize findings to the larger population. Finally, studies included were prospective, longitudinal and cohort designs. Cross-sectional designs were excluded. The relationship of income to all, and subsequently each obesogenic behavior was independently examined by coding each study finding. Direction of the association was indicated with a "+" or "-". If a study finding was coded with a "+" that finding was significant and in the direction of our hypothesis. If a study finding was coded with a "-" that finding was significant and not in the direction of our hypothesis. Null findings were coded as "null."

Results: For this analysis, 16 effects from 13 individual studies were examined. Of the 16, 6 (37%) examined dietary intake, 7 (44%) examined PA, 2 (13%) examined sleep, and 1 (6%) sedentary/screen time. Overall, 50% of the articles included were in support of our hypothesis. Of the 8 effects examined that were in support of our hypothesis, (100%) were statistically significant (p<.05). Of the 8 effects examined that were not in support of our hypothesis, only one (13%) was statically significant.

Conclusions: Income appears to have an inconsistent relationship with engagement in obesogenic behaviors. A future systematic review and meta-analysis will include additional measures of SES that include education, family disadvantage, neighborhood deprivation, occupation, and various SES composite scales.
Identification of baseline factors associated with body mass, waist circumference, and blood glucose levels in an effort to personalize weight loss treatment

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: The purpose of this analysis was to identify baseline factors that, if addressed by adjunctive treatments, could better personalize weight loss treatment and possibly improve outcome in a sample of economically and racially diverse participants enrolled in a pragmatic weight loss trial.

Methods: Baseline data from 803 participants enrolled in the PROPEL (Promoting Successful Weight Loss in Primary Care in Louisiana) cluster randomized controlled weight loss trial were evaluated. Underserved participants with obesity (body mass index [BMI]: 30.0-50.0 kg/m2) were recruited from 18 health clinics throughout the state of Louisiana in the United States. Baseline body mass (kg, and BMI) and age were measured and recorded. Health-related quality of life was measured with the PROMIS-29, which is a self-report questionnaire that assesses physical function, sleep disturbance, pain, and other patient-reported outcomes. Disinhibited eating was measured with the Eating Inventory. Participant's health status, including sleep apnea, was obtained from a comprehensive health history. Sitting time was measured with the International Physical Activity Questionnaire - Short Form. Fasting blood glucose was measured with an Alere Cholestech LDX™ Analyzer. Pearson correlations examined associations between outcomes, while general linear models adjusted for age, sex, race and education compared outcomes between participants with sleep apnea and the rest of the cohort.

Results/findings: The sample was predominantly female (84%) and African American (67%). Mean BMI and age were 37.2 kg/m2 and 49.4 years, respectively. Poorer sleep was associated with higher disinhibited eating (r=0.23; p<0.01). BMI correlated positively with the PROMIS pain score (r=0.20; p<0.01) and negatively with the physical function score (r=-0.21; p<0.01). Participants with sleep apnea (n=98) had higher blood glucose levels (difference: 8.7±smn;4.0 mg/dL; p=0.03) and larger waist circumference (difference: 3.8±smn;1.4 cm; p=0.01) compared to the rest of the participants.

Conclusions: This study identified factors that, if treated, could improve weight loss and health outcomes. A strength of the study is the large sample size and inclusion of physiological, behavioral, and patient-reported outcomes. Due to the cross-sectional nature of this analysis, further research is needed to determine if addressing these factors improves outcomes.
Validity of consumer-level activity monitors for measuring steps in chronic heart failure patients

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: To assess the step counting validity of six consumer-level activity monitors in chronic heart failure patients under free-living conditions and during slow walking speeds.

Methods: In a 3-day field study, patients with chronic heart failure and healthy individuals wore six activity monitors (Withings Go, Omron HJ-322U-E, SmartLAB walk+, Garmin vivofit, Garmin vivofit 3, and Fitbit Charge 2) during free living. Their daily step counts were compared with the criterion number of steps as recorded by Actigraph wGT3X-BT. In addition, concurrent validity of all devices was examined. Furthermore, in a lab-based study, the activity monitors were evaluated during treadmill walking at speeds of 2.4, 3.0, 3.6, and 4.2 km.h\(^{-1}\) with manually counted steps as a criterion.

Results: Under free-living conditions, all activity monitors except Fitbit Charge 2 showed substantial correlation with the criterion and mean absolute percentage error <10% in healthy individuals. In patients with chronic heart failure, all of the devices performed worse than in healthy individuals: only two of them (Garmin vivofit 3 and Withings Go) demonstrated at least moderate correlation with the criterion and none of them had their mean absolute percentage error <10%. In the lab-based study, the accuracy of all activity monitors deteriorated at treadmill speeds of 3.0 km.h\(^{-1}\) and slower.

Conclusions: Even though none of the tested activity monitors fall within arbitrary thresholds for validity, most of them perform reasonably well enough to be useful tools for practitioners to motivate patients with chronic conditions such as chronic heart failure to walk more
Needs assessment to explore requirements for a tool to enforce exercise as medicine in hospital care


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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: The prescription of exercise as a form of treatment in clinical care has been advocated worldwide through the 'exercise is medicine' (E=M) paradigm. However, E=M currently has no position in general routine hospital care. To enforce E=M in hospital care, clinicians should be provided with a tool which provides an objective and systematic screening of eligible patients for referral to active lifestyle interventions and an individually tailored E=M advice. This study aims to explore requirements for an E=M tool among hospital clinicians.

Methods: Functional and technical requirements of an E=M tool were explored with a newly developed survey and face-to-face interviews among 22 hospital clinicians (medical specialists, residents, physician assistants, nursing practitioners, lifestyle coaches and hospital managers) in seven clinical departments in two Dutch academic hospitals.

Results: Outcomes gave detailed insight in the requirements for an E=M tool in hospital care, whereupon an E=M tool can be developed. Results indicated that the tool should be a digital instrument for hospital clinicians that is linked to hospitals' electronic medical patient records. Its function should be to recruit eligible adult patients for referral to active lifestyle interventions. Patient characteristics, such as: age, gender, diagnose, co-morbidity, current exercise behavior, motivation to change exercise behavior and health related quality of life should be the input to indicate the urgency to be more physically active and the need to be coached in changing lifestyle. The tool should generate a 'customized' exercise advice for patients. A calculation model should predict, on the basis of local big data, how urgent it is to increase the level of exercise for health within each patient and how individual patients will benefit from more exercise. The tool should also generate referral options for clinicians.

Conclusions: This study presents requirements on a tool to support mutual decision making in referral to active lifestyle interventions and to individually advice patients in physical activity and exercise. An extensive continuation of research on the implementation of E=M, supports the mutual decision making process of lifestyle referral by clinicians and provides insights about implementing physically active lifestyle prescription in medical care.
Social support as a mediator of the relationship between perceived neighborhood environment and physical activity: data from the Dallas Heart Study

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Objective
A link between neighborhood environment and leisure-time physical activity (LTPA) is established. However, little is known about specific psychosocial pathways by which neighborhood environment influences LTPA.

Methods: Using cross-sectional data from the multi-ethnic, population-based Dallas Heart Study (DHS), we compared the role of social support and stress on the relationship between perceived neighborhood environment (PNE) and LTPA. PNE was measured using a score created from the Project on Human Development in Chicago Neighborhoods survey. Three sub-scores were created using factor analysis: (1) neighborhood violence; (2) physical environment; and (3) social cohesion. Higher scores were associated with more unfavorable perceptions. Social support was self-reported using a count response to the question, "How many relatives do you have that you feel close to?" Stress levels were self-reported using a five-point scale, with responses categorized as low (1-2), moderate (3) and high (4-5) stress levels. LTPA was self-reported and converted into MET-minutes/week based a validated conversion scale. We used structural equation modeling to look at both the direct effects of PNE on LTPA and the indirect effects as mediated through social support or psychological stress.

Results: Among the 1714 participants with both valid survey and LTPA data (58.3% black, 26.1% white, 15.6% Hispanic), the only overall direct relationship between PNE and LTPA was for perceived neighborhood violence (beta=0.05, p=0.05). Social support mediated the relationship between each factor (perceived violence, physical environment, social cohesion) with LTPA (p<0.05 for all indirect beta-coefficients related to social support). In contrast, worsening PNE was associated with increases in stress for each factor (perceived violence: beta=0.06, p=0.01; physical environment: beta=0.14, p<0.01; social cohesion: beta=0.13, p<0.01). However, stress did not significantly mediate the relationship between PNE and LTPA (p=0.05 for indirect beta coefficients between stress and LTPA in mediation analyses for all perception sub-types).

Conclusions: Unfavorable neighborhood environment perceptions are associated with both social support and LTPA among participants in the DHS. These results highlighting social support as compared to stress as a mediator between PNE and LTPA emphasize the need to examine pathways between neighborhood influences and health behaviors. These findings suggest that interventions targeting neighborhood perceptions should consider focusing on increasing social support to increase LTPA.
Protocol adherence during cycling-based interval exercise using Polar M430 physical activity trackers for self-monitoring of heart rate: Lessons learned from a 6-month feasibility study

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Lifestyle interventions often apply endurance-based protocols as components to evaluate the effects of exercise on cardiorespiratory fitness. However, the effects may depend on how well participants follow the intended exercise protocol. As part of a complex intervention feasibility study, we aimed to evaluate protocol adherence during multiple cycling-based interval exercise sessions.

Methods: Participants were recruited from the seventh survey of the population-based Tromsø Study (2015-16) with inclusion criteria; age (55-74 years), body mass index (≥30kg/m²), physical activity level (sedentary), cardiovascular disease risk (NORRISK 2 elevated risk) without prior myocardial infarction. The final sample included 11 men and 4 women aged 57-74 years. The endurance exercise protocol involved 19 supervised and progressively challenging interval-based indoor cycling sessions, where participants received "live" instructions using a Technogym projector system. Participants received Polar M430 watches with heart rate (HR) chest straps to monitor their %HRmax in relation to projected instructions. HR zones followed Polar standards; Very Light (50-60 %HRmax), Light (61-70 %HRmax), Moderate (71-80 %HRmax), Hard (81-90 %HRmax), Very Hard (91-100 %HRmax). Data on exercise protocol adherence were extracted from 7 sessions evenly distributed throughout the study period. Potential deviations from protocol were investigated with coefficients of variance (CVs). Paired t-tests were used to evaluate changes in protocol adherence between the first and last session.

Results: Discrepancies between instructed and actual exercise time in the different HR zones for all 7 sessions were as follows; Very Light (CV 58.50%), Light (CV 64.10%), Moderate (CV 62.45%), Hard (CV 64.97%), Very Hard (CV 125.58%). Deviations from protocol were significantly attenuated towards the end of the study period for time in the Light HR zone (p = 0.042), although significantly increased for time in Moderate (p = 0.003) and Very Hard (p = 0.004) HR zones.

Conclusion: Participants may experience difficulties in following prescribed exercise programs, particularly at higher intensity levels, even when receiving visual aid and instructor supervision. Self-monitored HR-based exercise may be viable for lifestyle interventions although participants should receive sufficient education and guidance in using HR monitors. This feasibility study will form the basis for a larger RCT aimed towards long-term lifestyle changes.
Objectively measuring the effect of the built environment on physical activity: a systematic review and framework

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective:
Evidence on environmental improvements that effectively increase physical activity at a neighbourhood, regional, national or international level are required to inform policy. Advancing technological developments have resulted in objective measures of both physical activity and environment, using accelerometry and GPS or GIS, becoming commonplace. Use of objective measures provides the potential opportunity to directly compare environmental effects on physical activity across different cities and locations. Nevertheless to date research using objective measures of both environment and physical activity have not been systematically reviewed and synthesised. Hence this review is vital to determine comparability of studies, which are conducted in different environments and within different populations.

Methods:
A systematic search of the literature was conducted in June 2018 on multiple health, geography, transportation and social sciences databases. The review protocol followed the PRISMA guidelines and is published on Prospero ID: CRD42018087274. After abstract and full-text screening 70 papers were included in the final review. These papers consisted of 50 studies across 20 countries.

Results:
76% studies found a statistically significant relationship between at least one objectively measured aspect of built environment and objectively measured physical activity level; of these studies 87% found a positive relationship; the environment was found to increase activity, 2.5% a negative relationship and 10.5% of studies reported both. These contrasting findings may be explained in part by differing environment measures; GIS (48%), GPS (44%) and smartphone GPS (8%) and physical activity measures; accelerometer (90%), smartphone accelerometer (4%), GPS (4%) and pedometer (2%). Equally as 46% of studies were conducted in the US this relationship may be explained in part by location. Inconsistencies in definitions and thresholds of both physical activity and built environment paired with contrasting study designs currently prevents meta-analysis and cross-location comparison of studies. Subsequently a framework has been developed, generalizable to different study designs that allows great study inter-comparability of future studies and amalgamation of historic studies.

Conclusions:
Utilisation of the created framework is promising in identifying built environment features that are either situation specific in increasing physical activity or consistently beneficial across different cities and countries.
The AICR/WCRF score and risk of mortality in adults: a longitudinal analysis of the NIH-AARP Diet and Health Study

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: To 1) Create an American Institute Cancer Research/World Cancer Research Fund (AICR/WCRF) score operationalizing the 2018 WCRF/AICR recommendations and 2) Examine how greater adherence to the recommendations is associated with all-cause, cancer, and cardiovascular disease mortality among adults in the National Institutes of Health-AARP (NIH-AARP) Diet and Health Study.

Methods: A review was conducted of studies operationalizing prior WCRF/AICR recommendations to inform and create a score based on the 2018 recommendations. Using data from the NIH-AARP Diet and Health Study associations between the score and risk of all-cause, cancer, and cardiovascular disease mortality were examined. Dietary data were collected via a 124-item food frequency questionnaire at baseline (1995-1996). Other lifestyle variables collected were body mass index and physical activity. Study participants were followed via annual linkages to the Social Security Administration Death Master File and causes of death verified through the National Death Index Plus. Cox proportional hazard models with person-years as the underlying time metric were used to model the relative risk of mortality outcomes.

Results: The AICR/WCRF score focused on eight of the 10 WCRF/AICR 2018 recommendations:
1) Maintain a healthy body weight,
2) Engage in regular physical activity,
3) Eat a diet rich in vegetables, fruits, whole grains and legumes,
4) Limit consumption of fast foods and other processed foods high in fat, starches, or sugars,
5) Limit consumption of red and processed meats,
6) Limit consumption of sugar-sweetened beverages,
7) Limit consumption of alcohol, and
8) For mothers, breastfeed if you can.

Each of the sub-scores were worth one point: 1, 0.5, and 0 points for fully, partially, and not meeting the recommendations, respectively (total score: 0-8 points). We hypothesize that higher scores reflecting stronger adherence to the recommendations will be associated with a reduced risk of all-cause, cancer, and cardiovascular disease mortality.

Conclusions: The AICR/WCRF score is a practical assessment tool operationalizing the 2018 recommendations. Future studies are needed to further examine how optimally this score captures behavioral nutrition and physical activity and how it relates to cancer risk and mortality in other populations.
Age related cooking skills: A guide to new evidence-based age appropriate cooking skills recommendations for children

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Childhood obesity is a global epidemic. One of the key recommended strategies for its prevention is increasing children's cooking skills to enable children to make healthier food choices through involvement. However, a decline in domestic cooking is reported in adults and thus, opportunities for children to learn cooking skills. To address this a number of online sources have published age-related cooking skills recommendations for children. Yet, the rationale and/or evidence for assigning skills to the specific ages is unclear. Thus, this study aimed to critically analyse the appropriateness of age-related publically available children's cooking skills recommendations to provide evidence-based cooking skills recommendations.

Methods: Available online resources recommending age-related cooking skills were critically analysed and the cooking skills were deconstructed into their basic mechanical and cognitive components. These components were then mapped onto age-related fine motor skill, numeracy and literacy recommendations. These were then reviewed by experts in the field of Human Movement and Education for accuracy and face validity.

Results: New evidenced-based and expert reviewed age appropriate cooking skill recommendations are proposed.

Conclusions: The new age-related cooking skill recommendations can provide guidance for parents and guardians in relation to different cooking tasks that they can do with their children in the home environment. Additionally, the recommendations can be used within the CookEd framework when designing and targeting cooking interventions to children of specific ages in clinical or community settings.
Assessment of Food Agency using CAFPAS in a nationally representative sample of adults

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Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Cooking meals at home is associated with better diet quality, healthier weight, and could be a key modifiable determinant to improve health. However, evidence as to how to best intervene to promote more home cooking, and how to measure the ability to cook healthy meals at home is mixed. Some measures of cooking focus on individual cooking skills or domains of knowledge. But these scales may be problematic due to the diversity of possible approaches to food preparation. In this study, we conduct a large national survey of adults in the US using a new measure of Food Agency to examine how Food Agency is related to cooking attitudes, confidence, behavior, and dietary intake.

Methods: We conducted a web-based, national survey of adults in the US (n=1,457) using Amazon Mechanical Turk (MTurk) and employed quotas based on the Current Population Survey to achieve a nationally representative sample. Participants answered validated questions about their cooking and food skills, cooking confidence, attitudes, perceptions and behavior. Food Agency was measured using the Cooking and Food Provisioning Action Scale (CAFPAS) a 28-question scale that captures food related attitudes, self-efficacy and structural barriers to food preparation. Analyses included cross tabulations, and multivariable regression models controlling for important socio-demographic measures. Significance was considered at p<0.05.

Results: In adjusted models, greater Food Agency (based on CAFPAS score) was associated with higher confidence in ability to cook from scratch (p<0.001), follow a recipe (p<0.001), cook a healthy meal (p<0.001), and prepare a meal with vegetables never used before (p<0.001). Greater Food Agency was also associated with greater frequency of cooking dinner (p<0.001), cooking from scratch ingredients (p<0.001), and lower frequency of cooking with packaged or boxed ingredients (p<0.001). Higher Food Agency was associated with greater intake of fruit (p=0.007), salad (p<0.001), vegetables (p<0.001), and lower intake of soda (p=0.038).

Conclusions: Higher Food Agency, as measured by the CAFPAS is associated with higher cooking confidence, greater cooking frequency, and with dietary intake. The CAFPAS, and the construct of Food Agency, will be useful for the development and evaluation of cooking skill interventions.
The “CookEd” model for planning, implementing and evaluating domestic cooking education programs

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Domestic cooking education programs are typically designed to improve individual's food and cooking skills, often with an overarching aim to improve diet quality. Currently, there are no published models available to guide the development, implementation and evaluation of domestic cooking education programs. We aimed to address this gap in the literature through the development of the proposed "CookEd" model.

Methods: The evidence-base on food and cooking skill education was reviewed and this guided the development of the initial model. The model was then critiqued by experts in food and cooking skill education/research until consensus on the content and format of the final proposed model was reached. The CookEd model is designed to be applied across the gamut of domestic cooking education programs delivered in clinical or community-based settings (excluding schools). A specific focus of the model is an innovative prioritisation matrix to assist with selecting which food and cooking skills to prioritise in cooking education programs, based on dietary guidelines, specified program outcomes and various participant characteristics. The development of this matrix involved mapping food skills and cooking skills to core food groups (e.g. vegetables, whole grains, meat and meat alternatives, dairy and dairy alternatives, fruit), recommendations specified by dietary guidelines (e.g. reducing salt, fat, added sugar) and identifying special considerations for a range of target groups.

Results: Hypothetical scenarios respectively describe the application of the CookEd model to plan, implement and evaluate: 1) a domestic cooking education program to improve diet quality in adults with low-incomes, in a rural community-based setting; and 2) a research study of an after-school cooking program to improve the food skills, cooking skills and vegetable intake of 5 to 12 year old children.

Conclusions: The proposed CookEd model, including the food and cooking skill prioritisation matrix, can be adapted by cooking program developers internationally so that it is relevant to the local food culture and dietary guidelines. Further research is required to establish the CookEd model's utility in real-world cooking education programs.
Accuracy of estimating portion size from food images among Nutrition and Dietetics undergraduate students

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective:
With the increased use of digital images in dietary assessment, it is important to be able to identify and quantify portion size accurately through food images. However, little is known on the ability of current nutrition and dietetics students in performing image-based dietary assessment. This study aims to determine the accuracy of estimating portion sizes from digital food images among nutrition and dietetics students in Malaysia.

Methods:
A total of 315 students (88% females) who were enrolled in Nutrition or Dietetics undergraduate programs from six public universities in Malaysia participated in this online survey. Each participant was shown two sets of food images depicting a meal served on a plate and in a bowl. Participants were asked to estimate the quantity of the presented eight food items to the closest gram. Estimation error was determined by calculating the weight difference between the estimated and weighed portion sizes.

Results:
The mean estimation error was lowest for white rice (8.3 ±smn; 95.7%) and highest for shredded chicken (54.9 ±smn; 159.5%) with large variability. For bowl food items, rice vermicelli and soup were significantly underestimated, while shredded chicken and blanched vegetables were significantly overestimated (all p<0.001). For plated food items, fried chicken and watermelon were significantly overestimated. Only 248 (9.8%) of the total estimates were within 10 percent of the actual weight.

Conclusions:
Few nutrition and dietetics undergraduate students in Malaysia could provide acceptable estimation of portion sizes based on food images. The findings suggest a need for formal training in portion size estimation to support the use of image-based dietary assessment methods.
Design and rationale of a randomized controlled trial to evaluate a substance use prevention and healthy eating intervention: Families Preparing the New Generation Plus

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Purpose: Latino youth are at increased chronic disease risk compared to their non-Latino counterparts because of their growing overweight/obesity rates, lack of adherence to diet and physical activity recommendations, and greater rates of tobacco and substance use. Parents are important change agents due to their ability to create home environments that promote healthful behaviors and to their role as providers of resources to the family. Parenting interventions are efficacious in preventing substance use, but too few studies have used a family approach to promote healthy eating. The purpose of this study is to extend the scope of Families Preparing the New Generation (FPNG) - an efficacious parenting program proven to help prevent substance use among Latino youth - to also promote healthy eating. This presentation will describe the design and rationale of a NIMHD-funded group randomized controlled trial to test the effects of the nutrition-enhanced parenting program (FPNG+).

Methods: The study's main aims are to (1) test the effects of a nutrition-enhanced parenting program (FPNG+) on desired substance use and diet outcomes among Latino youth, (2) explore how enhancing parenting skills impact the effects of FPNG+, and (3) understand how social and cultural factors impact how FPNG+ works. In collaboration with the American Dream Academy (ADA), an organization delivering academic success programs to families throughout the Phoenix Area, 1,494 families who have a 6th-8th grade student will be recruited into the study over three years. Randomized at the school level, parents from 18 schools will be assigned to one of three 10-week arms: FPNG+ (substance use prevention and healthy eating), FPNG (substance use prevention only), and the ADA academic success comparison program. Data will be collected from the youth participant and his/her participating parent before the start of the program, immediately after it ends, and 16 weeks later.

Conclusions: This study will inform how parenting can be incorporated into an intervention promoting multiple healthy behaviors among youth, and will contribute to our long-term goal to design and disseminate programs that help youth develop and maintain long-lasting positive lifestyle behaviors in order to prevent substance use, obesity, diabetes, and other chronic diseases.
Food Involvement and Variety Seeking Tendency in a Diverse Adult Population

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Understanding the factors that may influence food choice and adoption of healthy eating habits in diverse groups is key in designing interventions to promote a healthy diet. The objective of this study is to determine the relationship between demographic characteristics of a diverse group of adults and food involvement and variety seeking tendency with respect to foods.

Methods: A survey that included items on demographic characteristics, a food involvement scale (FIS), and a variety seeking tendency scale (VARSEEK) with respect to foods was administered online to individuals in O’ahu, Hawai‘i and other diverse locations (n=92). The FIS included the Set and Disposal (S&D) Involvement subscale and the Preparation and Eating (P&E) Involvement subscale. Pearson's correlation was calculated to assess the association between the FIS scores and VARSEEK score. To investigate the association between demographic variables and FIS and VARSEEK scores, univariate analysis using one-way analysis of variance or linear regression was performed. Then, analysis of covariance was conducted with the demographic variables with a p-value < 0.20 and the backward stepwise selection method was used to identify final models.

Results: Participants' average age was 39 years, and 57% were female. Approximately 60% of participants resided in Hawaii. The total FIS score and VARSEEK score were 69.6 ± smn; 10.0 (range 36-84) and 30.9 ± smn; 6.8 (range 12-40), respectively. They were moderately correlated (r=0.41, p<0.001), and the main correlation was with the P&E involvement subscale from the FIS score. None of the demographic variables were significantly associated with VARSEEK. Education was positively associated with FIS P&E score; whereas, age, employment, and household income were negatively associated with FIS score.

Conclusions: Our findings revealed a positive relationship between food involvement and variety seeking tendency, and also demonstrated higher food involvement in those who were more educated, younger, without employment and earning less. These results indicate the need for diverse strategies to deliver effective food-related interventions to promote healthy eating according to demographics. For instance, offering low-cost participatory activities, such as exotic cooking classes, for those who are younger and earning less such as college students, may be one way to influence behavior.
P1, P1.139

Using Item Response Theory to evaluate items that measure intake of energy-dense, nutrient-poor foods amongst toddlers.

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: This study used item response theory (IRT) to evaluate measurement properties of items for assessing intake of energy-dense, nutrient-poor (non-core) foods amongst toddlers. The aim was to identify discriminating items suitable for inclusion in a short-form tool to assess obesity-related behaviours.

Methods: This is a secondary analysis of dietary data collected via three 24-hour recalls on 18-month old children participating in the InFANT trial, in Melbourne, Australia. Parents also completed a food frequency questionnaire (FFQ) which assessed infant dietary intake over the past month, measured on a nine point scale. The responses of 463 parents to 15 items on the FFQ were analysed using IRT. Analyses were performed using SPSS v25 and Winsteps (4.0.1). Data were screened for missing responses and floor/ceiling effects. Unidimensionality was assessed using principal components analysis (PCA) with direct oblimin rotation. Infit and outfit mean squares assessed the fit between item responses and the Rasch model. Item performance was assessed using item characteristic curves, category response curves, and item-person maps.

Results: Median non-core food and drink intake measured via 24-hour recalls was 65g/day (IQR=34-121). Distribution of all FFQ items was left-skewed, and therefore responses were dichotomised into 'never or < once per month' and all other frequency categories combined. One item (related to added sugar) was excluded based on PCA, to satisfy assumption of unidimensionality. The Rasch dichotomous model with 14 items showed acceptable item fit statistics, though accounted for only 40% of total variance. Order of item difficulty supported construct validity (lowest to highest being sweet biscuits; cakes/alternatives; fish, fried/battered/crumb/breaded; savoury biscuits; hot chips; ice cream/custard; crumbed chicken; savoury pastries; pizza; chocolate/lollies; crisps; flavoured milk; softdrink/cordial; hamburgers). Correlation between raw scores obtained in Winsteps, and median daily intake of non-core food and drink was rs=0.45, p<0.001. The item-person map indicated that several items discriminated at the same level, therefore eight items were removed. Correlation between raw scores of six items (sweet biscuits; savoury biscuits; pizza; crisps; flavoured milk; soft drink/cordial) and intake of non-core food and drink was rs=0.38, p<0.001.

Conclusions: Where measurement of dietary behaviours is of interest, IRT provides a useful item-reduction technique.
Evolution of nutrient intake of French children during the last 10 years: comparison of data from the two French nutrition and health surveys (ENNS 2006-2007, Esteban 2014-2016)

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Purpose
In France, the National Nutrition and Health Programme (PNNS) aim to improve the health of the population by intervening on nutrition. The evaluation of its effectiveness requires monitoring of nutritional characteristics and studying the evolution of dietary intake in the French population. The objective of this work was to study the evolution of dietary intake of French children during the last 10 years, according to French recommendations, by comparing data from two national samples of 6-17-year-old.

Methods
Studies were based on two cross-sectional population-based surveys using a multistage sampling design: the ENNS study realized in 2006-2007 (including n=1358 children) and the Esteban study realized in 2014-2016 (including n=1279 children). Dietary data were collected through three 24h recalls realized by internet or by phone, monitored by dieticians. Among 6-10-year-old children data were collected by food records. Sampling scheme and weighting were taken into account for descriptions. The two samples have been compared by linear regression and chi-2 test (gender-stratified, weighted and standardized data).

Results
Over the last 10 years, globally, carbohydrates intakes (% EIWA) decreased significantly in boys and girls (46.5% in 2006 versus 45.6% in 2015; p<0.01). Among boys, 28.4% consumed more than 50% EIWA of carbohydrates, while they were 18.6% ten years later (p=0.001). Meanwhile, lipids intakes (% EIWA) increased in boys and girls (37.6% in 2006 and 38.2% in 2015; p<0.01). Consumption of simple sugar from sweetened food increased. Children were 40.1% to reach the recommendation for simple sugars from sweetened foods (<12.5% EIWA) in 2006 and only 32.5% in 2015. Adherence regarding to salt consumption (<6g per day) decreased significantly during the last decade (from 43.8% to 29.7% for boys and from 64.1% to 50.4% for girls).

Conclusions
These results show that nutritional objectives of the PNNS were not achieved in the French population. As a whole, food consumption and dietary intake of French children get worse during the last 10 years. So nutrition should be subject to next priorities of public health in France by strengthening actions of the PNNS.
Development of an innovative technology assisted food frequency questionnaire for elementary and middle school children: Findings from a pilot study

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Objective: Tools to assess dietary intakes in children are limited. Current tools require caregiver assistance, and/or are paper-based format. This study collected preliminary data for the development of a self-administered, web-based food frequency questionnaire (FFQ) in children.

Methods: This study utilized a convenience sample of boys and girls, 6-14y, in the New York City metropolitan area. The study had three components: 1) in-person completion of FFQ, 2) completion of a 3-day food record, and 3) participation in end-of-study focus groups. During the study visit, study staff measured children's heights and weights and caregivers completed socio-demographic questionnaires. Children self-administered a web-based FFQ using a tablet device with minimal assistance from their caregiver. The FFQ was previously validated in adults and included 1,200 food images (up to 6 portion size options) to assess food intakes in the past 90 days. During the week following the in-person visit, children completed a paper-based 3-day food record (2 weekdays/1 weekend). Children voluntarily participated in focus groups, which collected information on missing food/beverage items and portion sizes, and children's overall experience with FFQ self-administration. Nutrient and food group intakes on the FFQ and food records were compared. De-attenuated Pearson correlation coefficients were calculated to account for the within-person variation.

Results: 55 children (34 girls;62%) completed the FFQ and 3-day food record (n=55). Approximately half of the children were 6-10 years old (n=30;55%) and the majority were normal weight (n=44;80%). Most of the children were white (n=36;65%) and the remaining identified as Asian (n=9;16%), Hispanic (n=6;11%), and Black (n=4;7%). The highest correlations between the FFQ and 3-day food records were observed for iron (0.68), saturated fat (0.54), fat (0.54), vegetables (0.54), and dairy (0.50). The lowest correlations were observed for whole grains (0.09) and vitamin C (0.11). In focus groups, children (n=20) identified areas for improvement including ease of use, alterations of food images, and removal of foods not commonly consumed.

Conclusions: We observed moderate correlations between the FFQ and food records for several foods/nutrients. The findings from this pilot study will inform the future development of a self-administered, web-based FFQ for use in children.
17370

P1, P1.142

Understanding error in measurement of children’s dietary intake: Insights from a cognitive interviewing approach

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Short food questions (SFQ) are appealing brief dietary assessment methods that can be tailored for use across many settings. Although SFQ have been found to be reliable, their accuracy appears to be low and variable across food groups. The purpose of this study was to increase understanding of measurement errors associated with parent reporting of children's dietary intake. To this end, a cognitive interview approach was used to measure parents' thought processes when reporting their children's dietary intake.

Methods: Cognitive interviews were conducted with 21 Australian parents of 3-7-year-old children, using a combination of think-aloud and retrospective probing approaches. Parents were asked to 'think-aloud' while completing three different styles of SFQ about their child's food intake. Interviews were recorded, transcribed and thematically analysed using a deductive and inductive approach. Responses within themes related to measurement errors, including response estimation strategies, problems encountered and facilitators of responses, were compared for discretionary versus core foods.

Results: A primary source of error emerged, for both core and discretionary foods, whereby parents frequently estimated their child's intake rather than calculating actual intake. This occurred when intake was variable or different than normal, when parents were unable to recall what was consumed, and were not present at all occasions when the child consumed foods (e.g. when child was at child care or at social occasions). Social desirability concerns - tensions between reporting intake accurately but also appearing to feed their child "well" - were reported by some parents for both core and discretionary foods but did not emerge as a prominent theme overall. Confusion about reporting of foods offered versus consumed arose as a theme affecting reporting of core foods, particularly vegetables.

Conclusions: Cognitive interviewing provides insights into parents' thought processes when answering questions about their child's food intake, increasing understanding of the origins of errors in measurement of children's dietary intake. Although social desirability bias can lead to estimation error, this study identified another important source of error, namely that challenges of recall often lead parents to estimate rather than to calculate their responses.
Development of Parent Engagement Indices to Interpret Child Impact from Multi-Component, Asymmetrically Implemented School- and Family-Based Intervention

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Objective -
Efforts to engage and involve parents are common strategies in health interventions for children; the expectation is that greater participation will enhance their child's benefits from the program. However, parent participation is typically low and measurement is often insufficiently defined, measured and/or assessed. Fuel for Fun: Cooking with Kids plus Parents and Play (FFF) is a multi-component, school- and family-based intervention for 4th-grade students. An evaluation of FFF included a cluster-randomized design with four study arms with asymmetric opportunities for parent engagement, thus requiring a unique metric to define parent engagement. This study describes the process of developing a FFF parent engagement profile (PEP) and an index to measure parent engagement intensity (PEI).

Methods -
PEP was developed by cataloging all opportunities for parent participation, and then summing the number of participation activities. A standardized PEP metric was calculated by dividing the opportunities presented in each study arm assignment. PEI was developed by considering the frequency of each activity type (e.g., 2 family night events, 9 24-hour dietary recalls) and multiplying by a weighted constant unique to each activity that considered effort required to complete each activity (e.g., length of time to complete), convenience (e.g., done at home/online or away from home?, required child interaction?), and invasiveness (e.g., wearing an accelerometer). Intervention experts categorized activity effort independently, and arrived at consensus on differing values. PEI potential, unique to study arm assignment, was standardized with a maximal study arm divisor.

Results -
Eight activity types were identified; 4 intervention- and 4 evaluation-based. PEP ranged from 1 - 8 depending on study arm. PEI ranged from 2 - 48. After categorizing and summing activities by effort (1=more effort v 0=less effort), then multiplying by frequency of participation opportunities, each activity type yielded the same weighting constant.

Conclusions -
Development of these parent engagement metrics revealed the potential for disparate levels of parent engagement. This enabled a more robust description of FFF parent engagement and plans for evaluation of FFF impact. PEP and PEI inclusion has potential to clarify impact assessment, thus informing intervention designs.
Sex modifies the association between diet intake-regulation related genes and BMI z-scores in children

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Excessive energy intake is a critical contributor to the development of childhood obesity. Genes that encode neurotransmitters and their receptors in the hypothalamus and the food reward circuitry may play a critical role in dietary regulation and consequently weight gain. The aim of this study was to assess the association between polymorphisms of three genes, DRD2 (rs1800497), CLOCK (rs1801260), and NR3C1 (rs56149945), involved in the neural pathways governing dietary regulation and BMI z-scores in school-aged children.

Methods: Anthropometric measurements and genotypes were available in 121 children (8-12 y, 56% boys) participating in a cluster-randomized, controlled impact assessment of Fuel for Fun, a multi-component, school- and family-based intervention designed to improve culinary skills, dietary intake and physical activity. Height and weight were measured at baseline and 12 months later and converted to age and sex-related BMI z-scores. Genetic material was obtained from buccal swabs following standard collection and assay protocols. Other than the three target genes, the polymorphism of FTO (rs9939609) was included as a reference. Mixed-effects linear regression was applied to assess the genetic association and control clusters within families and schools. Covariates, including age, sex, race, screen time, and intervention arm, were adjusted in the analyses.

Results: Obesity affected 6% and 17% children at the baseline and month 12. No significant genetic association with BMI z-score was identified, except for rs9939609 (AG vs. GG alleles) with follow-up BMI z-scores (p=0.039). However, sex significantly interacted with the polymorphisms including rs1800497 (p=0.047), rs1801260 (p=0.029), and rs9939609 (p=0.034) at baseline, and rs1801260 (p=0.039) and rs56149945 (p=0.015) at follow up. In girls, but not boys, AG alleles at rs1801260 were associated with higher BMI z-scores compared to AA alleles at both assessments. A allele at rs9939609 was additively associated with higher BMI z-scores at baseline in girls. In boys, but not girls, CT alleles at rs56149945 were associated with higher BMI z-score at follow up and tended toward significance at baseline.

Conclusion: Sex potentially modifies the association between diet-regulation related genes (ie., CLOCK and NR3C1) and BMI z-scores in children. This novel finding may have important clinical implications.
A longitudinal study on the effect of bicycle commuting on body composition, metabolic, and cardiovascular health

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

The physiological health benefits of bicycle commuting is well-documented. This novel study elucidates the effects of bicycle commuting at the vascular level by employing the gold standard measure for arterial stiffness. Objective: To monitor changes in body composition, metabolic, and cardiovascular health markers in adult bicycle commuters. Methods: This longitudinal study examines the health of bicycle commuters (n = 17, 7 males, age: 48.9 ±smn; 10.9yr.; weight: 84.0 ±smn; 19.7kg; height: 1.7 ±smn; 0.1m) with measurements taken over a year (1: baseline; 2: 3-5 months; 3: 7, 10 months; 4: 12, 14 months). Measurements include pulse wave velocity (PWV), body mass index (BMI), waist:hip ratio (WHR), cholesterol ratio, blood glucose level, glycated haemoglobin (HbA1c), systolic (SBP) and diastolic blood pressure (DBP), and resting heart rate (RHR). A repeated-measures analysis of variance is used to generate the following results: time comparison: mean change, ±smn;90% confidence interval, and a qualitative interpretation. Results: Compared to baseline, BMI and SBP improved between measurement points 1 and 4 (BMI 1v4: -2.5, ±smn;3.4 kg.m2; likely beneficial; SBP 1v4: -10.0, ±smn;10.0 mmHg; likely beneficial), while DBP steadily improved at all time points (DBP: 1v2: -2.9, ±smn;5.3; unclear; 1v3: -5.5, ±smn;5.6, likely beneficial; -8.9, ±smn;5.9 mmHg; very likely beneficial). RHR and PWV maintained likely beneficial improvements at all time points (RHR: 1v2: -4.9 ±smn;4.5; 1v3: -4.6, ±smn;4.5; 1v4: -4.3, ±smn;4.8 b.min-1; PWV: 1v2: -0.9, ±smn;0.88; 1v3: -0.89, ±smn;0.94; 1v4: -1.1, ±smn;0.97 m.s-1). There were possibly harmful changes in HbA1c, glucose and cholesterol at all time points (HbA1c: 1v2: -0.21, ±smn;0.3; 1v3: 0.34, ±smn;0.31; 1v4: 0.09, ±smn;0.34%; blood glucose level: 1v2: 4.7, ±smn;11; 1v3: 3.4, ±smn;12; 1v4: 4.7, ±smn;12 mg.dL-1; cholesterol ratio: 1v2: 0.3, ±smn;0.56; 1v3: 0.41, ±smn;0.6; 1v4: 0.23, ±smn;0.62). Conclusions: Habitual bicycle commuting has a beneficial effect at the vascular level and may be suitable in the prevention of atherosclerotic-derived cardiovascular disease. Conversely, metabolic health tended to decline over the course of the year. It is possible that bicycle commuting led to compensatory behaviour changes in nutrition and/or a reduction in other physical activities. Nutritional support and physical activity education may improve outcomes for adult bicycle commuters.
Adapting the Sedentary Behavior Questionnaire for College Students

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Introduction: With the increasing recognition of negative health impacts related to sedentary behavior, greater attention has focused on quantifying time spent sedentary. College students represent a population transitioning into young adulthood who are establishing lifestyle behaviors which can endure. However, as currently crafted, many sedentary behavior questionnaires focus on sedentary time during work and leisure time, which can result in loss of important information on sedentary time for college students engaged in schoolwork. Therefore, the objective of this study was to examine a self-reported measure adapted for the unique behaviors of college students.

Methods: Undergraduates at a large US public university were surveyed using the 9-item Sedentary Behavior Questionnaire which assesses domain-specific sedentary activities on weekdays and weekends separately and derives weighted daily minutes spent sedentary. The SBQ has been validated and is widely used in adult populations. To adapt the SBQ for college students (SBQ+), we added three items to assess time spent sitting for class-based activities, leisure computer use and socializing and scored it to derive weighted daily minutes. In addition, the International Physical Activity Questionnaire was administered, and the sedentary behavior item was evaluated. All questionnaires were administered online, and demographic data were obtained.

Results: Undergraduates (N=272; 79% female) reported 476+289 min/day sedentary time on the 9-item SBQ (original), with the top contributors to sedentary time being TV viewing (123+80 min/day) and talking/texting on the phone (85+80 min/day). The SBQ+ indicated substantially more sedentary time (706+496 min/day), with TV viewing and added items of class-based activities (135+87 min/day) and socializing (95+73 min/day) emerging as the top contributors to total sedentary time among college students. The IPAQ item indicated a lower sedentary time than either the SBQ or SBQ+ with 298+200 min/day.

Conclusions: Although objective measures of sedentary time are needed to confirm self-reported estimates, these data indicate that sedentary time surveys for undergraduates may be more accurate when specifically querying about domains relevant to the college experience. Additionally, sedentary behavior reduction interventions targeted for college students could benefit by considering both individual-level domains for modification (e.g., TV viewing) and institutional/environmental-level modifications (e.g., social norms about sitting during lectures).
Past-week recall of sedentary time: validity of a weekly self-reported measure in university students

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: To evaluate the validity of the Past-week Sedentary Time questionnaire for University students (PAST-WEEK-U), a modified version of the Past-Day Adults' Sedentary Time, University (PAST-U) questionnaire, in a homogenous sample of undergraduate students by comparison with criterion data obtained using the activPAL4 inclinometer (PAL Technologies Ltd, Glasgow, UK).

Methods: In this cross-sectional study, undergraduate university students (n = 25, age = 17-24, 88% female) wore the activPAL4 for one week and recorded their sleep and wake times in an activity log. Immediately following this week, participants completed the PAST-WEEK-U, which assessed sedentary time over the past week in various domains including work, study, transportation, television viewing, leisurely computer use, leisurely reading, eating, socializing, and other purposes. Sedentary time from each individual domain was summed and averaged into total daily waking sedentary time and compared to the total daily waking sedentary time derived from the criterion measure activPAL4. The agreement between these two measures were assessed via Bland-Altman plots in Microsoft Excel (Version 15.32.).

Results: On average, participants were sedentary for 11.34 waking hours per day, as measured via the activPAL4 inclinometer data. In comparison, the average sedentary time captured using the PAST-WEEK-U was 0.09 hours lower (i.e., 11.25 waking hours per day), with a 95% limit of agreement ranging from -5.38 to 5.55 hours.

Conclusions: The PAST-WEEK-U provides a questionable measure of sedentary time in undergraduate students as it demonstrates systematic under and over reporting of sedentary time.
Ten-year patterns of sitting and all-cause mortality: Evidence from the Canadian Multicentre Osteoporosis Study (CaMos)

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Objective Increasing evidence suggests a link between sedentary time (ST) and all-cause mortality (ACM). Although behaviour is not static over time, nearly all studies relied on ST at a single time point, which may lead to misclassification. In this study, we classified participants based on ST reported at three time points over 10 years and examined the association between the 10-year pattern of ST and ACM.

Methods Data were obtained from the Canadian Multicentre Osteoporosis Study, a prospective cohort study of adults sampled from the general Canadian population. Domain-specific (transport, TV, occupational) and total ST were assessed by self-report at baseline, 5- and 10-year follow-ups. Death was ascertained by follow-up interviews. Group-based trajectory modelling with a censored normal model was used to identify patterns of ST. The association between patterns of ST and ACM was assessed using Cox regression models, adjusted for sociodemographic, lifestyle, and health covariates.

Results Final sample included 8718 participants without major physical limitations. The average age was 62 years and 69% were women. During an average follow-up of 11.2 (SD=4.1) years, 1348 deaths occurred. For occupational sitting, 14% were classified as "low", 11% "low-increasing", 60% "medium" and 16% "high". For TV sitting, 9% were classified as "low", 65% "medium" and 27% as "high". For transport sitting, 74% were classified as "low" and 26% "high". For total ST, 57% were classified as "low", 31% "medium-increasing", 4% "high-decreasing" and 8% "high". In adjusted models, there was no significant associations of long-term transport and TV ST with ACM. For occupational sitting (among 2843 participants working at baseline), those in the "low-increasing" (HR: 0.32; 95%CI: 0.13-0.83) and "medium" (HR: 0.48; 95%CI: 0.31-0.74) categories had a lower risk of ACM than those with low occupational ST. For total sitting, those with high ST had a lower risk of ACM than those with low ST (HR: 0.62; 95%CI: 0.45-0.86). We found no significant effect modification.

Conclusions Contrary to most studies, our study found null or inverse associations between long-term ST and ACM. Specific associations differed by domain. Future studies should assess domain-specific long-term behavioural pattern to fully understand the health effects of ST.
Physical activity levels are associated with active modes of commuting to and from school in Spanish children and adolescents

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Objective: The purposes of this study were: to analyse the levels of physical activity (PA) and sedentariness by sex and age, and to study its association with the usual mode of commuting to and from (to/from) school in Spanish children and adolescents.

Methods: A total of 585 students participated in this study. Data were collected in two time points (spring 2016 and spring 2018), in 5 Primary schools and 2 Secondary schools from Granada (Spain). Students completed the Young Activity Profile (YAP) and a mode of commuting to/from school questionnaires. The YAP questionnaire reported information on PA at school, PA out of school, total PA and sedentariness. The mode of commuting questionnaire reported the usual mode of commuting to/from school, and participants were categorized as active (i.e. to walk or cycle usually to and/or from school) or passive commuters (i.e. not to walk or cycle usually to and from school). Age, sex, and distance between home and school were self-reported. Student T-test was used to analyse the differences in PA and sedentariness by sex and age. Linear regression analyses were performed to study the association between PA and sedentariness with active commuting to/from school.

Results: Male children reported higher total PA and sedentariness than female children (both, p<0.01). Male adolescents reported higher PA at school, PA out of school, and total PA than female adolescents (all, p<0.001). The levels of PA at school (βa=0.610), PA out of school (βa=0.210), and total PA (βa=0.485) were associated with active commuting to/from school in children (all, p<0.001). The levels of PA at school (βa=0.703), PA out of school (βa=0.129), and total PA (βa=0.515) were associated with active commuting to/from school in adolescents (all, p<0.05). There were not significant associations between sedentariness and active commuting to/from school.

Conclusion: Overall, male children and adolescents reported greater PA levels than female counterparts, and active commuting to/from school behaviour was associated with greater PA levels in both children and adolescents. These results suggest that policy programs focused in the active commuting to/from school promotion might help to children and adolescents to increase their daily PA levels.
The Occupational Sitting and Physical Activity Questionnaire (OSPAQ): Validation against objective measures of physical activity and heart rate reserve

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose. The OSPAQ was developed as an easy-to-use tool for self-reported assessment of percentage time spent sitting, standing, walking and performing heavy labour in a workplace setting. The aim of this study was a thorough validation of all dimensions of the OSPAQ against technical objective measures of physical activity (PA), body posture and intensity (heart rate reserve (HRR)) in a mixed sample of sedentary and physically active workers.

Methods. Results are based on a preliminary sample from the Flemish Employees’ Physical Activity study, among workers in the service and production sector. Ambulatory measurements of PA and heart rate (HR) were conducted during 2 to 4 consecutive workdays, and enabled determination of the percentage of working time spent sitting, standing and walking. To objectively estimate the percentage of working time performing heavy labour, we calculated the relative HRR from the ambulatory HR recordings and defined the percentage of time working at a relative HRR of ≥30%. Intra-class (ICC) and Spearman rho correlations were analysed to assess criterion validity.

Results. The sample included 329 workers (58% female) aged 20-65 years (mean 38.6; SD 11.2); 57% had a higher education. Criterion validity results were good for assessing percentage of sedentary working time (ICC 0.87; Spearman rho 0.69), and moderate when it came to reporting the proportion of time standing (ICC 0.69; Spearman rho 0.57) and walking (ICC 0.52; Spearman rho 0.51) at work. The correlation between self-reported and objectively measured time performing heavy labour at work was weak (ICC 0.36; Spearman rho 0.31). The average underestimation of standing was significantly larger in women and in higher educated, while younger age groups and those with a lower physical fitness level showed a larger average underestimation of heavy labour.

Conclusions. These findings confirm previous evidence on the good criterion validity of the OSPAQ instrument for assessing working time spent sitting in a mixed occupational sample of sedentary and physically active workers. However, the comparison against objective technical measures of PA and HRR showed moderate and weak criterion validity results for reporting standing / walking at work, and for time performing heavy labour, respectively.
Objective: To assess the feasibility of wrist-worn accelerometry in measuring sedentary time (SED), light physical activity (LPA) and moderate to vigorous physical activity (MVPA) in preschool children. Inconvenience and complexity of hip-worn accelerometry protocols have led to low compliance rate and validity of the measurements of activity time and energy expenditure.

Methods: A 6-day accelerometry protocol was used to measure activity levels in 356 3-years-old children enrolled in full-day childcare centers in the US. Children wore ActiGraph wGT3X-BT accelerometers on the wrist all day for six days. Accelerometers were set at a sampling rate of 30 Hz. Data processing (ActiLife 6.13.3) parameters were 1) non-wear-time interval: 20 min; 2) minimum wearing hours: 13 hours/day; 3) minimum wearing days: 5 days with at least one weekend day; epoch: 5 seconds. Three different sets of cut-points were used to quantify the activity intensity and time: Vector magnitude (VM) cut-points from Johansson et al. (2016) (SED=328 counts/5s, LPA 329-1392 counts/5s, and MVPA=1393 counts/5s); rounding of Johansson mean VM counts by CARS score (SED=400 counts/5s, LPA 401-1600 counts/5s, and MVPA=1601 counts/5s); and ±2 Standard deviations (2SD) of Johansson mean counts by CARS score (SED=407 counts/5s, LPA 408-941 counts/5s, and MVPA=942 counts/5s).

Results: Valid data were obtained from 76% of the children. SED (min/day) were 532.7 (68.3%), 565.8 (72.6%), 568.9 (73.0%), for cut-points based on Johansson et al., rounding, and 2SD, respectively. LPA (min/day) were 230.4 (29.6%), 169.5 (21.7%), and 158.4 (20.3%) for cut-points based on Johansson et al., rounding, and 2SD, respectively. MVPA (min/day) were 14.3 (1.8%), 42.1 (5.4%), 50.1 (6.4%) for cut-points based on Johansson et al., rounding, and 2SD, respectively.

Conclusions: We achieved a higher compliance rate using a more stringent protocol (Costa et al., 2013). Percent of time spent in SED, LPA, and MVPA based on the rounding and 2SD of Johansson et al. cut-points were most consistent with the percentage of time reported in the literature using the hip-worn accelerometry (e.g., Sirard et al., 2005). The findings need to be cross-validated with observational tools and machine learning techniques.
Content validity and design considerations affecting validity in ecological momentary assessment studies in physical activity and sedentary behaviour: a systematic review

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Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: Ecological momentary assessment (EMA) is a method to collect real-time data based on repeated measures and observations that take place in a participant's natural setting. The application of EMA in physical activity (PA) and sedentary behaviour (SB) research can be a valuable addition to more traditional measures such as retrospective self-report questionnaires. This because it may take into account the context more of PA and SB and avoids recall bias. Because of these advantages and rapid advancement in mobile technologies, more studies have adopted EMA in recent years addressing topics of physical activity and sedentary behaviour. However, even with these potential capabilities, EMA research is associated with some limitations, including potential validity problems. In this paper we want to give a systematically overview of the existing literature on the use of EMA in physical activity and sedentary behaviour research. More specifically an overview of the design considerations that affect validity and to what extent the authors of the existing EMA studies in physical activity and sedentary behaviour assess the content validity of the used items

Methods: We searched the Pubmed, Web of Science, CINAHL and SportDiscus databases for all available studies on the use of EMA in non-clinical populations from different age categories. We included 31 studies. These studies were reviewed and analyzed for the following 5 areas: (1)study characteristics, (2)data collection procedure, (3)content validity and (4)respondent training.

Results: Results of this review showed a wide variability in the design and reporting of EMA studies in physical activity and sedentary behaviour. Most studies (74%) only used EMA in physical activity, 22% of the studies used EMA in both physical activity and sedentary behaviour. Only 1 study looked at sedentary behaviour. Monitoring period ranged from 1 to 36 days, and EMA surveys ranged from 2 to 30 times per day. 68% of the studies employed a smartphone. Most (84%) of the studies used time-based sampling strategy. About 74% of the studies failed to report information about content validity of the used items in the EMA. More results will be presented at the IBNPA conference.
Thigh inclination has been shown to be a highly specific discriminator between upright and seated activities. In addition, recent work has shown that the dynamic accelerations experienced while travelling in a car can be misclassified as light or even moderate intensity activity. We hypothesised that these dynamic accelerations can provide important contextual information about sedentary activities.

PURPOSE The purpose of this study was to develop a simple algorithm to identify periods of seated car travel. The algorithm is based on the premise that during seated car travel, 1) body-worn accelerometers register a background level of external dynamic acceleration due to forces generated by the road surface and car engine and 2) leg movements are restricted due to the spatial constraints of the car.

METHODS Participants (n=26, mean age=30.5yrs, 16 female, 10 male) were directly observed in their free-living environment on two separate occasions, for two hours each. Raw accelerometer data were summarized in 15-second containers and synced with direct observation video. Analysis was performed only on epochs of continuous sitting (thigh in horizontal inclination) of 3 minutes or longer. Acceleration magnitude (AM) was calculated by summing the absolute difference between acceleration data samples across each container. Using knowledge based on a priori observations of car travel, four features of the 15 second summary accelerometer signal were extracted and tested 1) median AM, 2) minimum AM decile, 3) maximum AM and 4) change in inclination angle between containers. Parameter constants were chosen based on grid search methods with the objective of maximizing positive and negative predictive value (PPV, NPV).

RESULTS 21 car travel events (100%) were correctly identified, with a single false positive (1%). PPV and NPV were 95.5% and 100%, respectively.

CONCLUSIONS Using a thigh worn accelerometer, seated car travel can be discriminated from other sedentary behaviours. Importantly, acceleration features pertaining to both the inclination angle and acceleration magnitude were needed to optimize classification accuracy. Researchers not using an inclination feature should be cautious in their interpretation of the body-worn accelerometer signal as time in car travel may be classified as light (or moderate) activity rather than sedentary (or inactive).
Identifying and assessing different approaches to developing complex interventions (INDEX study): New guidance

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective
The aim of the UK Medical Research Council and National Institute of Health Research funded INDEX study was to produce guidance for researchers on how to develop complex interventions to improve health. This included behavioural nutrition and physical activity interventions.

Methods
To develop the guidance, evidence was triangulated from three sources: systematic reviews, qualitative interviews and an e Delphi. This study was guided by two international stakeholder workshops. A systematic methods overview was conducted of published approaches to intervention development (n=27) that offer developers guidance on specific ways to develop interventions. A second systematic review identified international primary research published in 2015-16 reporting intervention development studies (n=87) to compare and contrast different approaches, methods of data collection and analysis. In parallel, semi-structured qualitative interviews were conducted with a diverse sample of 21 developers (social scientists; clinicians; public representatives) and wider stakeholders (funders, journal editors) regarding their views and experiences of intervention development. A thematic inductive analysis was conducted. The reviews and qualitative findings generated 80 items for a consensus exercise consisting of two e-Delphis: one seeking the opinions of experts in intervention development; the other seeking the opinions of relevant stakeholders. Participants were asked: 'when developing complex interventions to improve health, how important is it to...' and rate items on a five-point scale from 'very' to 'not important'. Triangulation of findings fed into a logic model and the final guidance document.

Results
An overview of the guidance relevant to behavioural nutrition and physical activity intervention development will be presented. This includes key actions linked to domains for developers to consider in order to operationalise a set of principles. Principles include: iterative cycles of development with stakeholder input at each cycle; integrating creativity with scientific methods; being open to failure, change, and consider unintended consequences; and looking ahead to future evaluation and real-world implementation.

Conclusions
The guidance is intended as a tool for reflection, as it may not be possible or desirable for intervention developers to address all actions. This is because there is no firm evidence for what approach to intervention development leads to success and future real-world impact.
Physical activity and gene expression in the Norwegian Women and Cancer Post-genome Cohort

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Disease prevention and management (SIG)

Purpose: Physical activity (PA) is one of the major modifiable risk factors for diseases including cancer, along with other lifestyle factors. The physiological and molecular mechanisms of the association between PA and health are not fully understood. Regular PA may promote an anti-inflammatory state in the body, thus contributing to the down-regulation of pro-inflammatory processes related to the onset and progression of multiple disease states. We aimed to assess whether PA levels were associated with differences in the gene expression signatures in blood samples collected in the Norwegian Women and Cancer (NOWAC) Post-genome Cohort, a nationally representative, population-based cohort of middle-aged women.

Methods: Questionnaire data on self-reported PA levels and other variables were extracted from the NOWAC database. Final sample size included data from 850 healthy women. Blood samples were collected using the PAXgene Blood RNA collection system, and gene expression profiles were measured using Illumina HT-12 Expression Bead Chip microarrays. After data preprocessing, we tested for differences in gene expression between groups with low and high PA levels, using limma for the single-gene level, and global test for a targeted gene set analysis. Statistical analyses were adjusted for BMI, smoking, and medication use. P-values were adjusted using the false discovery rate (FDR), significance threshold was set to p<0.05.

Results: Mean age of our study population was 54.3 years, mean BMI was 25.3kg/m2, and 25% were current smokers. When comparing low versus high self-reported PA levels, we did not identify any significantly differentially expressed genes or gene sets.

Conclusion: In our cross-sectional analysis of healthy, middle-aged Norwegian women, self-reported PA was not associated with differences in blood gene expression profiles. To our knowledge, this is the first cross-sectional study aiming to assess the association between gene expression and PA levels in a general population.
"In Favor of Myself for Athletes": A controlled trial to improve disordered eating, body-image, and self-care in adolescent female aesthetic athletes

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Disease prevention and management (SIG)

Purpose
The current study aimed to develop and examine the impact of a prevention program focused on positive protective factors, such as body appreciation and media literacy, to reduce the risk of development of eating disorders and health-compromising behaviors among aesthetic athletes.

Methods
Participants were 49 female figure skaters and dancers aged 10-16 years (13.1±smn;1.6) and 46 age-and-branch-matched controls. The intervention program included ten weekly 45-minute structured sessions, focusing on promoting self-care habits and positive body esteem. The program was team-based and included multiple interactive methods and approaches, and designed to be very relevant to aesthetic sports, specifically dance and figure skating.

Outcomes were measured by self-report questionnaires at baseline, post-intervention, and 3-months follow-up using the Eating Disorders Inventory-2, the Eating Disorders Examination Questionnaire-8, Thin-Ideal Internalization and Socio-Cultural Attitudes Towards Appearance Questionnaire-4, the Body Esteem Scale, and the Body Appreciation Scale.

Repeated measures analysis of variance and Bonferroni’s post hoc tests were conducted to test the differences between intervention and control groups in outcome variables in all three study times, and the group*time and group*time*age interactions. An alpha level of p<0.05 was used.

Results
Aesthetic athletes that participated in the prevention program "In Favor of Myself for Athletes" demonstrated significant improvements in several outcome measures, many with a large effect size, compared with control athletes. Study results revealed significant decreases in drive for thinness (P<0.001; ?2=0.170) and eating disorder symptoms (P<0.001; ?2=0.243), increased body esteem (P<0.001; ?2=0.213), decreased influences on body image by media (P<0.001; ?2=0.168), and more. The program had greater impact on athletes aged 10-12 years compared to 13-16-year-olds in terms of thin-ideal internalization [F(2.79, 160.00)= 3.267; p=0.027] and body esteem [F(2.52, 160.00)= 3.095; p=0.038]. Participants reported overall high satisfaction from the program.

Conclusions
This study provides an indication that "In favor of myself for Athletes" may produce an effective impact on promoting a positive body image and self-care in female adolescent athletes. To further enhance the program's impact, a larger-scale, randomized effectiveness trial should be performed.
The effect of exercise on reproductive function and body composition in women with polycystic ovary syndrome: A systematic review and meta-analysis

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Polycystic ovary syndrome (PCOS) is associated with significant health concerns in women of reproductive age. Exercise shows promise for managing symptoms, but there is limited evidence on the effect of exercise on PCOS. Therefore, our aim was to synthesize available evidence on the effect of exercise, and specifically different types of exercise, on regulation of reproductive function and body composition for women with PCOS.

Methods: We conducted a systematic review and meta-analysis following the PRISMA Statement. We searched the following databases up to April 5, 2018 for randomized controlled trials: CINAHL; Embase; Google Scholar (advanced feature); Ovid MEDLINE; PubMed; Sport Discus and Web of Science. Two authors (independently) reviewed the studies, assessed risk of bias, and determined the certainty of evidence with GRADE. We conducted a meta-analysis to assess the effect of exercise on reproductive function (primary) and body composition (secondary). For continuous data, we report mean differences (MD) and 95% CI, quantified statistical heterogeneity using the I2 test, and used random or fixed effects models, as appropriate.

Results: Seven trials (350 participants) were included with exercise interventions: aerobic; resistance and combined (aerobic/resistance) training. Most of the studies were small and of relatively short duration; they also had unclear risk of bias across several categories. We noted low and moderate-certainty evidence of no effect of any type of exercise for reproductive hormones, and moderate certainty that aerobic exercise reduced body mass index (BMI; MD -1.52 kg / m2, [95% CI -2.52, -0.53], p = 0.003).

Conclusions: Evidence is limited to discern the effect of exercise on health outcomes for women with PCOS. There is moderate certainty evidence that aerobic exercise alone is beneficial for reducing BMI. Future research should conduct studies of longer duration, larger sample sizes and detail menstrual cycle and fertility outcomes.
Objective measurement of physical activity and sedentary behaviour among South Asian adults: A systematic review

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Disease prevention and management (SIG)

Purpose: South Asians (SAs) are one of the fastest growing ethnic groups in western countries with a high incidence of metabolic syndrome and cardiovascular disease. Physical activity (PA) and sedentary behavior are modifiable risk factors that can decrease chronic disease burden in high-risk populations. While population-level surveys report SAs engage in low levels of PA, there are known limitations with self-report data. We aimed to synthesize available evidence to generate a PA and sedentary time (ST) profile of SAs from studies using accelerometry.

Methods: We conducted a systematic review and searched: Medline, EMBASE, CINAHL, PsycINFO, and SportDiscus. Inclusion criteria: studies that used accelerometry to measure PA and ST under free-living conditions (3-day minimum). Exclusion criteria: studies with an exclusive focus on drugs and/or surgical interventions, participants with health condition or physical disability that may impact mobility, and special populations such as athletes and pregnant women. Two authors independently adjudicated inclusion of citations at (i) title/abstract and (ii) full text. We conducted a forward and reverse citation search of all included studies. The date of the last search was March 5, 2018. We evaluated methodological quality using a modified Newcastle Ottawa Quality Assessment Scale. Due to inconsistencies in the way PA and ST were measured, defined and reported, we only provide a narrative synthesis.

Results: We identified 14 studies (n = 1,338). Majority of selected studies were of poor methodological quality. Participants' mean age ranged from 35 (9) to 74 (6) years; there were more women overall (53%). Despite using similar assumptions, we note variability in reported outcomes for PA and ST. The mean light PA ranged from 39 (5) to 574 (227) min/day. Moderate to vigorous PA among SA women ranged from 17 to 41 min/day and for men, between 32 and 43 min/day. ST ranged from 482 (98) to 587 min/day.

Conclusion: Few studies, and small sample sizes led to considerable variability, which limit our ability to draw definitive conclusions. These results highlight the importance of conducting methodologically robust studies based on random sampling to advance the field, and to describe PA and ST in the SA population.
The longitudinal association between physical activity and health-related quality of life among community-dwelling older citizens

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Physical activity (PA) is an important factor of optimal health. However, longitudinal studies among relatively older population (aged over 75) evaluating the association between PA and Health-related quality of life (HRQoL) are limited. Our study questions were: 1) what is the longitudinal association between PA and HRQoL? and 2) what is the longitudinal association between change in PA and HRQoL?

Methods: A longitudinal study was conducted in primary care and community settings in five European countries (the United Kingdom, Croatia, Greece, the Netherlands and Spain) between 2015 and 2017. Overall, 858 participants completed both baseline and 12-month follow-up questionnaires, and 763 participants (62.3% female; mean age = 79.8, SD = 5.3) were included in the analyses. Socio-demographic characteristics, lifestyle (smoking, alcohol), and health situation (multi-morbidity, frailty) were assessed. PA level was assessed based on the weekly frequency of activities that require a low or moderate level of energy. PA level were classified into three categories: more than once a week, once a week or less and (almost) never. The 12-Item Short-Form Health Survey (SF-12) was used to measure physical and mental HRQoL. Analysis of variance(ANOVA) and multivariate linear regression analyses were performed.

Results: Compared to participants who were physically active >1 per week, participants who were physically active = 1 per week had lower physical (B=-4.71; P<0.001) HRQoL scores at 12-month follow-up. Participants who were (almost) never physically active had lower physical (B=-4.66; P<0.001) and mental (B=-5.15; P<0.001) HRQoL scores at 12-month follow-up. Additionally, compared to participants whose PA level remained stable between baseline and follow-up (n=541), participants whose PA level increased (n=92) had higher physical (B=1.07; P<0.001) and mental (B=3.67; P<0.01) HRQoL scores at 12-month follow-up, and participants whose PA level decreased (n=130) had lower physical (B=-3.23; P<0.001) and mental (B=-3.43; P<0.001) HRQoL scores at 12-month follow-up.

Conclusion: Our results show that a lower level of PA is associated with lower HRQoL among older citizens. An improvement in PA is associated with higher HRQoL. Our results emphasize the need to support older people to be physically active, and therewith contribute to their physical and mental HRQoL.
Gender differences in the association of leisure-time physical activity and loneliness among medical care patients with depressive symptoms

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Research showed associations between leisure-time physical activity (LTPA) and loneliness, which both interplay with depression. However, less is known about potential gender differences in the association of LTPA and loneliness among depressed individuals. The current study investigates the role of gender in the relationship of LTPA and loneliness among medical care patients with depressive symptoms whilst taking into account LTPA intensity and depressive symptom severity.

Methods: Consecutive medical care patients (n=13763, 18-64 years) from three sites in Germany completed a computerized health screening (participation rate=87%). Those experiencing at least one episode with subthreshold depressive symptoms within the last 12 months (Patient Health Questionnaire-8) were invited to participate in an RCT testing computer-based interventions to promote depression preventive behaviors. Of 1588 eligible patients, 786 (50%) gave written informed consent. Cross-sectional data was analyzed from 588 trial participants (mean age=39.3 years, 62% female) who completed the baseline interview. Linear regression was used to examine the relationship between weekly hours of LTPA (Godin Leisure-Time Exercise Questionnaire) and loneliness (UCLA Loneliness Scale). Separate regressions were run for each LTPA intensity level (vigorous, moderate, light). First, main associations were analyzed adjusted for gender, age, depressive symptom severity, impairment due to physical problems, recruitment site and setting. Then, interaction terms between physical activity and gender were added to the main models.

Results: A significant main effect was found for the association of vigorous LTPA with loneliness (standardized regression coefficient $\beta_a=-.097, p=.017$) while controlling for gender, age, depressive symptom severity, physical problems, recruitment site and setting. Main effects for moderate ($\beta_a=-.042, p=.291$) and light LTPA on loneliness ($\beta_a=.017, p=.669$) were not significant. Gender modified associations of vigorous (interaction $\beta_a=-.170, p=.003$) and moderate LTPA (interaction $\beta_a=-.127, p =.042$) with loneliness: More hours of vigorous and moderate LTPA were associated with reduced loneliness among men ($\beta_a=-.246, p<0.001; \beta_a=-.128, p=.028$), but not among women ($\beta_a=-.000, p=.997; \beta_a=.034, p=.532$).

Conclusions: Associations of vigorous and moderate LTPA with loneliness are moderated by gender independently of age, depressive symptom severity or physical problems. Longitudinal designs are needed to examine whether LTPA as a mean to reduce loneliness and progression of depressive symptoms may not be as effective in women as it is in men.
Associations between physical activity and urinary incontinence: The Lolland-Falster Health Study

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

**Disease prevention and management (SIG)**

Objective: The aim of the study is to investigate the association between urinary incontinence and physical activity in women in the general population.

Methods: The study will be using cross-sectional data from the Lolland-Falster Health Study (LOFUS), which is a household-based population study currently collecting data. Approximately 1500 women aged 18+ years will be included. Urinary incontinence is assessed using the International Consultation on Incontinence, Urinary Incontinence Short Form (ICIQ-UI SF) and the International Consultation on Incontinence Questionnaire Overactive Bladder (ICIQ-OAB). Physical activity is measured using a dual-accelerometer system (Axivity AX3), and time and intensity-domain features will serve as outcome measures. The one-way ANOVA will be used to examine the difference in physical activity between women with or without incontinence. LOFUS is approved by Region Zealand's Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015). Trial registration: Clinicaltrials.gov (NCT02482896).

Results: The results will be presented at the ISBNPA conference followed by a scientific paper.
Objective

Only one third of the adult Norwegian population meets physical activity (PA) recommendations. Not meeting the PA recommendation is associated with lower health-related quality of life (HRQoL). Healthy Life Centers (HLCs) are part of the primary care service in Norway and offers guidance to high-risk populations on lifestyle change regarding PA, diet and smoking behaviors. HLCs provide individual and group consultations using motivational interviewing, whereas coping with health-challenges is one of the main goals. However, there is a lack of knowledge on PA level and HRQoL of the HLC-participants. Therefore, the aim of this study was to examine PA level and HRQoL among HLC-participants, and compare the results to the general population.

Methods

All individuals >18 years starting an intervention at one of the 32 included HLCs, from Sept-16 to Feb-18, were invited to participate in this cross-sectional study. We included 996 participants (mean 49.6 years, 71% women). PA level was analyzed in terms of meeting PA-recommendations of = 150 minutes of moderate to vigorous PA per week, assessed with ActiGraph GT3X+ accelerometers over seven days. PA level was compared to the general population (n=3173), age 50-64 years, collected in the KAN-study 2014-2015. HRQoL was measured by the 36-Item Short Form Health Survey (SF-36), using three of eight sub-domains: General health (GH); Role physical (RP), and Role emotional (RE), with scores ranging from 0 (lowest functioning) to 100 (highest functioning). One sample t-tests were used to compare HRQoL-scores to a representative sample from the Norwegian population (n= 2118), within the same age range, collected in 2015.

Results

Eighteen percent of the HLC participants met PA recommendations, compared to 37% in the general population. Scores of the three HRQoL sub-domains were mean (SD) GH 52 (22); RP 47 (42), and RE 50 (31). These scores were 28-37% lower (p<0.001) than in the general population.

Conclusions

HLC-participants were less physical active and reported significant lower HRQoL compared to the general Norwegian population. This indicates a great potential to influence both PA and HRQoL in a high-risk population through lifestyle change interventions such as HLCs.
Evidence on the health benefits of supplemental propolis: A systematic review

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose Propolis is a honey-related product with reported health benefits such as improved immunity, lowering of blood pressure, treating allergies and skin conditions. A systematic literature review and narrative synthesis were conducted to investigate the evidence on the reported health benefits and future direction of propolis-products.

Methods A systematic review was conducted according to PRISMA guidelines to determine key outcomes and limit review bias. We searched Medline (OvidSP), Embase, and Central for quantitative and qualitative studies (1990, 2018). Citation, reference, hand searches and expert consultation were also undertaken. Studies of randomised control trials and observational data on humans with health-related outcomes were included. Collected data were entered into NVivo software (Version 12, QRS International) and analysed using a thematic framework and a narrative synthesis of emergent themes.

Results 63 included publications were discussed. The majority were cell-based and animal studies, with a few key human trials conducted. There is significant promise as an effective antioxidant and anti-inflammatory agent with particular promise in vision-related conditions such as myopia and reducing eye-strain related to the use of electronic equipment.

Conclusion Future research into the potential for propolis to support optimal vision and screen-related eye fatigue is recommended.
Personal mastery and all-cause mortality among patients with diabetes

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Personal mastery is a conviction that one is able to control the important circumstances that are impinging on one's life. High mastery is associated with positive consequences of health, physical functioning, and well-being among older populations. By examining the survival status of a sample of patients with diabetes, this study investigates the association between mastery and all-cause mortality over an 11-years follow-up.

Methods: Data were from the Diabetes Study 2003, an off-year survey of the Health and Retirement Study (HRS) to the 2002 HRS participants who had diabetes (mean age = 69.5). The survival status was obtained from the Exit Surveys of HRS. Mastery (measured by a 7-item questionnaire) and the Total Illness Burden Index (TIBI, a validated measure of comorbidity), along with other control variables, were entered into proportional hazard models to predict their survival from baseline through the end of 2014. Statistical significance was set at p< .05 level.

Results: Among the 1,661 diabetes patients, 762 (45.9%) had died by the end of 2014. Older (p< .0001) and male (p= .0002) patients with diabetes were more likely to die over the follow-up years and so were the patients with a higher TIBI scores (p< .0001) and poorer self-rated health (p< .0001). More important, diabetic patients with higher mastery scores were significantly less likely to die (Hazard Ratio = .96, p< .0001), after controlling for all other covariates.

Conclusions: Most patients with diabetes die of its complications and comorbidities. Our results support that mastery is a protective resource to these diabetic patients, after taking into account the severity and burden of their comorbidities. Future studies should incorporate personal master in dealing life circumstances into nutrition interventions for patients with diabetes.
Application of 1H-NMR Metabolomics for the discovery of blood plasma biomarkers of a Mediterranean diet

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: The Mediterranean diet is a dietary pattern well known for its benefits in disease prevention. Current methods for assessing adherence to dietary patterns present weaknesses such as lack of accuracy and potential for bias. Monitoring adherence to the Mediterranean diet (MD) could be improved by discovery of novel dietary biomarkers. The goal of the present study was to analyse the plasma metabolomic profile of 58 participants from the MEDDINI study, an intervention study which monitored adherence to MD for up to 12 months.

Methods: Food diaries from 58 participants were scored following a 14-point scale MD score and plasma samples collected. Participants were classified into two groups: low and high Mediterranean diet score and plasma samples were analysed with 1H-Nuclear Magnetic Resonance (1H-NMR). Univariate and multivariate analysis were used for statistical data interpretation.

Results: 59 metabolites were identified. Five metabolites significantly differed (p<0.05; q<0.5) between 'low' and 'high': citric acid, mannose, pyruvic acid, myo-inositol, and betaine. Citric acid was the best performing biomarker, which was also enhanced by the paired ratio with pyruvic acid. Metabolites correlated with the intake of certain food types as was the case of citric acid which positively correlated fruit, fruit juice and vegetable constituents of the diet, and negatively correlated with sweet foods alone. Following multivariate analysis, PLS-DA models showed these metabolites corresponded to the top five most influential metabolites.

Conclusion: The present study reports, for the first time, a potential association between blood plasma levels of pyruvic acid, mannose and myo-inositol with MD consumption, and it corroborates previous associations with citric acid and betaine. Furthermore it proves 1H-NMR based metabolomics to be an effective tool in measuring adherence to MD and in the discovery of novel dietary biomarkers that could be used in disease prevention and to better understand the binomial of health and diet.
Adherence to the Dutch dietary guidelines 2015 and incidence of prediabetes and type 2 diabetes

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Disease prevention and management (SIG)

Background: In order to prevent ten major chronic diseases including type 2 diabetes (T2D), new Dutch dietary guidelines were developed, which focus on food groups rather than nutrients. In this study, we investigated the association between adherence to the Dutch Healthy Diet index 2015 (DHD15-index) and incidence of prediabetes (preT2D) and T2D in a representative sample for the general Dutch population.

Methods: Two prospective cohort studies, The Hoorn and The New Hoorn Study were used for data analyses. In total, data from 2951 participants without diabetes at baseline (mean age 56.5 ± smn; 7.5 years; 49.6% male) were harmonized. Baseline dietary intake was assessed with validated Food Frequency Questionnaires and classified in tertiles of adherence to the DHD15 index (range: 0-130). PreT2D and T2D were classified according to the WHO criteria 2011. Poisson regression was used to estimate prevalence ratios between participants score on the DHD15-index and preT2D and T2D, adjusted for follow-up duration, energy intake, sociodemographic and lifestyle factors. Change in fasting plasma glucose levels (mmol/L) over follow-up was analysed using linear regression analyses, additionally adjusted for baseline value.

Results: During a mean follow-up of 6.9 ± smn; 0.7 years, 837 participants developed preT2D and 321 participants developed T2D. Highest adherence to the DHD15-index was significantly associated with lower T2D incidence (PRT3 vs T1: 0.74 (0.55; 0.99), p_trend=0.05). Highest adherence was associated with a lower risk of preT2D, compared to lowest adherence, but this was not statistically significant (PRT3 vs T1: 0.86 (0.73; 1.02), p_trend=0.09). A higher adherence to the DHD15-index was not associated with change in fasting plasma glucose levels (β13point: -0.012 (-0.034; 0.009) mmol/L).

Conclusion: In this Dutch population-based study, adherence to the DHD15 was associated with a lower incidence of T2D. These results support the benefits of adhering to the guidelines in T2D prevention.
Total energy and macronutrient intake according to body mass index, fat mass index and body fat percentage: The seventh Tromsø Study 2015-16

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Obesity increase worldwide, with excessive energy intake as the most apparent cause. Body mass index (BMI, kg/m2), is a frequently used overweight measure, but does not distinguish between fat and fat free mass. We investigated the association between total energy and macronutrient intake, BMI, fat mass index (FMI (kg fat/ m2) and body fat (BF) percentage among participants in a population study.

Methods: Altogether 2453 women and men aged 40-84 years participating in the seventh Tromsø Study survey (2015-16) completed a validated food frequency questionnaire (FFQ) and were examined with Dual-Energy X-ray Absorptiometry. Nutrient intake including total energy (MJ/day) and macronutrients (energy percentage (E%)) were calculated by the food and nutrient database at the University of Oslo. BMI was defined as under- or normal-weight (<25), overweight (25-29.9) and obese (=30). FMI was categorized into quartiles and BF (%) was categorized in four groups. The association of total energy and macronutrient intake in categories of BMI, FMI and BF were adjusted for age, educational level and self-reported leisure time physical activity (sedentary, light or moderate/vigorous, Saltin and Grimby questionnaire).

Results: Mean energy intake was 8.6 and 10.1 MJ/day in women and men, respectively. BMI and FMI (r=0.83, p<0.001) , and BMI and BF (r=0.81, p<0.001 and r=0.76, p<0.001, in women and men respectively) were highly correlated. In women, there was a non-significant positive association between total energy intake and BMI and FMI (p=0.06 and 0.4, respectively), and a significant positive association between protein intake BMI, FMI and BF (p= 0.001 for all). In men, there was a significant positive association between protein intake and BMI, FMI and BF (p<0.001), and a negative association between BMI, FMI and BF and total energy intake (p=0.01, p=0.01 and p=0.015, respectively), fat (p=0.008, p=0.03, p=0.1), and carbohydrates (p=0.01, p=0.01 and p=0.04).

Conclusion: The strong positive association between BMI, FMI and BF indicate that BMI is a satisfactory measure for overweight in population studies. The cross-sectional design makes reverse causality possible and the associations found between BMI, FMI, BF and several nutrients need further investigation.
A bigger breakfast is associated with lower energy intakes and better diet quality

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Breakfast is widely recognised as the most important meal of the day, and recent reviews have shown that breakfast skipping is associated with poorer diet quality, obesity, and chronic disease risk factors. This study aimed to investigate the role of breakfast consumption and energy contribution from breakfast, on overall nutrient intakes and diet quality among a large, nationally-representative cohort of Australian adults.

Methods: One-day 24-hour recall data from 2011-12 National Nutrition and Physical Activity Survey (n=9341, adults = 19 years) was analysed, where respondents were classified into breakfast consumers or skippers. Breakfast consumers were further classified into quartiles of breakfast energy contribution (energy intake from breakfast / total energy intake). Diet quality was assessed using the Healthy Eating Index for Australian Adults (HEIFA-2013) with higher scores (maximum 100) indicating better diet quality. Analysis of covariance was undertaken to compare groups, adjusting for age, gender and socioeconomic status.

Results: Overall, 85.9% of adults consumed breakfast, contributing to a mean of 20.0 (SE 0.1)% of daily energy intake for consumers. Compared with breakfast skippers, breakfast consumers reported higher daily intakes of energy, dietary fibre and micronutrients including B vitamins, calcium, iron and iodine, and higher HEIFA-2013 score (48.3 (SE 0.2) vs. 40.6 (SE 0.4, P <0.001)). Among breakfast consumers, a higher relative breakfast EI was associated with lower intakes of total energy, added sugars, saturated fat and alcohol and higher intakes of most micronutrients (per 1mJ) and greater HEIFA-2013 scores (Ptrend <0.001). Greater HEIFA-2013 scores were primarily achieved due to higher component scores for grains, fruit, discretionary foods, water and alcohol.

Conclusions: These findings indicate that consumption of a higher energy breakfast may result in lower total energy intakes and better diet quality compared with lower energy breakfasts and breakfast skipping.
Long term weight loss success and health behaviors among Adults in the United States

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: To determine the relations of levels of long term weight loss with health behaviors among United States (U.S.) adults.

Methods: We examined the association between long term weight loss (LTWL) and multiple health behaviors including fast food habits, dietary quality, caloric intake, and meeting physical activity guidelines. Data from 9,004 U.S. adults, whose maximum lifetime BMI was overweight or obese, were utilized to address the study's objective. LTWL was defined as loss maintained for 1 year or more. LTWL was grouped into categories (5-9.9%, 10-14.9%, 15%-19.9%, =20%), with <5% weight loss serving as the reference group. Multivariate regression models were estimated using OLS regression for continuous outcomes (e.g., number of fast food meals) and logistic regression for dichotomous measures (e.g., meeting physical activity guidelines).

Results: Multivariate analysis reveals that in comparison to the reference group, participants who achieved 15-19.9% weight loss reduction were significantly less likely to frequent fast food establishments (-0.39; 95%CI= -0.75, -0.02; p<0.05), have a higher healthy eating index score 3.81; 95%CI=1.42, 6.21; p<0.01), and have higher odds for meeting health promoting physical activity guidelines (OR=1.79; 95%CI= 1.01, 3.19; p<0.05); however, no significant relationship was observed with caloric intake. In comparison, being in the highest weight loss stratum (=20%), was significantly related to a lower caloric (kcal) intake (-349.1; 95%CI= -581.3, -116.9), yet not to the other healthful behaviors.

Conclusions: Interventions aiming to improve the health behaviors (e.g., diet quality, physical activity) of adults with very high levels of weight loss, appear to be warranted.
Lifestyle risk index (diet, physical activity, BMI, smoking), work ability and sick leave among Norwegian employees with and without physician-diagnosed asthma

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Objective: Previous research suggests that a healthy lifestyle may improve self-perceived work ability (WA) and reduce sick leave (SL), especially among employees with respiratory diseases, however, studies with focus on asthma are limited. This study aims to examine the association between multiple lifestyle risk behaviors (unhealthy diet, low physical activity, overweight/obesity and smoking), and WA and SL among employees with and without reported physician-diagnosed asthma.

Methods: This study uses data from a cross-sectional population study in Telemark, Norway. Complete data on lifestyle, WA and SL were obtained from n=10 355 employees aged 18-50 years. The participants were stratified into two groups, with and without physician-diagnosed asthma (n=1110). An overall lifestyle risk index was computed based on participants' reports on the four individual lifestyle factors. The index was divided into "low"-, "moderate"-, "high"- and "very high" risk scores. We used multiple logistic regression to examine the associations with WA and SL. WA was measured by the first single item question of the Work Ability Index. SL was assessed by the question: "have you been one or more days on sick leave in the previous 12 months". We adjusted for age, gender, education and main occupational group.

Results: A dose-response association was observed between the lifestyle risk index and likelihood of decreased WA and increased SL in both groups. The association was stronger among participants with asthma than among those without asthma. Reduced WA (score<8) was more likely among asthmatics with a high and very high lifestyle risk score, compared to asthmatics with low risk score (OR 2.2, 95% CI: 1.4, 3.7 and OR 2.6, 95% CI: 1.4, 1.5, respectively). Furthermore, SL was more likely among asthmatics with a moderate, high and very high lifestyle risk score compared to asthmatics with low risk score (OR 1.8, 95% CI: 1.3, 2.5; OR 2.1, 95% CI: 1.5, 3.1; OR 2.7, 95% CI: 1.7, 4.5, respectively).

Conclusions: The results indicate that employees, and especially those with asthma, may benefit from multiple lifestyle changes to improve work ability and reduce the likelihood of sick leave. The results are considered relevant to occupational intervention health programs.
Predictors of relapse in physical activity and dietary behaviors in adults with overweight: a concept mapping study among professionals and experience experts

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Objective
Losing weight is possible through changes in physical activity and dietary behaviors. To uphold the health benefits of these behavioral changes, it is crucial that people do not relapse into unhealthy habits. To prevent relapse, insights into predictors of relapse are needed. Currently the perspectives of practitioners (i.e. dietitians, weight loss counselors and lifestyle coaches) and experience experts (i.e. adults who recently lost weight through behavioral changes, but experienced relapses) on potential predictors of relapse are underexplored. Hence, we aimed to identify predictors of relapse in physical activity and dietary behaviors by synthesizing perspectives from practitioners and experience experts using concept mapping.

Methods
Concept mapping is a structured participatory methodology designed to integrate views from different stakeholders, to produce a visual display of the relationships between ideas. We comprised five groups of 5-10 practitioners and three groups of 5-10 experience experts, who participated in an on-site concept mapping session. One week prior to the session, all ideas on potential predictors were collected by an online questionnaire. During the concept mapping session, these ideas were used as input for the group brainstorm, thereafter all ideas were individually sorted by relatedness and rated on importance. Principal component analysis and cluster analysis were conducted using the software Ariadne, wherein concept maps were created that graphically presented the relation between predictors.

Results
In total 39 practitioners (100% female, Mage: 44.7 years, 57% weight loss counselor) and 21 experience experts (86% female, Mage: 53.4 years) participated, and saturation was achieved. Practitioners’ and experience experts’ perspectives are largely in line with regard to both type and importance of predictors. In multiple groups resilience, life imbalance, intrinsic motivation, social barriers and practical barriers were identified as important predictors of relapse in physical activity and dietary behavior.

Conclusions
Our study confirmed knowledge from previous literature and health behavior models (e.g. Marlatt's cognitive behavioral model), but also identified some new concepts (e.g. resilience). These findings contribute to current health behavior models and the development of a new theoretical framework regarding relapse prevention in physical activity and dietary behaviors. Future quantitative studies are needed to confirm our results.
Objective: HAT TRICK is a gender-sensitized lifestyle intervention for men focused on physical activity (PA), healthy eating and social connectedness, and delivered in collaboration with a semi-professional Canadian ice hockey team. The overarching aim of the HAT TRICK study was to assess feasibility, as well as determine an estimate of intervention effectiveness concerning PA, healthy eating, social support, depression risk, and anthropometric measures. This presentation will report preliminary findings from the HAT TRICK study, specifically focused on PA, depression risk, and anthropometric measures.

Methods: This quasi-experimental study utilized a non-randomized, pre-post test design. Men 35+ years, residing in British Columbia, Canada, who reported <150 mins of moderate to vigorous (MVPA)/week and with a Body Mass Index (BMI) >25 kg/m², and a pant waist size of >38” participated in the 12 week face-face program. Data were collected at baseline, 12-weeks, and 9-month follow-up. PA and depression risk was assessed by self-report (i.e., GLTEQ & MDRS-22) and all anthropometrics (i.e., BMI, waist circumference-WC, blood pressure-BP) were collected by a trained researcher.

Results/findings: Participants (N=60) had a mean (SD) age of 51 (10.09) years, a BMI of 36 (6.0) kg/m², and WC of 124 (13.11) cm. Repeated measures ANOVA showed a significant difference between time points on MVPA (F(1.862, 93.103) = 26.095, p < .001, partial eta² = .343), depression risk (F(1.764, 93.510) = 3.496, p=.040, partial eta² = .062), BMI (F(1.578, 83.629) = 6.729, p=.004, partial eta² = .113), WC (F(2,106) = 37.704, p<.001, partial eta² = .416), and diastolic BP (F(2,106) = 4.535, p=.013, partial eta² = .079). Although systolic BP decreased over time, the change was not significant (F(1.732, 91.817) = 2.716, p=.079, partial eta² = .049). Post hoc analysis revealed significant positive improvements for all variables, except systolic BP, after 12 weeks. These changes were maintained at 9-month follow-up.

Conclusions: A gender-sensitized lifestyle intervention that integrates PA, health eating and social connectedness, and is delivered in a location and with an organization that men strongly identify with, holds potential for decreasing men's depression risk as well as improving a number of risk factors for chronic diseases.
P1, P1.180

Recruitment, retention, and acceptability of HAT TRICK: Strategies for engaging men in a gender-sensitised lifestyle intervention

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Strategies are needed to engage and retain overweight and inactive men in health promotion interventions. This presentation will describe the recruitment, retention, and acceptability of HAT TRICK, a lifestyle intervention for men focused on physical activity (PA), healthy eating, and social connectedness. HAT TRICK includes 12-weekly face-to-face sessions delivered in collaboration with a semi-professional Canadian ice hockey team.

Methods: Multiple data collection methods were used in this descriptive study including recruitment and attendance records and self-report questionnaires. Participants were recruited using a multi-faceted recruitment strategy including media releases, a program webpage including testimonial videos, announcements during ice hockey games, print posters, and social media. Eligibility screening was conducted by telephone, during which time potential participants were provided information about the program, reported their height, weight, age, and typical weekly PA. Prior to participation, participants completed the Physical Activity Readiness Questionnaire (PAR-Q), which was reviewed by a certified exercise physiologist. Where needed, participants were referred to their physician to obtain medical clearance. Weekly attendance logs were kept and participants that had two consecutive unexplained absences were followed-up with. Upon program completion, participants completed a satisfaction and acceptability questionnaire.

Results: A total of 90 individuals expressed interest in participating, 66 were deemed eligible, and 62 completed baseline measures and were assigned to a HAT TRICK group (69% enrollment rate). At baseline, participants had a mean (SD) age of 50.0 (10.1) years, BMI of 36.2 (6.0) kg/m2, waist circumference of 124.0 (13.1) cm, and participated in an average of 74.8 (99.5) minutes of MVPA per week. All participants that required additional medical follow-up (n=12) obtained clearance from their doctor. Average weekly attendance rate was 72%. Participant retention at post-test and 9-month follow-up measures was 94% and 90%, respectively. At post-test, 100% of participants reported being satisfied with HAT TRICK, felt that the program was appropriate for men like them, and would recommend the program to other men.

Conclusions: The results of this study demonstrates overweight and inactive men can be recruited and retained to a gender-sensitised lifestyle program. The approach can be used as a model for future trials in this area.
The association between sedentary behaviour and indicators of stress: A systematic review

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Purpose
Sedentary behaviour (SB) is linked to adverse physical health outcomes in adults, with emerging evidence demonstrating associations between SB and mental health outcomes (e.g. anxiety, depression). Yet, the strength of the evidence regarding the link between SB and psychological stress is unclear. Given the high prevalence of both SB and stress in modern life, this study aimed to systematically synthesise current evidence exploring associations between SB and stress in adults.

Methods
A systematic review of original research published between January 1990, November 2018 was conducted using SB and stress search terms entered into electronic databases (Medline/Medline complete, CINAHL complete, PsychINFO, SPORTDiscus and EMBASE). An evaluation of study methodological quality, a narrative best-evidence synthesis of associations between subjective/objective measures of SB and stress, and sensitivity analysis (objective versus subjective measures of SB and stress) were conducted.

Results
From n=11,714 de-duplicated hits, n=22 studies were included, reporting on data from n=76,745 people (age 18-98y, 64.3% women). Of 22 studies (three trials, one observational, three cohort, and 15 cross sectional studies), SB was measured subjectively in 14 and objectively in 8. Across the studies (0=strong-, n=9 moderate- and n=13 weak-quality), there was moderate evidence that overall SB (when assessed across all SB types) and sitting time was positively associated with stress (i.e. greater SB was associated with increased stress), and inconsistent evidence for a relationship between television viewing time, occupational sitting/computer use, and stress. Positive associations were more frequently reported in studies that employed subjective measures of stress or SB.

Conclusions
Limited research has explored the association between SB and stress. However, our findings suggest a positive association may exist, particularly between overall sitting time and stress. High-quality longitudinal/interventional research is required to confirm findings and determine the direction of the relationship.
Physical Activity Patterns in Adults with Down Syndrome

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Background: Individuals with Down syndrome have an increased risk for obesity compared to the general population, thought to be due in-part to a decreased metabolism. Studies have indicated that adults with Down syndrome are also less physically active than the general population. There are limited data available, however, on objective physical activity patterns in adults with Down syndrome.

Objective: To assess the feasibility of using accelerometry in adults with Downs syndrome to measure physical activity, and to describe the physical activity patterns in adults with Down syndrome.

Methods: Twenty-nine adults with Down syndrome ages 22-60 years followed in a Down syndrome clinic at Massachusetts General Hospital in Boston, USA were provided with accelerometers. Subjects wore an Actigraph accelerometer around the waist, with data collected in 1 minute epochs.

Results: Twenty-six subjects (89.7%) returned valid accelerometer data and were included in further analyses. Mean age was 34.7 years, with 38% male. All but one subjects were verbal. Seventeen subjects lived with family, 4 lived alone, and 5 lived in group homes. Most (88%) subjects were overweight or obese by Body Mass Index criteria (mean BMI 31.7). Subjects provided 18 days of accelerometer data on average, including an average of 5 weekend days. Median daily sedentary time was 365.9 minutes (range=60.3-586.4), light activity was 144.7 minutes (range=21.1-291.1), and moderate activity was 7.1 minutes (range=0.3-88.3). Vigorous activity was very limited, with only two subjects achieving over one minute of vigorous daily physical activity. Median daily moderate-to-vigorous physical activity (MVPA) was 7.2 minutes. Median daily step count was 2,654 (range=347-5,545).

Conclusion: Objective physical activity data collection in adults with Down syndrome is feasible. Adults with Down syndrome engage in very little health enhancing physical activity, and do not meet the current physical activity or step count recommendations for adults. Given the high prevalence of obesity in adults with Down syndrome, emphasis should be placed on identifying opportunities for increasing physical activity in this high-risk population.
P1, P1.187

Lifestyle-related chronic disease, physical activity, and sitting time among Lebanese Australian adults

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PURPOSE: Understanding the impact of ethnicity and migration on health is paramount in developing health promotion initiatives within multicultural populations. In Australia, the Lebanese-Australian population is a large and growing group, but with limited attention through health-based research. This study examined the odds of lifestyle-related chronic disease (cardiovascular disease, diabetes, cancer, hypertension) among adults of Lebanese ethnicity living in Australia, stratified by country of birth, compared to those of Australian ethnicity. The study also examined the impact of physical activity and sitting time on the odds of chronic disease among those of Lebanese ethnicity.

METHODS: Participants were 43,531 adults sampled from baseline data of The 45 and Up Study, a longitudinal cohort study of health and wellbeing in adults aged 45+ years from New South Wales, the most populous state in Australia. Participants included those of Lebanese ethnicity born in Lebanon (n=449), Australia (n=349), and other countries (n=76), and those of Australian ethnicity (n=42,657). Physical activity was assessed with the Active Australia Survey and sitting time was assessed with self-report of usual number of hours spent sitting each day. Participants also reported whether their doctor had ever told them they had cardiovascular disease, diabetes, cancer, or hypertension.

RESULTS: Logistic regression indicated that, after adjusting for age, sex, education, area of residence, physical activity, sitting time, smoking status, and BMI, those of Lebanese ethnicity had significantly higher odds of reporting diabetes (OR 1.52; 95%CI 1.23, 1.87) compared to those of Australian ethnicity. No significant differences existed for cardiovascular disease, cancer, or hypertension. After stratifying those of Lebanese ethnicity by country of birth, those born in Lebanon had higher odds of reporting diabetes (OR 1.99; 95%CI 1.54, 2.56) and lower odds of reporting cancer (OR 0.62; 95%CI 0.43, 0.91) and hypertension (OR 0.73; 95%CI 0.59, 0.90). Further stratification by physical activity and sitting time did not substantially alter the results.

CONCLUSIONS: Country of birth differences exist in chronic disease among those of Lebanese ethnicity. These findings provide much needed evidence on the health of people of Lebanese ethnicity, and can be used to inform the development of culturally-tailored health promotion initiatives.
The effects of cycle and treadmill desks on sedentary workers

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Disease prevention and management (SIG)

Purpose: The aim of this paper was to systematically review and, using meta-analytical approach, quantitatively examine the effects of workplace interventions (including cycle and treadmill desks) on sedentary behaviour, physical activity, energy expenditure, cardiac and metabolic indicators, work performance and cognitive function.

Methods: Seven electronic databases were searched in January 2018 to identify parallel group and crossover studies that assessed the effects of workplace interventions such as cycle and treadmill desks. Twenty-seven studies met the inclusion criteria and were included in the meta-analysis.

Results: Workplace interventions significantly decreased both daily (SMD = 2.58; [3.94, 1.23], p < 0.001) and workplace (SMD = 1.98, [2.80, 1.16], p < 0.001) sedentary behaviour and increased low-intensity physical activity levels (SMD = 2.02; [0.02, 4.02], p = 0.05), but did not affect moderate and vigorous intensity workplace physical activity. Subgroup analysis showed significant increase in low-intensity physical activity for treadmill desks (SMD = 2.72; [0.14, 5.30], p = 0.04), but no effect of cycle desks (p = 0.72). Workplace interventions significantly increased energy expenditure (SMD = 3.84, [2.44, 5.23], p < 0.001), positively influenced glucose and insulin levels, and significantly raised heart rate. However, there was no effect on blood pressure, dopamine, cortisol, cholesterol and triglyceride levels. Work performance was significantly decreased. Both interventions reduced typing speed (cycling: SMD = 0.35, [0.68, 0.02], p = 0.04; treadmill: SMD = 0.82, [1.2, 0.51], p < 0.001). The number of typing errors significantly increased during cycling interventions (SMD = 0.39, [0.13, 0.66], p = 0.004). No effect was found for the selective attention tests. However, there was an improvement in recall ability (SMD = 0.68, [0.23, 1.13], p = 0.003).

Conclusion: Cycle and treadmill desks could be potentially effective for increasing physical activity, reducing sedentary behaviour and may positively influence energy expenditure. Work performance was hindered by cycle and treadmill desk interventions, but most likely not due to a decrease in cognitive function. A considerable heterogeneity in the measuring protocols for most of the included variables should be considered.
How do cardiac rehabilitation practitioners view the role of the family in patients’ physical activity experiences? A qualitative study

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Physical activity (PA) following a myocardial infarction (MI) can help improve patients' long-term health, yet uptake of PA through cardiac rehabilitation (CR) is poor. Whilst family support has potential to facilitate the behaviour change process, little is known about how the family may be involved to support patients' PA during and post CR. We therefore aimed to explore how family members might contribute to patients' PA-related rehabilitation, from the perspective of CR practitioners.

Methods: Fourteen CR practitioners working across CR phases 2 - 4 (2 cardiac nurses, 3 physiotherapists, 2 occupational therapists, 7 exercise specialists) were recruited due to their experience of working with post-MI patients in CR. Semi-structured interviews were used to explore perceived familial roles, influences and support for patients' PA behaviour post-MI. Audio data were transcribed verbatim and analysed thematically and by CR phase.

Results: Three themes were identified by CR practitioners as ways in which the family might shape the PA experiences of post-MI patients: 'being a second pair of ears', 'keeping the patient within PA boundaries' and 'providing social support'. These processes operated within the wider context of the families' own health beliefs. Other influences (patient motivation, peer support, public perceptions and knowledge surrounding PA post-MI) were also noted as important in influencing patient PA behaviour post-MI, but appeared to occur outside of the family context.

Conclusions: Given the central role family members can play in post-MI patients PA, integrating family members during the CR process to help promote PA seems favourable. Further research will investigate how best to involve families in a way that is acceptable for patients, family members and CR practitioners.
The association of occupational sitting with cardiometabolic risk factors and outcomes – a systematic review from a gender-sensitive perspective

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Based on a previous systematic review on occupational sitting and health risks (van Uffelen et al. 2010), the aim of this systematic review is to update and summarize the evidence on associations of occupational sitting and cardiometabolic outcomes. Main research questions are: What is the evidence for an association of occupational sitting and cardiometabolic risk factors, related diseases and mortality? Are these associations different for men and women?

Methods: Studies were identified in January 2018 by literature searches in 10 data bases. Studies published from 2010 to 2017 were included with gainfully working adults (population), exposed to sedentary work (exposure), compared to persons with a different occupational sitting pattern (comparator), with cardiometabolic risk factors, cardiovascular diseases and mortality as outcomes. The study design was restricted to cohort, intervention and case-control studies. Data on main characteristics of included studies were extracted. Two independent reviewers assessed methodological quality of selected studies using adapted versions of SIGN-checklists and additionally a checklist to evaluate gender bias. If possible, a meta-analysis will be conducted.

Results/findings: On November 30th, 2018, the status quo was as follows: out of 8677 abstracts 269 full-texts were assessed, resulting in 46 eligible studies (26 cohort, 6 case-control, and 14 intervention studies). The studies are heterogeneous in measuring occupational sitting and the outcomes under investigation. A quarter of the studies report associations stratified by gender, about one-third of the cohort studies examined cardiovascular risk factors, predominantly change in body mass index. Final results expected in June 2019 will be presented.

Conclusions: In line with the previous systematic review by van Uffelen et al. (2010), the preliminary data analysis shows wide heterogeneity of study designs, measures, and findings. In intervention studies exposure (change of sitting time) is predominantly monitored objectively by accelerometry, whereas in cohort and case control studies exposure is mainly described on the basis of subjective measures. This is prone to measurement bias and may render it difficult to detect clear effects. However, the special analysis and focus on gender of this review contributes to knowledge in the field of sedentary behaviour and gender-sensitive workplace health promotion and prevention.
17103

P1, P1.192

Modifiable physical factors associated with physical functioning for patients receiving dialysis: a systematic review

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: Patients receiving dialysis have reduced physical function which is associated with unfavourable clinical outcomes and decreased quality of life. The primary objective was to identify and explore modifiable physical factors (i.e. can be changed with exercise) that are associated with physical function for patients receiving dialysis.

Methods: Searches were performed in MEDLINE, Embase, Emcare and The Cochrane Library in October 2018. Two reviewers independently screened articles for inclusion. Aetiological study designs (cross-sectional, longitudinal or case control) involving dialytic populations that report association or predictive statistics between a modifiable physical factor and physical function were eligible for inclusion. 'Upstream' predictor variables were 1) modifiable via exercise program (e.g. muscular strength) and 2) considered an impairment in the International Classification of Functioning, Disability and Health (ICF). Physical function was defined as any variable 'downstream' (i.e. ICF measures of ability or participation) such as the Short-Form 36 (SF-36) Physical Function Questionnaire.

Results: Of 5380 titles screened, 20 studies were eligible for inclusion (two longitudinal, ten cross-sectional and eight case-control studies). Seventeen included studies investigated patients receiving haemodialysis. Twelve studies focused on muscle size and mass and the relationship with physical function, with the remaining eight focusing on physical activity levels and the relationship with physical function. Studies related to muscle size and mass displayed a low to moderate relationship (R value range 0.23-0.63) with physical function whilst physical activity levels displaying a moderate to strong relationship (R value range 0.31, 0.72) with physical function. Physical function outcome measures were diverse across studies, with no clear standardised protocol. Seventeen studies used self-report physical function measures (e.g. SF-36), with 12 including objective measures (e.g. six-minute walk test). Eight studies used a combination of self-report and objective measures.

Conclusion: Physical function is impaired in dialytic populations and this review found an association between modifiable factors and physical function. There is a need for standardised protocols to assess physical function in dialytic populations, and to focus attention on patients receiving peritoneal dialysis. Identification of the key modifiable predictors of physical function will inform future exercise-based interventions to improve the well-being of patients receiving dialysis.
P1, P1.193

The effect of a physical activity program at the workplace on the pain of manufacturing workers

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: This study aimed to evaluate the effect of a specific physical activity program at the workplace in manufacturing workers with pain. With the development of the industrial world, emerged the jobs implying the repetition of movements and the adoption of the same posture during most of the labour day. These contribute to the degeneration of soft tissues and the creation of inflammatory processes. In the last decades, the workplace has been considered an optimal environment for the promotion of healthy habits. Workers spend more than a half of their day in the work environment, which highlights its importance to promote healthy lifestyles and contribute to the well-being of individuals. We propose that companies analyse the risk factors in their workers that lead to the development of musculoskeletal conditions, and that preventive/rehabilitation measures should be introduced to avoid the development of musculoskeletal disorders. A good level of physical condition improves characteristics like strength and mobility, protecting the musculoskeletal system. Therefore, physical activity programs are used as a prevention and rehabilitation of these conditions.

Methods: our study was conducted in a manufacturing company. The sample was constituted by 99 participants, with ages between 20 and 63 years. The participants were distributed between two groups, an intervention group (n=41) and a control group (n=58).

Results: through the application of the logistic regression method we were able to conclude that the specific physical activity program decreased the pain perception on the thoracic region, of OR=3.04, and on the knees, of OR=2.02.

Conclusion: our results allow us to conclude that there is an association between the physical activity in the workplace and the decrease of pain, specifically, in the thoracic region and in the knees.
Digital media use, physical activity and sociodemographic determinants: case controlled study of adolescent participants in obesity therapy

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Introduction
An improvement of existing intervention approaches is required as they show only small effects. Although etiologic models indicate that physical activity, digital media use and socio-demographic factors influence obesity there is a significant lack of evidence concerning the manifestation and correlations of these factors in 11 to 17-year-old obesity therapy participants. In order to optimize the therapy approaches and use the potential of media in treatment concepts, knowledge of the patients' major lifestyle factors is required. The aim of this study was to analyze physical activity patterns and media use behavior of obese 11- to 17-year olds and compare them to a control group.

Method
The national multi-centre study was conducted from 2015. A standardized questionnaire was administered to 582 participants with an age of 13.20±1.29 (M ±SD; SD) years including questions on physical activity, social media usage and sociodemographic factors. The sample consists of 291 patients participating in an obesity therapy and 291 students as control group, both pair-matched in age, gender and attended school type.

Results
The results indicate that therapy participants were less physically active, irrespective of whether or not they were a member in sports club. In this context, socio-demographic factors significantly influenced physical activity. Both groups of 11 to 13-year olds and 14 to 17-year olds were equally characterized by low physical activity. Media use in these groups was well above recommended average, while therapy participants used media 49 minutes longer than participants in the control group. Sex and school type significantly influenced the overall and single media usage. Both groups used similar social networks but therapy participants often showed higher range of use.

Discussion
Differences can only be found between participants of obesity therapies and the control group, concerning their media use behavior. No differences were shown between the activity of both groups. In addition, obesity therapy participants clearly differ in their settings of sportive activities and social media usage behavior from control group and national reference groups. To optimize therapy approaches further research needs to evaluate how media could be used efficiently to support obesity therapy and follow-up care.
Development of a clinical, bilingual tool to help providers counsel adolescents with obesity in making healthy lifestyle changes

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective. Health care providers (HCPs) report barriers to communicate effectively with and support adolescents in weight management. They may benefit from clinical tools to complement their consultations. Since most adolescents with obesity do not meet minimum lifestyle recommendations, we developed Conversation Cards for Adolescents (CCAs), a clinical, bilingual tool to facilitate adolescent-HCP communication and help adolescents with lifestyle behaviour change. The purpose of this research is to describe the conceptualization, development, refinement, and dissemination of CCAs.

Methods. Our research was completed between May 2016 and August 2018. It included three interrelated phases: (1) Conceptualization, (2) Development, and (3) Production and Knowledge Translation. Phase 1 included designing our study using cross-language and patient-oriented research principles (i.e., engaging Anglophone and Francophone adolescents as partners in research). Phase 2 comprised several sequential steps, including a scoping review, an in-person patient engagement panel, 1-on-1 interviews, focus groups, an online prioritization activity, and a telephone-based, data validation consultation with adolescents with obesity and HCPs from pediatric weight management clinics in Edmonton and Ottawa. Phase 3 included designing, refining, and disseminating CCAs in collaboration with Obesity Canada.

Results. We identified and prioritized 153 factors that help, may help, or deter adolescents with obesity from adopting healthy lifestyle behaviours. The top 15 priorities in each of these three categories were included in our tool (a hard-copy deck of cards) and were organized into the following suits: nutrition, physical activity, sedentariness, sleep, mental well-being, relationships, and clinical factors. Each card contains an individual statement pertaining to a barrier or enabler that adolescents encounter in making and maintaining healthy lifestyle changes (e.g., I have a hard time falling asleep because of my anxiety or nonstop thinking).

Conclusions. Our research generated a practical, evidence-based, bilingual tool for adolescents with obesity and HCPs to use during clinical consultations. Future steps include empirically evaluating CCAs' feasibility and user experience in health care settings.
Changes in adiposity and cardiovascular risk factors in sedentary women and men with obesity and high cardiovascular disease risk – results from a 6-month single-arm complex lifestyle intervention feasibility study

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Purpose: A key challenge in lifestyle interventions is maintenance of favorable lifestyle changes. The purpose of this analysis was to investigate changes in cardiovascular risk and adiposity in sedentary women and men with obesity and high cardiovascular disease risk, participating in a feasibility study aimed at investigating novel tools for long-term maintenance of lifestyle changes.

Methods: Participants were recruited from the seventh survey of the population-based Tromsø Study (2015-16) with inclusion criteria; age (55-74 years), body mass index (=30kg/m²), physical activity level (sedentary), cardiovascular disease risk (NORRISK 2 elevated risk), with no prior myocardial infarction. A final sample of 11 men and 5 women aged 57-74 years were included. All participants were exposed to a 2-week intervention of two 1-hour group sessions per week with instructor-led gradually intensified exercise (endurance and strength), three 2-hour group counseling sessions with nutritionist (Nordic Nutritional Recommendations) and psychologist (Implementation Intention-based strategies), respectively, and wore a physical activity tracker (Polar M430 watch). We investigated change in adiposity (waist circumference, body weight, body mass index, body composition) and cardiovascular risk factors (total and LDL cholesterol, triglycerides, systolic and diastolic blood pressure) measured 1 week after end of intervention, presented as mean change with standard deviation and p-values from mean-comparison (paired t-test). One participant was removed prior to analysis due to extreme outlier values.

Results: From baseline to end of intervention, there was a mean decrease in energy intake, increase in self-efficacy, strength, endurance and physical activity level. Mean decrease was in waist circumference 4.2 (0.9) cm (p=0.0003), body weight 2.8 (0.99) kg (p=0.0135), body mass index 1.0 (0.3) kg/m² (p=0.0092), fat mass 3.2 (0.8) kg (p=0.0014), systolic and diastolic blood pressure 4.3 (3.8) and 1.3 (2.1) mmHg (p=0.2795 and 0.5626), respectively. There was no change in blood lipid levels.

Conclusion: In this small-sample feasibility study with a moderate physical activity and a minimal diet and behavior intervention approach, we observed a decrease in adiposity but not in cardiovascular risk factors. Long-term follow-up is needed to explore maintenance of lifestyle change. Findings support proceeding to a full scale RCT.
Changes in energy- and nutrient intake among sedentary people with obesity participating in a 6-month complex intervention: A feasibility study

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objectives: To investigate changes in energy- and nutrient intake among sedentary people with obesity and elevated cardiovascular disease risk, participating in a complex intervention feasibility study. This study adds to current knowledge through its complex intervention aimed at investigating novel tools for long-term maintenance of lifestyle changes.

Methods: Participants were recruited from the seventh survey of the population-based Tromsø Study (2015-16) with inclusion criteria; age (55-74 years), body mass index (=30kg/m2), physical activity level (sedentary), cardiovascular disease risk (NORRISK 2 elevated risk) without prior myocardial infarction. A final sample of 16 people (5 women) aged 57-74 participated. During a 22 weeks intervention the focus was on exercise (two instructor-led endurance and strength group-sessions per week) and minimal behavior (three psychology-led group-sessions) and diet (one individual and three nutritionist-led group-sessions) intervention. The individual diet session (100% attendance) was based on Nordic Nutrition Recommendations (NNR). All participants logged a 3-day food diary for awareness of own food intake. Three group sessions (80% attendance) covered general and practical food knowledge, shopping and cooking. Nutrient intake was measured at baseline and at end of intervention via a validated food frequency questionnaire (FFQ). Nutrient calculations were performed with the food calculation database at the University of Oslo. Two participants were excluded from analyses due to incomplete FFQs.

Results: From baseline to end of intervention, in both sexes, mean total energy intake, sugar, fat (all types) and salt intake decreased, while mean intake of carbohydrates, fiber and vitamin C and D increased. In women, mean alcohol intake decreased and mean intake of protein and folate increased. In men mean intake of protein decreased. Compared to NNR, mean intake of saturated fat was higher and carbohydrates was lower in both sexes, and in men mean intake of alcohol was higher, and mean intake of fiber lower. There was a mean decrease in adiposity, increase in strength and endurance, total physical activity level and self-efficacy, but no change in cardiovascular risk factors.

Conclusion: Despite minimal nutrition intervention, there was a favorable change in nutrient intake after the intervention period. Findings support proceeding to a full-scale RCT.
Physical activity participation and the risk of chronic diseases among South Asian adults: A systematic review and meta-analysis

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Purpose
Chronic diseases are emerging as a public health challenge in South Asia. Global evidence supports the role of physical activity (PA) in chronic disease prevention, however, South Asia specific reviews with a focus on PA domains (transport, occupation, household and leisure) are lacking. The purpose of this study was to systematically review published literature to identify the association between PA domains and chronic diseases and to provide summary estimates of the strength of association among South Asian adults aged 40 years and over.

Methods
Nine electronic databases were searched for published, peer-reviewed English language, quantitative studies examining the association between PA and selected chronic diseases. Inclusion criteria included population (South Asian adults 40 years or older), exposure (PA or sedentary behaviour) and outcome (type 2 diabetes mellitus, breast cancer, colorectal cancer, coronary heart disease, stroke, vascular disease and musculoskeletal diseases and their markers). The National Institute of Health checklist was used for quality assessment of individual studies, and the overall quality of evidence was graded using the Grading of Recommendations Assessment, Development and Evaluation framework. A random-effects meta-analysis was carried out for cardiometabolic outcomes whereas narrative synthesis was completed for other outcome variables.

Results
A total of 24 cross-sectional or case-control studies (26,092 participants) from 6 South Asian countries were included in the review. Inactive or poorly active South Asian adults were at 31% (range, 7-60%) higher risk of being hypertensive. The risk of cardiometabolic outcomes was 1.34 times higher (pooled OR: 1.34 (1.10-1.63), I² = 64%) among inactive people compared to those with higher levels of total PA. Household PA was found to have a protective effect for breast cancer risk. Total PA had a protective effect on osteoporosis among males, and there was a protective effect of leisure time PA among females.

Conclusion
The review findings continue to support the role of total PA in addressing the burden of hypertension and cardiometabolic conditions in South Asia. Contemporary studies with a longitudinal design, representative samples, valid and reliable assessment of different domains are needed to establish the role of PA in chronic disease prevention in the region.
Coffee consumption and overall and cause-specific mortality – the Norwegian Women and Cancer Study (NOWAC)

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Disease prevention and management, Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Coffee consumption has previously been reported to reduce overall and cause-specific mortality. We aimed to further investigate this association by coffee brewing methods and in a population with heavy coffee consumers.

Methods: The information on total, filtered, instant, and boiled coffee consumption from self-administered questionnaires was available from 117,228 women in the Norwegian Women and Cancer (NOWAC) Study. We used flexible parametric survival models to calculate hazard ratios (HR) and 95% confidence intervals (CI) for total, cardiovascular, and cancer mortality by total coffee consumption and brewing methods. We modeled restricted cubic splines with four knots, with its locations based on Harrell's recommended percentiles of the total and filtered coffee consumption.

Results: During 3.2 million person-years of follow-up, a total of 13,818 deaths occurred. Compared to light coffee consumers (=1 cup/day), we found a statistically significant inverse association with high-moderate total coffee consumption (more than 3 and up to 6 cups/day, HR=0.90; 95%CI 0.84-0.96) and total mortality. The positive association between heavy filtered coffee consumption (>6 cups/day) and total mortality observed in the entire sample (HR=1.09; 95%CI 1.01-1.18) was not found in never smokers (HR=0.85; 95%CI 0.68-1.06). Both high-moderate filtered and total coffee consumption were associated with a reduced risk of cardiovascular mortality (HR=0.80; 95%CI 0.67-0.94; HR=0.32; 95%CI 0.17-0.60, respectively), whereas no significant association was found for heavy coffee consumption. However, the association was stronger in the analyses of never smokers (>6 cups of coffee overall HR=0.32; 95%CI 0.17-0.60; >6 cups of filtered coffee/day HR=0.20; 95%CI 0.08-0.56). The consumption of over 6 cups/day of filtered, instant, and coffee overall was found to increase the risk of cancer deaths by 23% (95%CI: 11%-36%), 40% (95%CI: 9%-81), and 14% (95%CI: 3%-26%), respectively. However, these associations were not statistically significant in the subgroup analyses of never smokers: HR=1.06; 95%CI 0.82-1.38; HR=0.91; 95%CI 0.38-2.21; HR=1.09; 95%CI 0.88-1.36, respectively.

Conclusion: The data from the NOWAC study indicate that the consumption of filtered coffee reduces the risk of cardiovascular deaths, and that the observed positive association between coffee consumption and cancer mortality is most likely due to residual confounding by smoking.
Development of a draft standardised evaluation framework for identifying effective interventions for promoting physical activity

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Policies and environments (SIG)

Purpose: With a range of interventions available for promoting physical activity (PA), it has become imperative to identify those that are both effective and feasible for real world application. The purpose of this study was to develop the first draft of a standardised evaluation framework (SEF) that aims to be useful for guiding practitioners, researchers, funders and policy makers with the evaluation of PA interventions in Ireland.

Methods: As part of the Irish Physical Activity Research Collaboration (I-PARC), this study uses a mixed methods design to develop the first draft of a SEF for identifying effective PA interventions in Ireland. First, previous frameworks were identified from the published and grey literature to inform the evaluation aspects needed in this framework. Second, a consultation period with the steering group (inc. government bodies, government agencies, funded bodies, and universities) was used to guide and recommend alterations to the draft SEF.

Results: The study identified relevant criteria based on previous frameworks (n=12) and through the steering group meetings (n=4). This first draft includes 8 sections and 30 criteria for assessing the value of PA interventions based on four areas: formative, process, impact and outcome evaluation. An additional output from this study was an organisational model for understanding the different levels of interventions for promoting PA. This model helps understand the range of intervention types, from a government department to a one-day taster session for promoting PA.

Conclusions: This research has developed the first draft of a SEF that will now be tested with a wider group of practitioners, researchers, funders and policy makers. Although this is currently "work in progress", the final version of the SEF will have the potential to be an educational and guiding resource for those wishing to evaluate interventions for promoting PA. Additionally, the data that can originate from such a framework may be useful for relevant funders and policy makers when deciding on the renewal or discontinuation of future PA interventions.
In their own words: Young adults perceptions of health and health enhancing behaviours

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Objective:
Young adults (YA) are in a transitional stage of their lives, figuring out their values and habits. This is a critical stage for the encouragement of healthy behaviours such as healthy eating and exercising. However, it is unclear what types of strategies to encourage these behaviours resonate with YA. The aim of this research was to explore YA values and perceptions in the context of health and healthy behaviour promotion strategies.

Methods:
This qualitative study involved n166, 18-24 year olds engaging in a facilitated in-depth online conversation about health over 4 weeks. Participants were recruited via market research field-house databases and used a 'virtual lounge room' methodology. Discussion topics included perceptions of health and strategies they would use to encourage the health-enhancing behaviour of healthy eating. Data analysis was conducted independently by two authors using LeximancerTM or by manual inductive thematic coding to elicit meaning from the conversations. Analysis using LeximancerTM involved input of textual conversations into the content analysis program for development of key ideas, followed by manual thematic analysis.

Results:
Health, to this cohort of YA, is multi-faceted, and many place particular importance on good mental health and exercise. Health to some was more focussed on physical appearance, often fuelled by comparison to others. Many YA believed that at their age and health status, adopting health-enhancing behaviours was not a priority. Participants believed they were not able to or do not prioritise health-enhancing behaviours due to barriers such as a perceived lack of time, money, knowledge and perceived effort of these behaviours over alternatives such as convenience foods. Strategies they proposed to encourage healthy eating included: incentivising healthy food with monetary rewards or discounts; dispelling inconsistent messages by increasing knowledge of healthy food; quick and affordable healthy recipes; and promoting the short-term tangible benefits of healthy behaviours such as emotional and physical wellbeing.

Conclusions:
Some YA need motivation and incentives to focus on their health, as the long-term consequences are not sufficiently tangible. There is a need for focussed health messaging that address the needs and desires of YA and directly addresses the barriers they face.
WEDNESDAY JUNE 5 2019
ORAL SESSIONS,
Most Canadian packaged foods remain too unhealthy to be marketed to children according to the World Health Organization Regional Office for Europe (WHO-EURO) nutrient profile model


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Influence of food labelling on food choices (Chair: Coosje Dijkstra), South Hall 2A, June 5, 2019, 12:05 PM - 1:30PM

Policies and environments (SIG)

Background: Federally legislated restrictions on the marketing of unhealthy food and beverages to children have been proposed in Canada, however, the nutrient profile (NP) model for defining "unhealthy" products has not been finalized. The WHO-EURO NP model was developed specifically to help reduce children's exposure to unhealthy food promotion and has been validated using Canadian food supply data. Given WHO suggestions to adapt existing NP models rather than develop new ones, this study aims to explore the WHO-EURO NP model's application to the Canadian food supply by assessing changes in its evaluation of the healthfulness of Canadian products and their eligibility to be marketed to children from 2013 to 2017.

Methods: This study analyzed data from the University of Toronto Food Label Information Program (FLIP) database. Collected in 2013 and 2017, FLIP contains nutritional information for packaged food products from top Canadian food retailers, categorized according to Health Canada's Table of Reference Amounts (TRA) for foods. Six TRA categories commonly marketed to children were analyzed: Bakery Products, Beverages, Cereals and Grains, Dairy Products, Combination Dishes and Snacks; total n=6885 [2013] and n=8404 [2017]. Products were further categorized into their relevant WHO-EURO category and evaluated using category-specific nutrient thresholds. Products with nutrient contents below specified thresholds were considered healthful and eligible for marketing to children. Chi-squares tested differences in the proportion of products eligible for marketing to children between FLIP 2013 and 2017, overall and per TRA category.

Results: No change was observed in the overall proportion of products considered eligible for marketing to children between FLIP 2013 (27.9%) and 2017 (27.5%; X²=0.42, p-value=0.517). No differences were found within any food category except Beverages, where the proportion of healthful products was greater in FLIP 2017 compared to 2013 (19.2% vs 11.5%, respectively, X²=13.45, p-value=0.0002).

Conclusions: These results highlight that food categories highly marketed to children have remained largely unhealthy over 4 years, with less than one third of products meeting the WHO-EURO criteria. Moreover, this study indicates that if implemented in Canada, the WHO-EURO NP model would likely be effective in restricting the marketing of most unhealthy foods to children.
A randomized controlled trial evaluating the relative effectiveness of two front-of-pack nutrition labels

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Influence of food labelling on food choices (Chair: Coosje Dijkstra), South Hall 2A, June 5, 2019, 12:05PM - 1:30PM

Policies and environments (SIG)

Objective
Front-of-pack (FOP) nutrition labelling has become an increasingly popular strategy to improve diet quality. However, there is a lack of consensus on the relative effectiveness of different FOP labels. The objective of this trial was to test two promising labels: 1) the United Kingdom's Multiple Traffic Lights label (MTL) and 2) France's Nutri-Score (NS) label. We hypothesized that both labels improve diet quality, but due to its simplicity relative to MTL, NS would be more effective.

Methods
This trial followed a 3×es;3 (No label Control, MTL, NS) crossover design with 154 participants exposed to each condition in random order via an on-line grocery store. Groceries were purchased and delivered to participants' homes for a random subset of shops. Diet quality was assessed by calculating a modified Alternative Healthy Eating Index-2010 (primary outcome) and average Nutri-Score (secondary) based on participants' purchase orders. Per serving values of individual macronutrients purchased were also evaluated using the nutrient profiles of purchase orders. A first difference regression model allowed for assessing differences in diet quality across intervention arms.

Results
The mean modified AHEI-2010 score and mean Nutri-Score were 42.5 and 3.6 respectively in Control. The AHEI-2010 score was 1.21 higher in NS (P = 0.03) and 1.20 higher in MTL (P = 0.02) compared to Control, but not significantly different between labels. There was an increase in average Nutri-Score by 0.23 (P = 0.01) in NS compared to MTL and by 0.30 (P < 0.01) in NS compared to Control. In the NS intervention, calories, sodium and saturated fat per serving decreased by 11.2 kCal/serving (P = 0.05), 25.3 mg/serving (P = 0.04) and 0.32 g/serving (P = 0.02) respectively compared to Control. In the MTL arm, only calories per serving decreased significantly by 12.3 kCal/serving (P = 0.02) compared to Control.

Conclusions
Both FOP Labels outperform Control in Average Nutri-Score, modified AHEI-2010, and calories per serving, providing support for implementation of both labels. Nutri-Score outperforms Control in saturated fat and sodium and outperforms the Multiple Traffic Lights in average Nutri-Score.
Consumers' recall, understanding and perceptions of products with a nutrient content claim and a symbol depicting 'health'

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Influence of food labelling on food choices (Chair: Coosje Dijkstra), South Hall 2A, June 5, 2019, 12:05PM - 1:30PM

Policies and environments (SIG)

Nutrition claims and health-oriented symbols are often used on food labels. Health-oriented symbols can alter consumers' perceptions of foods and may increase the 'halo effect' (i.e., health-related benefits not contained within products) of foods bearing such symbols.

Objective: To examine consumers' recall and perceptions of products with a "low in saturated and trans fats" nutrient content claim (NCC) and a heart-shaped bowl as a symbol depicting 'health'.

Methods: In an online consumer survey, participants (n=1,997) were randomized to view a healthier or less healthy soup, each one with either: 1) control/no claim, 2) an NCC, 3) an NCC + symbol (heart-shaped bowl) or 4) no claim + symbol. Participants were shown an image of the product for 10 seconds, which was subsequently removed and participants were asked if they recalled seeing a claim on the label. They were also asked to describe their understanding/interpretation of the claim using open-ended questions. Participants were shown again the same label and were asked to rate product healthiness and purchase intentions, using a 7-point Likert scale.

Results: Overall, 75% of participants in the NCC condition were able to recall the presented claim; 12% of participants in the control/no claim condition thought they read a claim. The symbol did not influence participants recollection of a claim (p=0.74). Most participants (68%) recalled a "low in total, saturated and/or trans fats" claim, while 16% believed there was a "low in sodium" claim, despite no mention of sodium on the label package. When asked about the meaning of the claim, 50% of participants interpreted the claim accurately, 26% interpreted the claim as overall 'healthy', 11% thought the claim related to sodium, and the rest had other responses. Labels with an NCC were perceived as significantly healthier and a greater intention to purchase (both p<0.001); the 'healthy' symbol did not enhance these perceptions (p=0.67 and p=0.45, respectively).

Conclusions: There was high recollection of an NCC on the labels, although only half of participants were able to correctly interpret the claim. The additional effect of a 'healthy' symbol was limited. This study reinforces the 'halo' effect of nutrient content claims on product perceptions.
Prevalence of health, nutrition, and environment-related claims in the Brazilian packaged food supply

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Influence of food labelling on food choices (Chair: Coosje Dijkstra), South Hall 2A, June 5, 2019, 12:05PM - 1:30PM

Policies and environments (SIG)

Objective: To assess the prevalence of nutrition, health and environment-related claims in the Brazilian packaged food supply and examine whether foods with claims were more likely to be high in critical nutrients.

Methods: This is a cross-sectional study that used data on a random 30% subsample of 11,434 packaged foods and beverages collected in the five largest food retailers in Brazil in 2017 (n= 3,491 products). The taxonomy developed by The International Network for Food and Obesity/NCD Research, Monitoring and Action Support (INFORMAS) was used to classify front-of-package claims on food packages, including three major categories: nutrition claims, health claims, and environment-related claims. Data were entered twice for inter and test-retest reliability analyses. We also classified foods as being high in content of critical nutrients, including free sugar, total fat, saturated fat, trans fat, sodium, and presence of nonnutritive sweeteners, using a modified version of the Pan-American Health Organization nutrient profiling model. We calculated the prevalence of products with claims overall and by food categories and examined whether foods with claims were more likely to be high in critical nutrients using 95% confidence intervals.

Results:Claims were found in 41.2% of products. Nutrition claims were the most prevalent (28.5%), followed by health claims (22.1%), and environment-related claims (5.2%). In some categories, such as breakfast cereals, granola bars, packaged fruit juices, nectars and fruit-flavored drinks, more than 85% of the assessed products contained claims. Foods with nutrition claims were more likely to have high content of critical nutrients (65.3%; 95%CI 62.3,68.2% vs. 54.1% 95%CI 52.1,56.0). On the other hand, products with health (52.9%; 95%CI 49.3-56.4% vs. 58.5%; 95%CI 56.6,60.3) and environment-related claims (33.5%; 95%CI 27.0,40.8% vs. 58.6%;95%CI 56.9,60.2) were less likely to be high in critical nutrients.

Conclusions: More than a third of the Brazilian packaged food supply have claims. Nutrition claims are the most prevalent and more likely to have worse nutritional content. Considering the potential halo effect that claims borrow to unhealthy foods, policies to improve consumers' access to nutritional information should consider restricting the presence of claims on unhealthy products.
Examining the impact of proposed mandatory front-of-package ‘high-in’ nutrition symbols in the Canadian prepackaged food supply

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Influence of food labelling on food choices (Chair: Coosje Dijkstra), South Hall 2A, June 5, 2019, 12:05PM - 1:30PM

Policies and environments (SIG)

Average Canadian intakes of sodium, saturated fats, and sugars, are above recommended levels. In response, as part of Health Canada's Healthy Eating Strategy, the mandatory display of high-in front-of-pack (FOP) symbols to alert consumers to products high in these nutrients and to encourage their reformulation by manufacturers, has been published in Canada Gazette Part 1.

Objective:
The aim of this study was to investigate the extent to which these symbols would appear on foods and beverages in the Canadian prepackaged food supply, both overall and by food category.

Methods:
Using the University of Toronto's Food Label Information Program database 2013 (n=15,277 after exclusions), products were assessed for their potential to display a symbol based on recently published criteria proposed to regulate their display. The criteria includes thresholds based on the % Daily Value (DV) for each nutrient, above which a symbol for that nutrient would have to be displayed. Exemptions for fruits and vegetables without added sodium, sugars, or saturated fats, non-flavoured whole or partly skimmed milk, eggs, sweetening agents (i.e. sugar, honey, syrups and molasses) and table salt are listed in the proposed regulations and therefore removed from the current analysis.

Results:
61.7% (n=10251) of products examined would be subject to the display of at least one symbol. Of these, 52.3% (n=5358) would have a sodium symbol, 41.9% (n=4295) a saturated fats symbol and 41.0% (n=4207) a sugars symbol. 37% of products would display a symbol for more than one nutrient. Product categories which would have the greatest proportion of foods with symbols include processed meats (93.8%), soups (93.0%), desserts (87.2%), sugars and sweets (82.3%), dairy (76.9%) and bakery products (71.0%).

Conclusion:
This is the first study to evaluate the impact of proposed regulations for the mandatory FOP symbols on Canadian prepackaged foods. Findings identify a high concentration of symbols in categories contributing meaningfully to dietary sodium, sugars, and saturated fats, but also in categories for which consumption is encouraged in national dietary guidelines (e.g. dairy products). These findings can inform ongoing discussions on how best to optimize criteria underpinning the display of a FOP symbol.
O01, O01.6

Drawing on strategic management approaches to inform salt reduction: An external environmental analysis for packaged foods

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Influence of food labelling on food choices (Chair: Coosje Dijkstra), South Hall 2A, June 5, 2019, 12:05PM - 1:30PM

Policies and environments (SIG)

Objective: Energy dense, nutrient poor foods are a driver of diet-related chronic disease. Improving food environments often relies on business to voluntarily change their practices. However, there is little public health consideration of the factors known to influence business actions, namely the 'external environment' (institutions and people outside of a business that affect it). This highly novel study takes a business and public-health lens to explicate the external environment affecting the willingness of business to act on public-health goals, and to identify the implications for voluntary product reformulation to reduce salt in packaged foods for sale in Australia.

Methods: We drew on Strategic Management approaches to conduct an applied policy analysis and an adaption of an external environmental analysis. Documentary data of relevance to the packaged food sector (including food processors and supermarkets) for the period 2013-2016 were collected from peer reviewed and grey literature. Two business analysis frameworks, Political-legal, Economic, Social, and Technological 'PEST', and Michael Porter's 'Five Forces', guided data extraction and analysis.

Results: The packaged food sector in Australia is heterogeneous and complex. Voluntary product reformulation to reduce salt in packaged foods was found to be an uneasy fit with the external environment in which most packaged food companies operate, although influences varied between industry sectors. A high cost of doing business, muted domestic growth, intense competitive rivalry, asymmetry of power in favour of supermarkets, and marginal consumer interest in less salty food were likely to create commercial disincentives to invest in voluntary salt reduction above more pressing commercial imperatives. Innovative opportunities for public-health actors identified through this analysis included: support for 'shared value' in economic discourse; and leveraging investor, supermarket and consumer bargaining power.

Conclusions: The methods and theories commonly used in business literature can provide meaningful insights for public-health. In this case, the nuances of the external environment in which companies operate proved useful in highlighting areas of focus to incentivise voluntary action by businesses for public-health goals. Our approach could be adopted and adapted in the analysis of other complex public-health issues.
Use of the Nutri-Score Front-of-pack labelling system to evaluate the healthfulness of the Canadian packaged food supply

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Influence of food labelling on food choices (Chair: Coosje Dijkstra), South Hall 2A, June 5, 2019, 12:05PM - 1:30PM

Policies and environments (SIG)

Purpose: Different front-of-pack (FoP) labelling systems are now used in many countries to better communicate information about the nutritional content or quality of packaged food and beverages to consumers. Nutri-Score is a scale-based, graded (from more nutritious (A) to less nutritious (E)) summary FoP system recently developed and implemented in France. The Nutri-Score provides a more comprehensive rating of the nutritional attributes of foods and beverages compared with other summary label systems. Therefore, the objective was to apply the Nutri-Score system to evaluate differences in product healthfulness and evaluate changes over time in the Canadian food supply.

Methods: Eligible food and beverages had nutrition information extracted from the University of Toronto Food Label Information Program database from 2013 (n=6759) and 2017 (n=8521). The Nutri-Score was derived, ranging from -15 (more nutritious) to 40 (less nutritious), for products in six major food and beverage categories: 1) bakery products 2) beverage products 3) cereals and grain products 4) dairy products and alternatives 5) combination dishes 6) snacks. Differences in Nutri-Score between product categories and year were compared using Kruskal-Wallis tests.

Results: The Nutri-Score for cereals and grain products was significantly lower (more nutritious) (mean±smn;SD)(0±smn;6, Grade C) than all other given product categories in 2017 (p<0.001). There were significant differences in scores between combination dishes (4±smn;6, Grade C) and bakery products (11±smn;9, Grade E) (less nutritious) compared with all other categories (p<0.001). There was no difference in scores between other categories evaluated as less nutritious: snacks (9±smn;7, Grade C); beverages (8±smn;8)(Grade D); and dairy products (9±smn;8, Grade C)(P>0.05). Overall, there was no significant difference between the scores in these six categories in 2017 compared with 2013 (p>0.05).

Conclusions: Bakery products and beverages were the least nutritious product categories, and cereals and grains more nutritious, using Nutri-Score. The overall nutritional score for products evaluated was not different from 2013 and 2017, suggesting that the nutritional composition of these categories evaluated has remained relatively unchanged during the past five years. This emphasises the need to prioritise reformulation of these products to reduce the impact they may have on poor diet quality among Canadians.
16959

O02, O02.1

Fathers’ perceptions of family feeding: A grounded theory of Family Food Labour

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Food-related parenting practices and their children's eating (Chair: Ric Rosenkranz), South Hall 2B, June 5, 2019, 12:05 PM - 1:30 PM

Children and families (SIG)

Purpose: Family mealtimes play an important role in children's long-term health and development through the provision of nutrition, role modelling and connection with other family members. While time constraints and work-life stressors for mothers and fathers can challenge eating together as a family, there is relatively little information about the role fathers play in the family mealt ime environment and management thereof. This study aimed to investigate how fathers negotiate the role of feeding with other family members, and understand how this both impacts and is shaped by the structure of mealtimes.

Methods: To answer this question, a ground theory approach was used. Fathers (N=28) in this study had children aged 12 years or younger, were employed in 'blue collar occupations' or 'service industries', and lived within a variety of family structures. Fathers' experiences were captured through conducting six focus groups and one individual interview at their work places.

Results: Findings suggest that a complex set of arrangements is needed for the act of feeding the family to occur. Two major themes were identified: (i) Mealtime Structure which reflects the various arrangements and management procedures (including rules) that give ultimate shape to how mealtimes happen; and (ii) Division of Labour which reflects the work required bringing about such arrangements and how this work (or labour) is distributed or allocated.

Conclusions: A model of Family Food Labour is offered. This reflects the balance needed to be struck between the demands of Mealtime Structure and the Division of Labour required to ensure the family is fed. It is intended to support understanding of family feeding processes and the role that fathers' play within them. While the model of Family Food Labour needs further theorising and might be expanded in the future, future studies could identify the potential for interventions to target aspects of Family Food Labour to increase the frequency or quality of interactions at family meals.
Mothers’ observed restrictive feeding practices are associated with their own weight, not children’s characteristics

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Food-related parenting practices and their children's eating (Chair: Ric Rosenkranz), South Hall 2B, June 5, 2019, 12:05 PM - 1:30 PM

Children and families (SIG)

Objective: Evidence is mixed regarding the effects of restrictive feeding on children's eating and weight. A limitation of much of this previous research is that commonly-used measures of restrictive feeding rely on parent report. Observing parent behavior in a feeding interaction may provide a more valid assessment of feeding practices and also allows for examination of nuances in how parents engage with their child around food. The purpose of this study was to describe verbal and non-verbal behaviors used by mothers to limit their pre-adolescent children's eating during a laboratory-based feeding protocol, and examine associations between mothers' restrictive feeding practices and mother and child characteristics.

Methods: US-based, low-income mothers and their pre-adolescent children (dyad N=108, mean child age = 11.0y (SD=1.2)) were offered a standardized plate of desserts after a meal and left alone for 10 minutes. Videos of the protocol were coded by trained staff using a coding scheme that identified restrictive statements with positive or negative affect and frequency of non-verbal restriction (e.g., mother pushing plate away; coding reliability Kappa>.80 for all codes). Mothers completed sub-scales of the Children's Eating Behavior Questionnaire to assess children's appetitive traits. Mothers' and children's heights and weights were measured to calculate body mass index (BMI). Poisson regression was used to examine associations between mother and child characteristics and counts of mothers' restrictive practices.

Results: Over 10 minutes, on average mothers made 3.2 (SD=3.1) positive restrictive statements, 1.0 (SD=1.6) negative restrictive statements, and engaged in 2.0 (SD=3.1) non-verbal behaviors to limit children's eating. No consistent associations were observed between mothers' restrictive practices and children's BMI or appetitive traits. However, mothers' BMI was inversely related to use of positive restrictive statements (RR=0.97, p=.008) and non-verbal restrictive behaviors (RR=0.97, p=.04) after adjustment for child BMI.

Conclusions: Unlike among younger children where mothers' restrictive statements vary by child BMI and appetite, among pre-adolescents, mothers' behavior did not vary by child characteristics. However, mothers of lower BMI restricted their children's eating more frequently than mothers of higher BMI. Future research is needed to understand how mothers' own weight may influence her use of restrictive feeding practices.
Associations between food-related practices at home and calories from snacking among 8-12 year old children

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Purpose: Snacking among children is a major source of discretionary calories. Given the childhood obesity epidemic, this study assesses associations between home food-related practices and children's reported snacking.

Methods: Baseline data were analyzed from 155 parent-child dyads who participated in the Healthy Home Offerings via the Mealtime Environment (HOME) Plus study and whose children reported snacking. HOME Plus was a randomized controlled trial to prevent excess weight gain among 8-12 year-old children. Parents were predominantly female (95%) while children were equally split by gender. Based on Social Cognitive Theory, the parent survey assessed food-related personal, behavioral and home environmental factors. Children reported their snack intake through three 24-hour dietary recalls. Snacking was defined as any food or drink children consumed as a snack. The dependent variable was percent calories from snacks. Children's height/weight were measured by study staff. Most frequent snacks are described. Using multivariate regression adjusted for parent education, we assessed associations between calories from snacking and diet quality (HEI), family meal sources (delivery, take-out) and frequency, child BMI z-score, parent self-efficacy to plan and cook healthful meals, home food availability of unhealthful foods (obesogenic score), and having a TV in child's bedroom with child's percent calories from snacking.

Results: On average 11% of children's daily calories came from snacks. The three most frequently consumed snacks were grained-based desserts (0.25 servings/day as snack (SD=0.48)), fruit (0.21 servings/day as a snack (SD=0.47)), and frozen treats (0.16 servings/day as snack (SD=0.26)). There were no significant associations between calories from snacking and diet quality, family meal sources and frequency, BMI z-score, parent self-efficacy to plan and cook healthful meals, obesogenic score, and having a TV in child's bedroom.

Conclusion: The study findings indicate lower percent calories from snacking in our school-age sample compared to younger children (ages 2-5) in national data; the same snack type (grained-based sweets) was most frequent in both age groups. Snacking in school-age children needs further examination to inform intervention programs. Future studies should investigate snacking among school-age children with parent feeding practices, children's independence in selection and preparation of snacks, and other home-related practices.
16528

O02, O02.4

Consuming like parents or peers? Influences on children’s intake of sugar-sweetened beverages

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Food-related parenting practices and their children's eating (Chair: Ric Rosenkranz), South Hall 2B, June 5, 2019, 12:05 PM - 1:30 PM

Children and families (SIG)

Objective

The aim of this study was to investigate what influences children's intake of sugar-sweetened beverages (SSB; soft drinks, coco milk etc.). Parents are very influential when it comes to fruit and vegetables intake among children, but the role of parents vis-à-vis peers in relation to SSB intake is less clear and not as well-documented in the literature. Applying a socio-cognitive framework, this study set out to explore whether parents exert a similar, 'healthy' influence when it comes to unhealthy practices such as avoiding SSB.

Methods

In a mixed-method design, we conducted a survey with 242 children (mean age 11.48, SD 0.56) and 118 adults (mean age 41.58, SD 4.03) recruited from public schools in the Central Region of Denmark resulting in 125 child-parent dyads. Regression analyses were applied. Afterwards, we recruited 31 dyads for qualitative interviews focusing on family interactions and roles regarding consumption of SSB. Content analysis was applied using Nvivo 11.

Results

The survey data showed that children's intake of SSB increases with their perception of friends' intake of SSB (b= .186, p< .001), parents' self-reported intake of SSB (b= .245, p< .005) and, more surprisingly, parents' requests to child to reduce intake of SSB (b= .138, p< .005). Children's intake of SSB decreases with parents' perceived influence on children's intake of SSB (b= -.181, p< .005). These results were to some extent supported by the qualitative interviews, where parents were often found to be gatekeeper for the child's intake. For children, intake of SSB was often associated with sociality and being with friends after school. Children reported finding it difficult to reduce SSB, when both friends and parents did not.

Conclusions

This study contributes to the understanding of the dyadic interaction between parents and children in relation to intake of SSB, but also the powerful descriptive norm of friends. The results highlight specific challenges regarding socialising children into a healthy lifestyle. Also, this study underlines the importance of interventions taking the social context into account by targeting children as well as their friends and parents.
A bi-directional look at parenting practices around food and children’s dietary behaviours: A qualitative inquiry

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Purpose: Parents influence children's dietary behaviours (DB); however, the mechanisms that lead children to make healthy dietary choices remain unknown. This study aimed to elucidate the interactions between parent and child characteristics that influence children's motivation to practice healthy DB.

Methods: Semi-structured interviews among 28 ethnically diverse child/parent dyads were conducted. Families of seventh-graders were recruited from public school classrooms in Surrey, British Columbia (Canada) (50% girls, 25% White, 68% mothers, 54% household income =$66,000). Following Knalf & Ayres (1996) methodology, structured family summaries were generated to preserve the family unit in the analyses. Descriptive coding and constant comparison analyses within and across families served to characterize how parenting, context, and child characteristics interact to influence children's DB.

Analyses, guided by grounded theory, were conducted in NVivo11 (QSR International, 2015).

Results: Three pathways emerged from the analyses:

1) Intrinsic Motivation: In these families, both parent and child valued and understood the importance of living a healthy lifestyle (eating well and being active). Parents combined autonomy supportive and structured food parenting practices to reinforce healthy DB and practices are consistent between parents. In many families, positive and influential external factors support families in maintaining healthy DB.

2) Extrinsic Motivation: In these families, parents take a narrow view of their child's diet and children are obedient/compliant to parental and societal pressures. Structured and situational permissive parenting practices are emphasized and are inconsistent between parents.

3) Amotivation/Indifference: In these families, the child prefers processed foods over healthier choices and parents exhibit low levels of health literacy. Extremely permissive practices are employed and are inconsistent between parents.

Overall, children's DB were healthier among children who are intrinsically motivated (higher vegetables/fruits intake and low intake of processed food). However, all children reported consuming some processed foods and/or sugar-sweetened beverages, with a higher prevalence among those who are extrinsically motivated or amotivated. Additionally, if psychosocial vulnerabilities were identified among family member, families tended to have dysregulated parenting practices.

Conclusions: This study highlights the need to consider the broader household context when designing paediatric dietary interventions, as dietary behaviours are influenced by child, parental and external factors.
Associations between acute and chronic stress and parent food-related parenting practices: An ecological momentary assessment study

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Food-related parenting practices and their children's eating (Chair: Ric Rosenkranz), South Hall 2B, June 5, 2019, 12:05 PM - 1:30 PM

Children and families (SIG)

Objective: Although prior research suggests that stress may play a role in parent's use of food-related parenting practices (e.g., parent feeding practices, food served at meals), it is unclear whether certain types of stress (e.g., acute, chronic) result in different food-related parenting practices. Identifying whether and how acute (i.e., momentary; lots to get done, parent/child conflict) and chronic (i.e., long-term; unemployment > 6 months) sources of stress are related to parent food-related parenting practices is important with regard to childhood obesity, especially within racially/ethnically diverse parents who are more likely to experience both types of stress and have higher levels of obesity and weight-related health problems. The current study examined the association between acute and chronic stressors and food-related parenting practices in a racially/ethnically diverse and immigrant sample.

Methods: The current study is a cross-sectional, mixed-methods study using ecological momentary assessment (EMA). Parents (mean age = 35; 95% mothers) of children ages 5-7 years old (n=61) from six racial/ethnic groups (African American, American Indian, Hispanic, Hmong, Somali, White) and low income households (76% < $35,000 annual income) in Minnesota participated in this ten-day in-home observational study. Cross-lagged models were run to examine associations between acute and chronic stress and parent food-related parenting practices within- and across-day.

Results: Overall, acute stressors were significantly associated with more unhealthy parent food-related practices (restriction and pressure-to-eat feeding practices, serving pre-prepared foods). For example, acute stressors, specifically interpersonal conflicts, had significant within-day effects on engaging in more unhealthful food-related parenting practices the same evening with across-day effects weakening by day three. In contrast, financial acute stressors had stronger across-day effects. Chronic stressors, including stressful life events were not consistently associated with more unhealthful food-related parenting practices.

Conclusions: Acute sources of stress were significantly associated with food-related parenting practices in racially/ethnically and immigrant households. Chronic stressors were not consistently associated with food-related parenting practices. Future research and interventions may want to assess for acute sources of stress in parents and target these momentary factors in order to promote healthful food-related parenting practices.
Key strategies for promoting family meals made at home

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Purpose: Although research has demonstrated dietary quality and weight management benefits of family meals, less is known about associations between the proportion of family meals made at home and meal planning, meal routines, household chaos, self-efficacy for preparing healthful meals, and child/parent weight status. Furthermore, family meal frequency is often measured retrospectively via survey questions of the past or typical week. The present study aimed to assess the proportion of family meals made at home in real-time and examine correlates of home meal preparation to inform family-meal intervention research. Methods: The present study analyzed NU-HOME 2017/2018 baseline data from 105 households. Ecological momentary assessment surveys were randomly sent to parents on seven evenings over a two-week period and asked about whether most/majority of family members living in their household were able to eat together and the meal source (e.g., full-service restaurant, fast-food restaurant, made meal at home). The proportion of family evening meals made at home was calculated across the two-week period using two cut-points (=50% of evening meals prepared at home vs. >50%; =70% versus >70%). Parent psychosocial surveys assessed demographic characteristics and mealtime correlates. Research staff measured child and parent height and weight (body mass index). T-tests/Fisher's exact tests were used to examine associations between proportion of family evening meals made at home and demographic characteristics, mealtime correlates, and parent and child weight status. Results/findings: Mean scores for family meal routines, family meal planning and parent self-efficacy for preparing healthful meals were significantly higher (p-value<.05) among families who made more than 50% of their meals at home compared to those making 50% or fewer meals at home. Mean family meal planning scores were significantly higher among families who made more than 70% of their evening meals at home compared to those who did not. Conclusions: Findings suggest programs intending to increase family meals made at home among those who already prepare more than 70% at home should focus on meal planning barriers, whereas for others, promoting more frequent family meals made at home may also require focus on mealtime routines and increasing parental self-efficacy for cooking.
16935

O03, O03.1

Associations of snacking parameters with dietary quality among US preschoolers aged 2-5 y

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Nutrition, physical activity, sedentary behavior and sleep research in preschoolers (Chair: Kathrine Downing), North Hall, June 5, 2019, 12:05 PM - 1:30 PM

Children and families (SIG)

Objectives: Snacking is nearly universal in the US among young children and contributes almost a third of daily energy. The extent to which snacking helps children meet nutritional needs or, conversely contributes to excessive intakes is debated. This research was aimed at evaluating associations of snacking frequency, size, and energy density with dietary quality among US preschoolers.

Methods: Participants were 4,049 children aged 24.0-71.9 months participating in the 2005-2014 National Health Examination Survey. Snack frequency, size, and energy density were estimated using the mean of 2, 24-hr dietary recalls. Overall diet quality was characterized using 3 indices: the 2010 Healthy Eating Index (HEI; 0-100); the mean adequacy ratio (MAR; % of recommendations, 0-100) for 5 nutrients of public health concern (Vitamin D, calcium, fiber, potassium, and iron), and mean % of recommended limits consumed added sugars, saturated fat, and sodium were calculated. Separate models were tested for each snacking parameter, adjusting for the other snacking parameters, total daily energy intake, demographics and energy reporting accuracy.

Results: On average, the HEI among US preschoolers was 53.0 and the mean adequacy ratio was 70.0 out of 100. Mean intakes of added sugars, saturated fats, and sodium exceeded current recommendations. HEI scores for the total diet were positively associated with snacking frequency (p<0.05) and negatively associated with mean snack energy density (p<0.01), whereas MAR for the total diet was negatively associated with mean snack size (p<0.01) and snack energy density (p<0.001). The mean % of daily limits consumed for added sugar, saturated fat, and sodium was positively associated with mean snack energy density (p<0.001).

Conclusions: These findings represent the first large nationally representative study of snacking and diet quality among US children aged 2-5 years. Results suggest that more frequent, smaller, and less energy dense snacks may benefit children's diet quality, whereas consumption of more energy dense snacks is linked to greater daily intakes of added sugars, saturated fats, and sodium. Longitudinal and experimental studies are needed to evaluate potential causal influences of snacking parameters on dietary quality in young children.
Purpose: Abnormal cortisol levels are associated with overweight and a preference for energy-dense foods. However, the association between long-term hair cortisol concentration (HCC) and diet among preschool-aged children is poorly understood. Studying the link between children's stress and diet is crucial, as early childhood is an important period for the development of eating habits as well as for the prevention of obesity and later chronic illnesses. The aim of this study was to investigate if HCC, a measure of long-term stress, is associated with dietary patterns among 3, 6-year-old Finnish children.

Methods: The current cross-sectional study is a part of the DAGIS study conducted in 66 Finnish preschools in 2015, 2016. Of the 864 participating preschoolers, 541 (63%) provided the information needed to examine the research question between HCC and dietary patterns. HCC was measured from 4-cm hair samples using a chemiluminescence immunoassay. The parents of the participating children filled in a food frequency questionnaire (FFQ) assessing the child's food consumption outside preschool hours. The FFQ items (n=47) were used as inputs in principal component analysis to derive dietary patterns. The associations between HCC and dietary pattern scores were examined with correlation analysis and logistic regression analysis adjusted for the highest educational level in the family, the number of nights with sufficient sleep and the number of days per week the child usually spends at preschool.

Results: We identified three dietary patterns, which were named 'sweets-and-treats', 'health-conscious' and 'vegetables-and-processed meats' based on the food items loading into each of the patterns. HCC was negatively linked to the 'health-conscious' pattern (r=-0.086, p<0.05). In logistic regression model, higher HCC was associated with increased odds of scoring low on the 'health-conscious' pattern (OR=4.1 [95% CI: 1.9-9.0] p<0.001).

Conclusions: This study supports the link between long-term stress and lower-quality diet, as it shows that elevated HCC and less health-conscious diets are connected already in the early childhood. The results are not generalizable outside the sample, but give reason to further investigate the relationship between stress and the development of children's eating habits and health.
An obesity treatment in preschoolers: 12 months results from a randomized controlled trial

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Nutrition, physical activity, sedentary behavior and sleep research in preschoolers (Chair: Kathrine Downing), North Hall, June 5, 2019, 12:05 PM - 1:30 PM

Children and families (SIG)

Objectives: Early obesity treatment seems to be most effective, but few treatments for preschoolers exist. This study examines the effectiveness of a parent-only treatment focusing on parenting practices with and without booster sessions (Booster or No-Booster) and standard treatment (ST).

Methods: This randomized controlled trial, the More and Less study, recruited families with 4 to 6-year-old children with obesity from child care centers (n = 68) in Stockholm County. Families were randomized to a 10-week parent program (1.5 h/week) with parenting skills training with or without booster sessions or to ST, delivered in outpatient pediatric clinics. Linear mixed models were used to examine treatment effects on primary (body mass index (BMI) z-score) and secondary outcomes (BMI, waist circumference) during 12 months. Three-way interactions were used to examine the influence of socio-demographic factors on primary outcome. The clinically significant change in BMI z-score (-0.5) was assessed with risk ratios.

Results: 174 children (Booster, n=44, No-Booster, n=43 and ST, n=87) (mean age 5.3 (SD 0.8) years, BMI z-score 3.0 (SD 0.6), 56% girls) and their parents (60% foreign background, 39% university degree) were included in the analysis. Twelve months post baseline children in the parent-only program had a greater reduction in their BMI z-score, 0.30 (95% CI 0.45 to 0.15), compared to ST, 0.07 (-0.19 to 0.05). Comparing all three groups, improvements in weight status were only seen for the Booster group, 0.54 (95% CI 0.77 to 0.30). The Booster group was 4.8 times (95% CI 2.4-9.6) more likely to reach a clinically significant reduction of =0.5 in BMI z-score compared to ST. Father foreign background decreased intervention effect, but only in the No-Booster group (p=0.008).

Conclusions: A parent-only treatment including parenting skills training outperformed standard care for obesity in preschoolers. This study adds evidence for high intensity obesity treatments already during the preschool years.
Prevalence and correlates of screen use in toddlers: results from the French ELFE birth cohort

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Nutrition, physical activity, sedentary behavior and sleep research in preschoolers (Chair: Kathrine Downing), North Hall, June 5, 2019, 12:05 PM - 1:30 PM

Objective: Screen use has been associated with adverse health outcomes in childhood. Given the increased variety of screen devices, estimating their use prevalence in toddlers and identifying their sociodemographic correlates is important for designing intervention strategies. We examined screen use prevalence and correlates in a nationwide sample of 2-year-old toddlers.

Methods: In 2011, 18,040 families of infants born in mainland France were enrolled in the Elfe birth cohort. At age 2 years, parents were interviewed by phone and reported their child's frequency (everyday, weekly, monthly, never) of screen use (watching television, playing on computers/tablets, smartphones or game consoles). Multivariable logistic regression was used to evaluate the associations of screen use with sociodemographic correlates, including child sex, number of siblings, single parenting, household income, both parents' birth place, education level and work status, maternal age, region of residence and survey season. Weighting procedures were used to redress departure of the 2-year sample from representativeness.

Results: 13,495 (75%) families were interviewed at the 2-year survey. Weighted prevalence of using screens everyday was 68% for television, 12% for computer/tablet, 10% for smartphone and 0.5% for game console. Compared to toddlers of mothers holding an undergraduate degree, toddlers of mothers with primary education were more likely to watch television daily (vs. less often) (OR [95%]: 2.49 [1.92, 3.24]) and to ever play (vs. never) on computer/tablet (1.32 [1.07, 1.61]) and game console (2.09 [1.43, 3.05]), but not on smartphone (0.99 [0.79, 1.25]). Household income was negatively associated with watching television and playing game console but positively associated with playing on computer/tablet and smartphone. Other correlates of greater screen use were non-working and younger mothers, living in a couple, lower paternal education level and winter/spring season. Toddler's sex and parents' birth place were not associated with screen use.

Conclusions: Although television remains the most used screen, around 10% of toddlers are already engaged in daily use of newer electronic devices. The direction or strength of association of correlates with screen use differs by type of screens. This suggests the necessity to intervene as early as toddlerhood with adapted intervention strategies to diminish screen use.
Aherence to 24-Hour Movement Guidelines in 5.5-year-old Singaporean Children

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Nutrition, physical activity, sedentary behavior and sleep research in preschoolers (Chair: Kathrine Downing), North Hall, June 5, 2019, 12:05 PM - 1:30 PM

Purpose: Integrated 24-Hour Movement Guidelines provide specific recommendations on sleep, screen viewing (SV) and moderate-to-vigorous physical activity (MVPA) to improve the health of children and youth. However, few studies have examined whether these recommendations are met (individually or in combination) in young children, especially in Asia. We evaluated adherence to these integrated and individual guidelines among 5.5-year-old Singaporean children.

Methods: Growing Up in Singapore towards Healthy Outcomes (GUSTO) is a mother-offspring cohort study examining early-life factors that affect long-term health and development of children. At age 5.5 years, child SV was assessed by parent-reported questionnaire. Movement behaviours were measured continuously using wrist-worn ActiGraph accelerometers over 7 consecutive days and nights. Mean (±smn;SD) daily MVPA, SV time and nighttime sleep duration across the week were estimated. Adherence to individual and integrated guidelines was determined. Meeting the guidelines was defined as: = 60 minute of MVPA/day, =2 hours of screen time/day, and 9, 11 hours of sleep/night. The socio-demographic correlates associated with guidelines meeting were examined by multivariable logistic regression.

Results: Of 864 children followed to age 5.5 years, 547 (63.3%) had both ActiGraph and questionnaire data: 51.7% were boys and 58.3% of Chinese ethnicity. Children averaged 67.3 (±smn; 23.7) min/day of MVPA, 101.86 (±smn; 88.7) min/day of SV and 480.6 (±smn; 57.2) min/night of sleep. Overall, the proportions of children who met the integrated guidelines were 5.5%, 70.2%, 59.6% and 13.7%, respectively. Multivariable analysis revealed that compared to Chinese children, Malay children were more likely to meet MVPA (OR [95% CI]): 1.68 [1.17, 4.40]) and sleep guidelines (1.78 [0.62, 3.43]) and less likely to meet SV guidelines (0.43 [0.24, 0.86]). Other correlates of higher adherence to the guidelines were; being a boy, a second- or later-born child and having a younger mother for adherence to MVPA guidelines; higher maternal education for SV guidelines; and an older mother for sleep guidelines.

Conclusions: A lower proportion of children met the integrated guidelines when compared with Canadian children. No significant associations were found between socio-demographic factors and integrated guidelines, partly because these factors were inconsistently associated with different components of the guidelines.
Toddlers’ nighttime sleep and physical activity: The within- and between-person mediating roles of sedentary behavior and napping

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Nutrition, physical activity, sedentary behavior and sleep research in preschoolers (Chair: Kathrine Downing), North Hall, June 5, 2019, 12:05 PM - 1:30 PM

Objective: Sleep, physical activity and sedentary behavior comprise a movement continuum related to child health. Sleep research among toddlers (age 1-3 years) has been understudied. Decreased nighttime sleep may result in next-day decreased active play (moderate to vigorous physical activity; MVPA), mediated through napping or sedentary behavior. Research has generally addressed person level characteristics (i.e. age, gender) related to activity on a typical day; with little attention to individual activity on a specific day. The objective of this analysis among toddlers is to examine whether next-day compensatory napping or sedentary activity displaces MVPA following a night of disrupted sleep.

Methods: 195 toddlers from a low-income community participating in an obesity prevention trial (mean age=27 months) wore an Actical accelerometer for up to seven days. Nighttime sleep (number of minutes asleep between 8pm-8am) and minutes of sedentary and MVPA were defined using established cut points for toddlers. A multilevel mediation model assessed the indirect within- and between-person effects (controlling for age and gender).

Results: Between-person: On average, across all days, toddlers who slept less at night, engaged in more sedentary behavior compared to toddlers who slept more at night. Toddlers who napped more, engaged in less MPVA compared to toddlers who napped less on average. Neither sedentary behavior nor napping mediated the relation between average sleep and average MVPA across days. Within-person: Sedentary behavior (not napping) significantly mediated the association between nighttime sleep and next-day MVPA (Indirect effect = .09, p<.01). Specifically, on days when toddlers got less nighttime sleep than usual, they engaged in more next-day sedentary behavior (B= -0.17, p<.01) and less MVPA (B= -0.52, p<.01). Increased next-day napping was not observed following less than typical nighttime sleep.

Conclusions: The within-person relation between decreased nighttime sleep and decreased next-day MVPA is partially explained by increased next-day sedentary activity, not napping. Findings highlight the importance of examining sleep and activity as a continuum of movement. Interventions to increase nighttime sleep may be influential for improving MVPA through reducing daytime sedentary behavior among toddlers.
Associations of Screen Time, Sedentary Time and Physical Activity with Sleep in the Early Years: A Systematic Review

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Nutrition, physical activity, sedentary behavior and sleep research in preschoolers (Chair: Kathrine Downing), North Hall, June 5, 2019, 12:05 PM - 1:30 PM

Purpose: Reduced physical activity and increased screen-time may adversely impact children's sleep, which is important to children's healthy growth and development, but little is known about these associations in the early years. The purpose of this study was to determine the association between screen time, movement behaviors (sedentary time, physical activity) and sleep outcomes in infants (0-1 year); toddlers (1-2 years) and preschoolers (3-5 years).

Methods: A systematic search was conducted in 17 electronic databases up to April 2018. Evidence was selected and synthesized according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Evidence was synthesized narratively stratified according to child age, exposure and outcome measure. Quality of evidence was assessed using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach.

Findings: Twenty-eight studies were included, comprising 26 unique cohorts (n=22 assessing screen time, n=3 sedentary time, n=9 physical activity). In infants, evening screen time was unfavorably associated with one sleep outcome; no evidence was available for movement behaviors. Toddlers' total daily screen time was unfavorably associated with two sleep outcomes; evening screen time was unfavorably associated with one sleep outcome. Toddlers' total physical activity was favorably associated with two and moderate-to-vigorous physical activity was favorably associated with one sleep outcome. In preschoolers, total daily screen time was unfavorably associated with six sleep outcomes; evening screen time was unfavorably associated with three sleep outcomes. Preschoolers' total sedentary time was favorably associated with one sleep outcome; moderate-to-vigorous physical activity was favorably associated with one sleep outcome; outdoor play was favorably associated one sleep outcome. Overall quality of evidence was low, with strongest evidence for evening and total daily screen time use in toddlers and preschoolers.

Conclusions: This novel systematic review indicates screen time is associated with worse sleep outcomes in toddlers and preschoolers (but not in infants), while greater time spent in outdoor play and moderate-to-vigorous physical activity is associated with better sleep outcomes in preschoolers. Although studies in infants and toddlers were relatively scarce, this study suggests that limiting screen time, particularly before bedtime, and encouraging higher intensity/outdoor play may benefit sleep outcomes in the early years.
Mothers’ perceptions and experience of participation in an infant obesity prevention program delivered via telephone calls or text messages

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Methods and interventions in E- & mHealth (Chair: Delfien van Dyck), Terrace 2A, June 5, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Objective: There is increasing use of text messages and telephone calls to support pregnant women and new mothers around infant feeding. We sought to explore participants’ perceptions and experience of participation in the Communicating Healthy Beginnings Advice by Telephone (CHAT) randomised controlled trial, an infant obesity prevention trial employing these strategies.

Methods:
A telephone survey was administered to mothers at six months of child's age. The survey included questions about satisfaction with the study and whether mothers would like to be part of a further research study. Participant responses on satisfaction questions were tabulated and analysed using Microsoft Excel. Of those mothers who agreed to participate in further research, a purposively selected sample of 61 mothers from different ends of the satisfaction spectrum were contacted via email and text message. Qualitative interviews were conducted by telephone, interviews were recorded and transcribed. Data was analysed using Braun & Clarke’s six simple steps, themes associated with mothers’ perceptions and experience of participation in program were explored.

Results: 61 mothers were contacted via email and text messages; 36 mothers agreed to participate of whom two did not answer telephone calls. 34 mothers consented to participate and were interviewed. Of those who were interviewed; 50% were born in Australia, 68% spoke English at home, 68% were first-time mothers. Booklets and resources that were mailed to mothers were viewed positively as useful, informative, concise and handy; most mothers valued the telephone calls and text messages due to the support received for breastfeeding, reminders for tummy time and screen time, tips on introduction to solids, strategies and contextual approaches to deal with psychosocial issues. Mothers were appreciative of the personalised support they received. The majority of mothers found the program very helpful, particularly first-time mothers. A few mothers considered the program onerous or believed they received no new information.

Conclusion: Participants responded favourably to the support provided by the program. This study adds to the knowledge base on participants' perceptions of an infant obesity prevention program delivered via telephone calls and text messages. This knowledge is useful for translation and replication of infant obesity prevention trials.
O04, O04.2

Profiling utilization of behaviour change techniques of an e-Health lifestyle modification app targeted at Canadian teens: A latent class analysis

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Methods and interventions in E- & mHealth (Chair: Delfien van Dyck), Terrace 2A, June 5, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Purpose: E-Health is increasingly used to deliver lifestyle modification interventions; however, little is known about the behavior change techniques utilized in these apps. This study aimed to: 1) profile how teens engage with Aim2Be - a gamified lifestyle behaviour modification app that supports teens in adopting healthy lifestyles related to behavioural nutrition, physical activity, screen time and sleep; and 2) determine whether user profiles differ by socio-demographic variables.

Methods: 294 Canadian teens (14.8 years, SD=1.4; 49% boys; 68% Caucasian) utilized the Aim2Be app for up to 4.5 months. Web-analytics tracked engagement with the six main app features: 1) selecting aims (goal setting), 2) completing tasks (action planning, behavioural practice, and habit formation), 3) reading articles (information about social and environmental consequences and prompting action), 4) viewing social walls (social support), 5) social wall posting/comments (demonstration of behaviours), and 6) completing quick wins (behavioural practice). Latent class analysis (LCA) served to identify user profiles. Multivariate multinomial logistic modeling assessed if engagement profiles differed by socio-demographic characteristics, including age, gender, ethnicity, socio-economic status, baseline body mass index and weight concerns.

Results: Three distinct user profiles were identified by LCA: uninvolved (N=92, 31%), goal-setter (N=33, 11%), and engaged (N=169, 58%). The uninvolved spent the least amount of time in the app (~25 minutes, SD=53.4) and when engaged in the app, they only browsed the social walls. The goal-setters spent an average of ~32 minutes (SD=29.3) and predominantly were involved in setting aims, completing tasks and daily quick wins. The engaged group used all six of the app features and spent ~128 minutes (SD=195.3) in the app. Multivariate analysis revealed that only gender predicted user profiles. Specifically, girls were more likely than boys to be in the goal-setter [Relative Risk Ratio (RRR)=4.45, p=0.001] or engaged (RRR=2.34, p=0.007) groups as compared to the uninvolved group.

Conclusions: To facilitate future development and improvement of e-Health lifestyle intervention that utilizes behavior change techniques, it is important to consider how users interact with the features incorporated into the app. In addition, there is a need to gain a greater understanding of how such intervention can be more appealing to boys.
Does ecological momentary assessment measure or cue sedentary behaviour of adults during the workday?

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Methods and interventions in E- & mHealth (Chair: Delfien van Dyck), Terrace 2A, June 5, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Objective: Ecological Momentary Assessment (EMA) is a method of collecting behavioural data in real-time and recent studies support its validity in measuring physical activity and sedentary behaviours (SB). However, less is known about whether EMA unintentionally cues the behaviour it is meant to measure (Maher et al., 2018) and if EMA is feasible in office-based settings. The purpose of this study was to examine compliance to EMA prompts, test whether EMA prompts cued participants' behaviour, and assess criterion validity of using EMA.

Methods: Baseline data from 45 adults (91.1% female, Mage= 39.7yrs) who were recruited for a standing desk intervention aimed at reducing SB at work were included. Participants received 5 randomly spaced EMA surveys each day for 5-work days. EMA items assessed current position (sitting, standing, stepping). EMA responses were time matched to objectively measured time in each position using ActivPAL before and after each prompt. Reactivity to EMA prompts was assessed by comparing objectively measured sitting/standing/stepping 15-mins before and after each EMA prompt using multilevel repeated measures models. Cohen's kappa was applied to check inter-rater agreement between EMA-reported and device-measured position at the time of the prompt and multilevel linear regression models were applied to examine whether each EMA-reported position predicted objectively measured time in sitting, standing, stepping ±smn;15-min intervals surrounding the prompt.

Results: Overall, participants answered 80.3% of EMA prompts (range 45-100%). Participants engaged in more sitting (βa;= 25.75; p=.01) and less stepping (βa;= -15.99; p<.01) in the 15-min after the prompt as compared to the 15-min before the prompt but no change in time spent standing was found. There was substantial agreement between EMA-reported and device-measured position (k =.713; p<.001), and EMA-reported position was positively associated with higher device-based time in each position (βa; sit= 651.71, βa; stand= 388.44, βa; step= 423.72; p's<.001) surrounding the prompt, supporting criterion validity.

Conclusions: The use of EMA is a feasible and valid assessment when used in an intervention to reduce SB in adults during the workday and did not appear to disrupt SB. Future research will examine the effects of the intervention on changes in EMA-measured outcomes including affect and productivity.
17040

O04, O04.4

Efficacy of an m-health physical activity and sleep intervention to improve sleep quality in middle-aged adults: The Refresh Study randomized controlled trial

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Methods and interventions in E- & mHealth (Chair: Delfien van Dyck), Terrace 2A, June 5, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Purpose: Poor sleep health is common and increases the risk of chronic disease. Only half of those reporting poor sleep health have a diagnosed sleep disorder. Physical activity is known to improve sleep quality, however many sleep health interventions do not specifically target physical activity as a strategy to improve sleep quality. This study aimed to compare the efficacy of a combined physical activity and sleep intervention with a sleep-only intervention and a wait-list control, for improving sleep quality in middle-aged adults without a diagnosed sleep disorder.

Methods: Physically inactive adults (40-65 years) reporting poor sleep quality (n=275) were recruited for a three-arm randomized controlled trial (Physical Activity and Sleep Health (PAS), Sleep Health-Only (SO) or Wait-list Control (CON) groups; 3-month primary time-point, 6-month follow-up). Intervention groups accessed a smartphone/tablet "app" using behaviour change strategies (e.g., self-monitoring, goal setting), with additional email/SMS support. PAS group participants received a pedometer. Primary outcome was Pittsburgh Sleep Quality Index (PSQI) total score. Secondary outcomes included self-reported moderate-to-vigorous-intensity physical activity (MVPA), resistance training (RT), sitting time, meeting activity guidelines (=150 minutes/week MVPA plus =2 days/week RT) and PSQI sub-components. Group differences were examined in a stepwise fashion, first between pooled intervention (PI) and CON groups, then PAS and SO groups.

Results/findings: Compared with CON, PI groups significantly improved sleep quality (3 months: 9.81 vs 7.84, p <0.001; 6 months: 9.72 vs 7.64, p <0.001), and PSQI sub-components scores at 3 and 6 months. Relative to the SO group, the PAS group reported 48 fewer minutes/day sitting time (p=0.042) at 3 months and was significantly more likely to report =2 days/week RT (OR = 6.54, p=0.016) and meeting activity guidelines (OR=5.38, p=0.023) at 6 months. All groups increased minutes/week of MVPA at 3 and 6 months compared with baseline.

Conclusions: The pooled interventions significantly improved sleep quality among middle-aged adults with poor sleep quality without a diagnosed sleep disorder. The adjunctive PA intervention did not additionally improve sleep quality. m-Health interventions targeting sleep health and physical activity offer an appealing, effective, broad-reaching, cost-efficient option for preventing the burden of disease associated with poor sleep quality.
A multicentre randomised controlled trial of an augmented exercise referral scheme using web-based behavioural support in individuals with metabolic, musculoskeletal and mental health conditions: findings from the e-coachER study


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Methods and interventions in E- & mHealth (Chair: Delfien van Dyck), Terrace 2A, June 5, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Purpose: There is no rigorous evidence that exercise referral schemes (ERS) increase physical activity (PA) of individuals with chronic health conditions. E-coachER is a novel web-based behavioural support package (https://www.ncbi.nlm.nih.gov/pubmed/30244214) to augment ERS. This is the first RCT to report whether adding web-based support to ERS improves objectively-assessed PA after one year compared to usual ERS.

Methods: 450 low active adults with obesity, diabetes, hypertension, osteoarthritis or depression were recruited by primary care or exercise practitioners. The primary outcome was minutes of moderate and vigorous PA (MVPA) in ≥10 min bouts measured by accelerometer over one week at 12 months, with a wear-time threshold of ≥16 hours per day for ≥4 days including ≥1 weekend day. Other accelerometer-derived PA measures, self-reported PA, ERS attendance, EQ-5D-5L and HADS were collected at 4 and 12 months.

Results: The sample had a BMI mean (SD) of 32.6 (4.4), and were primarily referred for weight loss, though 54% reported having low mood as a referral reason. The provisional ITT complete case adjusted comparison of groups at 12 months showed a weak effect in favour of the intervention group (N=236; 95% CI -1.4 to 25.9; P = 0.08). Among the intervention participants, 64% logged on to the on-line support at least once, and 36% progressed to review a PA goal. Reaching the goal review stage (or not) did not influence the findings in a CACE analysis. The intervention had no significant effect on ERS attendance, EQ-5D-5L or HADS scores, but in complete case repeated measures analyses (including both 4 and 12-months follow up) the intervention participants reported lower depression (P <0.05) and anxiety (P =0.05) scores compared with the control group.

Conclusion: Adding e-coachER to usual ERS had only a small effect on long-term objectively assessed MVPA. Engagement in the intervention was acceptable but whether participants completed a goal review (or not) did not influence the findings. Challenges were faced in the primary outcome analysis: few people accumulated ≥10 min bouts of accelerometer-assessed MVPA, resulting in a poor fit for the predefined model. Further sensitivity analyses are warranted.
The feasibility of real-time behavior monitoring in Czech older adults

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Methods and interventions in E- & mHealth (Chair: Delfien van Dyck), Terrace 2A, June 5, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Objective: Czech older adults have lower rates of physical activity than the population average and lag behind in the use of digital technologies even when compared to their peers from other European countries. The study objective was to assess the feasibility of intensive behavior monitoring through technology in Czech adults aged 50 years and older.

Methods: Participants (N=30, M age = 61.2, SD=6.8, range 50-74, 53% male, 23% retired) were monitored for 12 weeks while wearing a Fitbit Charge 2 monitor and completed three 8-day bursts of intensive data collection through surveys presented on a custom-made mobile app. Online surveys were also completed before and at the end of the 12-week period (along with post-study focus groups) to evaluate participant perceptions of their experience in the study.

Results: All 30 participants completed the study. Across the three 8-day bursts, participants completed 1623 out of 2026 surveys administered three times per day at a pseudo-random schedule (80% compliance rate), 497 out of 648 end-of-day surveys (77% compliance rate), and additionally self-reported 736 episodes of planned physical activity (with 4% of the reports initiated but returned without data). Overall rating of using the mobile app and Fitbit was above average (74.5 out of 100 on the System Usability Scale). The majority reported the Fitbit (90%) and application (84%) were easy to use and rated their experience positively (83%). Focus groups revealed that some surveys were missed due to notifications not being noticed or that participants would need a longer time window for survey completion. Some found wearing of the monitor in hot weather or at night uncomfortable, but overall participants were highly motivated to complete the surveys and to be compliant with the study procedures.

Conclusion: The use of a mobile survey app coupled with a wearable device appears feasible for use with Czech older adults. Participants in this study tolerated the intensive assessment schedule well but lower compliance may be expected in studies of more diverse groups of older adults. Some difficulty was noted with pairing and synchronization of devices with some types of smartphones, posing challenges for large-scale studies.
Quality improvement of food composition databases using methods from natural language processing and statistics

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Objective: Adequate nutrition is one of the pillars of human health. The estimation of the intake of nutrients from food consumption requires reliable food composition data (FCD). This data is used for the aims of dietary assessment and forms the basis of food-based dietary guidelines for healthy nutrition, which are important tools for the field of public health nutrition. FCD is stored in FCDBs, which presents a powerful source of knowledge. Keeping the existing in a good state and creating new high quality FCDBs is a relatively complicated task. We propose two computer methodologies for improving the quality of FCDBs and exploring the food and nutrition domain.

Methods: The first methodology is a method for mapping food composition data from various sources to a terminological resource, a food domain ontology. An existing ontology modeled to cover a larger portion of the food domain is chosen and used for the mapping. The methodology was evaluated on two sets of FCDBs: EuroFIR and USDA.

The second methodology addresses the problem of missing data, which arises in all FCDBs. This problem is partly resolved by borrowing data from other FCDB(s). Our proposed methodology eases the missing-data imputation process by introducing rules for borrowing formed from modeling based on null-hypothesis testing. We evaluated the proposed methodology on a subset of European FCDBs.

Results: The evaluation of the first methodology resulted in 87.9% accuracy, i.e. correct mapping of the terms of from the FCDBs and the concepts from the ontology. The second evaluation proved that our methodology gives lower error than approaches used for borrowing FCD in 85% of the cases on average, and more accurate results than the most used state-of-the-art approach used for borrowing data for imputation of missing values in 69.2% of the cases.

Conclusions: With the first methodology a certain level of harmonization in the meta-data of FCDBs can be achieved, which makes the access to the data more efficient. The second methodology speeds up the process of borrowing FCD and minimizes the error of calculating missing nutrient values. Both methodologies contribute to the quality improvement of FCDBs.
Adoption, implementation and sustainability of school-based physical activity and sedentary behaviour interventions in real-world settings; a systematic review

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Implementation of healthy lifestyle interventions in youth (Chair: Gisela Nyberg), Terrace 2B, June 5, 2019, 12:05 PM - 1:30 PM

Objective: Increasing children’s physical activity (PA) and reducing sedentary behaviour (SB) is linked to various positive biopsychosocial health outcomes. Despite a plethora of school-based efficacy studies to increase PA and reduce SB, the field has called for a focus on public health impact that requires a deeper understanding of how school-based models are adopted, implemented and sustained under real-world conditions. With over 60 scale-up and implementation frameworks, a first step is to understand what is being used in the PA and SB field. This knowledge is essential to achieve sustained, population-wide intervention impact as well to inform future research and practice. This systematic review aims to 1. Identify which implementation models are used in school-based PA and/or SB trials under real-world conditions and 2. Identify factors associated with the adoption, implementation and sustainability of such interventions in real-world settings.

Methods: The review follows PRISMA guidelines, is registered with PROSPERO and included a systematic search of seven databases: MEDLINE, EMBASE, CINAHL, SPORTDiscus, PsycINFO, CENTRAL, and ERIC, from January 1st, 2000 to July 31st, 2018. Studies were included if interventions: targeted school-aged children; were delivered in schools with a primary outcome of PA and/or SB; applied implementation models; and were effectiveness, scale-up, dissemination, translation or implementation trials.

Results: Of 49,417 articles identified, 15 were included, covering 10 discrete interventions. The majority of studies (n=12) utilised only one implementation model; the three remaining studies utilised between 2-5 models. Sixteen implementation models were mentioned to varying degrees to either plan studies (40%) and/or interpret findings (60%). Diffusion of Innovations (N=5), RE-AIM (N=4) and Domitrovich’s Conceptual Framework (N=2) were the most prevalent models described. Common facilitators associated with either adoption, implementation or sustainability included: teacher training, staff support, external support agents, collaborative planning and ease of application. Common barriers included: time, staff turn-over or lack of staff, and academic priorities.

Conclusions: This review summarises models currently used to frame the implementation of school-based PA and SB interventions and highlights factors relevant for implementation under real-world conditions. Future studies should prospectively incorporate appropriate implementation models to guide planning, implementation and evaluation of PA and SB interventions.
Implementation and scalability (SIG)

Objective: Considering the declining physical activity levels observed in Australia children as well as the significant proportion of sedentary time spent during teaching English, this intervention program embedded physical activity within the academic instruction. The purpose of this study was to evaluate the impact of the 4-week "Thinking While Moving in English" (TWM-E) program on primary school children's physical activity levels and on-task behaviour.

Methods:
Participants (N = 283 Grade 3-4 students, age = 9-11 years) were randomly assigned to a control (N = 162) or the TWM-E group (N = 121). The control condition followed the normal curriculum whereas the TWM-E group consisted of active English lessons (for example, running, skipping on a hopscotch while learning spelling). After receiving one day of professional learning, teachers applied the physically active English lessons 3 x 40 min sessions per week.

Children's physical activity was measured using accelerometers (AX3, Axivity), wrist-worn for five consecutive school days.

On-task behaviour was measured as percentage of time using a momentary time. Students were observed on a rotational basis in 15 sec intervals for 30 min in the allotted English time.

Results:
Physical activity results are currently being analysed.

On task behaviour:
Linear mixed models showed significant group-by-time effects favouring the TWM-E group on children's active engagement (F(1, 7.23) = 138.50, p = 0.001, Baseline: M control = 33.56, SE = 2.98, M TWM-E = 36.83, SE = 3.45; Post-test: M control = 22.78, SE = 3.06, M TWM-E = 86.03, SE = 3.52), passive engagement (F(1, 14.29) = 12.28, p = 0.003, Baseline: M control = 21.08, SE = 3.13, M TWM-E = 24.14, SE = 3.68; Post-test: M control = 32.83, SE = 3.20, M TWM-E = 12.10, SE = 3.73), and off-task behavior (F(1, 7.63) = 19.14, p = 0.003, Baseline: M control = 45.34, SE = 3.89, M TWM-E = 39.06, SE = 4.55; Post-test: M control = 44.74, SE = 3.98, M TWM-E = 1.13, SE = 4.62).

Conclusions:
The TWM-E program improved children's on-task behaviour and have the potential to increase children's physical activity levels without compromising academic time.
Principals’ perceptions of implementing physically active lessons in School

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Implementation of healthy lifestyle interventions in youth (Chair: Gisela Nyberg), Terrace 2B, June 5, 2019, 12:05 PM - 1:30 PM

Implementation and scalability (SIG)

Introduction: School is an ideal setting to promote and increase physical activity (PA) in children. However, implementation of school-based PA programmes seems difficult, due to schools focus on academic performance and lack of support to PA-interventions. Integrating PA into academic lessons (physically active lessons) is a promising way to increase children's PA levels without reducing academic time. However, little is known about principal's attitudes towards physically active lessons and benefits. Purpose: To explore principals' perceptions and prioritizing in regard to an implementation of physically active lessons, and to identify factors generating principals' acceptance.

Method: A total of 29 (of 40 possible) semi-structured telephone interviews were conducted with principals in primary and second grade schools in the city of Stavanger, Norway. Each interview lasted on average 16 min (range 7-24 min). The interviews were recorded and transcribed in full. Adopting a phenomenological approach, qualitative data were analysed using inductive content analysis. To assist the data analyse, the computer program QSR NVivo12 was used.

Results: The interview revealed that most of the principals were positive to physically active lessons due to children's need for variation in pedagogical approach and reduction of sedentary lessons. However, prioritizing was a constant challenge and the principals perceived a pressure between other school development projects and the lack of teachers’ motivation for change. Well-organized schools that worked systematically with improvement over time were more willing to introduce physically active lessons than schools striving to meet existing demands imposed by school owner. It seems important to realize that schools are different and have different capacity for implementing change.
Gamification in a physical activity app – what types of gamification get used, by who, and does it make a difference?

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Implementation of healthy lifestyle interventions in youth (Chair: Gisela Nyberg), Terrace 2B, June 5, 2019, 12:05 PM - 1:30 PM

Motivation and behavior change (SIG)

Purpose: Gamification may enhance the appeal and effectiveness of software. The study aimed to (1) describe engagement with gamification features in an online social networking physical activity app, "Active Team", (2) determine whether use of gamification features was associated with program efficacy, and (3) determine whether use of gamification features was associated with psychological and sociodemographic characteristics.

Methods: Active Team is a 100-day physical activity challenge delivered via smartphone app, designed for users to complete with existing friends. Gamification features included a leaderboard (allowing social comparison), ability to make wall posts and send/receive virtual gifts (social support) and ability to send/receive challenges (competition). A 3-arm, 9 month randomised controlled trial involving n=444 participants was recently completed, of which 141 participants received the gamified intervention. Physical activity was measured objectively (GeneActiv accelerometers) and participants self-reported their age, sex, BMI, educational status, and depression, anxiety, and stress (DASS-21). Descriptive analyses were used to determine the extent of gamification feature usage across the study period. The relationships between gamification features usage (operationalised as (1) leaderboard views and (2) sum of wall posts, gifts and challenges) and intervention effectiveness and participants' baseline psychological and sociodemographic characteristics were examined using Spearman's rho and linear regression, respectively.

Results: On average, participants viewed the leaderboard 83 times, made 5 wall posts, sent 5 virtual gifts and 1 challenge. Intervention effectiveness was significantly associated with leaderboard views (p=0.04), but not use of the other gamification features. High usage of the leaderboard was associated with being lower in BMI (p=0.01), having higher stress symptoms (p=0.01), and having lower depressive symptoms (p=0.046). Similarly, high usage of other gamification features was associated with being lower in BMI (p=0.04), having higher stress symptoms (p=0.02) and having higher educational status (p=0.003).

Conclusion: By far, the most commonly used gamification feature was the leaderboard, which was positively associated with intervention effectiveness. In contrast, the gamification features designed to facilitate social support and competition were relatively under-used. Further work examining the mechanisms and operationalisation of gamification in behaviour change programs is warranted. For now, social comparison appears a particularly promising motivational strategy.
Stakeholder engagement in selecting implementation strategies to support evidence-based feeding practices in childcare

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Implementation of healthy lifestyle interventions in youth (Chair: Gisela Nyberg), Terrace 2B, June 5, 2019, 12:05 PM - 1:30 PM

Implementation and scalability (SIG)

Objective: Engaging stakeholders in selection and tailoring of implementation strategies is an important principle of Community-Engaged Dissemination and Implementation (CEDI) research. The purpose of this study was to compare and contrast the priorities and selected strategies of two distinct stakeholder groups using CEDI methods.

Methods: Evidence-Based Quality Improvement (EBQI) panels were formed in two southern US states, Arkansas (AR) and Louisiana (LA). In one meeting, stakeholders prioritized barriers and facilitators to effective feeding that were identified through prior qualitative interviews with educators in both states. This was accomplished through a card-sort activity where educators, in small groups, placed a card in a stack of low, medium, or high priority. Next, rankings were aggregated across groups to determine their overall priorities. Researchers then used Intervention Mapping techniques to align prioritized barriers and facilitators with potential implementation strategies from the Expert Recommendations for Implementation Change (ERIC) projects. Finally, consistent with methods in concept mapping, these potential strategies were presented to the panel in detail, and panel members rated each potential strategy on a scale of 1 to 10 on both feasibility and importance. The research team used a ShinyAp to construct plots of these ratings in real time, to identify strategies in the "Go Zone" (i.e., highly feasible and important), and to facilitate discussion with the panel about the pros and cons of potential strategies.

Results: Both EBQI panels prioritized concerns about children's food insecurity, promoting recognition of the difference between encouraging and pressuring children, cultivating beliefs and skills to honor children's choices, and leveraging pleasant mealtime conversations. In addition, AR stakeholders prioritized contextual barriers (e.g., schedule, food quality); LA stakeholders prioritized additional barriers of educator beliefs about children's ability to understand hunger and fullness. In both groups, the ERIC strategies of ongoing trainings, educational materials, and reminders were in the Go Zone. Additionally, LA stakeholders rated peer evaluation and feedback as important and feasible.

Conclusions: This work illustrates the potential for similarities and differences in selected strategies across two different stakeholder groups. Results suggest one-size-fits-all approaches to implementation may not be appropriate.
Barriers and facilitators to adoption, implementation and sustainment of obesity prevention interventions in schoolchildren— a DEDIPAC case study

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Implementation of healthy lifestyle interventions in youth (Chair: Gisela Nyberg), Terrace 2B, June 5, 2019, 12:05 PM - 1:30 PM

Implementation and scalability (SIG)

Background: The aim of the study was to explore the implementation of school based diet and physical activity interventions with respect to the barriers and facilitators to adoption, implementation and sustainability; supportive actions required for implementation and recommendations to overcome identified barriers. Two interventions rolled out nationally in Ireland were chosen; Food Dudes, a programme to encourage primary school children to consume more fruit and vegetables and Green Schools Travel (GST), an active travel to school programme in primary and secondary schools. Trained school coordinators (teachers) cascade the programmes to other teaching staff.

Methods: Multiple case study design using qualitative semi-structured interviews with key stakeholders: primary and secondary school teachers, school coordinators, project coordinators/managers, funders and intermediaries. Fifteen interviews were conducted. Data were coded using a common categorisation matrix. Thematic analysis was undertaken using the Adoption, Implementation and Maintenance elements of the RE-AIM implementation framework.

Results: Good working relationships within and across government departments, intermediaries and schools were critical for intervention adoption, successful implementation and sustainability. Organisational and leadership ability of coordinators were essential. Provision of participation incentives acted as motivators to engage children’s interest. A deep understanding of the lives of the target children was an important contextual factor. The importance of adaptation without compromising core components in enhancing intervention sustainability emerged. Successful implementation was hindered by: funding insecurity, school timetable constraints, broad rather than specific intervention core components, and lack of agreement on conduct of programme evaluation. Supportive actions for maintenance included ongoing political support, secure funding and pre-existing healthy lifestyle policies.

Conclusions: Successful implementation and scale up of public health anti-obesity interventions in schools is dependent on good contextual fit, engagement and leadership at multiple levels and secure funding. Recommendations to overcome barriers include: capacity to deliver within an already overcrowded curriculum and clear specification of intervention components within a conceptual framework to facilitate evaluation. Our findings are generalisable across different contexts and are highly relevant to those involved in the development or adaptation, organisation or execution of national public health interventions; policy makers, guidelines developers, and staff involved in local organisation and delivery.
School Wellness Integration Targeting Child Health (SWITCH®): Process evaluation of implementation using mixed methods

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Implementation of healthy lifestyle interventions in youth (Chair: Gisela Nyberg), Terrace 2B, June 5, 2019, 12:05 PM - 1:30 PM

Implementation and scalability (SIG)

Objective: Public health organizations have recommended schools as key sites for wellness promotion, but implementing and sustaining changes in schools has proven challenging. The purpose of this study was to evaluate implementation processes of a multi-level comprehensive school wellness implementation model known as SWITCH (School Wellness Integration Targeting Child Health), using a mixed methods approach.

Methods: Twenty-five elementary schools from the Midwestern United States participated in the 2017–18 iteration of SWITCH. Consistent with best practices in implementation science, SWITCH uses a standardized protocol, but enables local adaptation by schools. A SWITCH Core Team in each school (3 leaders) is provided with a set of Quality Elements for overall programming as well as setting-specific strategies for impacting classrooms, the lunchroom, and Physical Education (PE). Implementation was assessed using a 'Checkpoint' survey during week 8 of the 12-week implementation phase, a follow-up survey, and semi-structured interview post-SWITCH. An 'Implementation Score' was calculated for each school based on reported use of Quality Elements and use of the web-based tracking system. Analyses summarized the factors contributing to effective implementation and school perceptions of the barriers and challenges with implementation.

Results: The SWITCH Implementation Scores ranged from 0.46 to 3.48 (range 0-4) with a mean of 2.34 (SD = 0.78). The factors that most contributed to effective implementation were: 1) Core Team representation from all target settings; 2) administrative support through Core Team representation; and 3) student engagement in programming and via the online tracking system. Parent engagement was the least implemented Quality Element by the Core Team; this was not seen as a priority. The lowest use of Quality Elements in the targeted settings was reported in the lunchroom, which also had the lowest core team representation (24%; classroom = 72%; PE = 64%). Core Teams reported discomfort in trying to facilitate implementation in "someone else's" area of the school, which they had limited time and energy to oversee.

Conclusions: The flexible SWITCH implementation model and the mixed-methods approach to process evaluation provide novel insights about facilitators and barriers faced by schools in implementing whole-of-school wellness programming.
Neighborhood design and Japanese older adults’ cognitive function: Mediation effects of objectively-assessed physical activity

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Healthy ageing (Chair: Paul Gardiner), Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective. There has been growing interest in the role of the neighbourhood physical environment in supporting the cognitive function of older adults. Physical activity is assumed to be one pathway through which built environment may influence older adults' cognitive function. Street layout is one of the key neighbourhood design elements, which can significantly impact the physical activity of residents. Nevertheless, to our knowledge, there is no study that has investigated the mediation effects of objectively-assessed physical activity in the associations between street layout with cognitive function among the elderly. The aims of this study were to examine (a) associations of two metric and space syntax measures of street layout with the cognitive function of Japanese older adults and (b) the extent to which objectively assessed physical activity mediated such associations.

Methods. Cross-sectional data from 287 older adults who lived in Japan were used. Two street layout measures, the intersection density and the space syntax measure of street integration, were objectively calculated for each participant's geocoded home location. The Mini Mental State Examination was used to evaluate cognitive function. Physical activity was objectively assessed with accelerometers.

Results. There was a statistically significant negative association between street integration and the odds of having cognitive impairment. Objectively assessed light and moderate-to-vigorous physical activity did not attenuate this relationship.

Conclusions. We found those who lived in areas with more integrated street layouts (as assessed by the space syntax measure of street integration) were less likely to have cognitive impairment compared with those who lived in less integrated areas. No attenuation effects of objectively assessed physical activity were found in the associations between street integration and cognitive impairment. This finding implies that street integration may influence cognitive function through mechanisms other than physical activity. Our findings provide unique evidence regarding the importance of the topological aspects of street layouts in (re)designing neighbourhoods to support mental illness in the context of a less-studied location. Studies in Asian cities can provide the international field with evidence for how extreme levels of street layouts can be beneficial or detrimental for the mental illness of older adults.
O06, O06.2

Reallocating time from sedentary behavior to light and moderate-to-vigorous physical activity: What has a stronger association with adiposity in older adult women?

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Healthy ageing (Chair: Paul Gardiner), Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: This study is the first to use compositional data analysis to investigate movement behaviors of elderly women and their relationships with fat mass percentage (FM%). The focus of the study is on the associations of time reallocations from sedentary behavior (SB) to light physical activity (LIPA) or moderate-to-vigorous physical activity (MVPA) with adiposity.

Methods: Over 400 older adult women were recruited as part of the cross-sectionally conducted measurements of older adults aged 60+ in Central European countries. This study was supported by a research Grant from the Czech Science Foundation under reg. No. 18-16423S. An accelerometer was used to assess daily movement behaviors. Body mass index (BMI) and fat mass percentage (FM%) were assessed as adiposity indicators using InBody 720 MFBIA.

Results: Using LS-regression, we found positive relationships of BMI and FM% with SB (relative to remaining movement behaviors) (p < 0.001 for both), while their relationship with MVPA (relative to remaining movement behaviors) were negative (p < 0.001 for both). The estimated BMI and FM% associated with a 30-min SB-to-MVPA reallocation were reduced by 1.5 kg/m² and 2.2 percentage points, respectively, whereas they were not reduced significantly with the reallocation of 30 min from SB to LIPA.

Conclusions: The findings highlight that SB and MVPA, but not LIPA, are significantly associated with adiposity in elderly women. The reallocation of time from SB to MVPA could be advocated in weight loss interventions in older women.
16472

O06, O06.3

Social networks as a determinant of ageing in place: The Longitudinal Survey of Health, Ageing and Retirement in Europe (SHARE)

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Healthy ageing (Chair: Paul Gardiner), Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Objective: 'Ageing in place' is seen as a sustainable and cost-effective way of healthy living in a rising ageing population. Research suggests that 'ageing in place' is associated with quality of life (QoL), social networks, and functional disability (e.g. able to walk, lift heavy things, handle money), but how these factors affect each other over time is less known. This study investigates if QoL and functional disability are determined by a person's social network over time.

Methods: We used data from the 4th (year 2011) and 6th (year 2015) wave of the SHARE survey, which is a longitudinal cross-national survey of 50+ people from 27 European countries. QoL was measured using the CASP-12 item scale. Functional disability was measured by a combined score of Activities of Daily Living (ADL), Instrumental ADL (IADL) and mobility limitations. Social network was measured by a combined score of size, satisfaction, proximity, contact and emotional closeness. Multivariate regression analysis of the longitudinal data was conducted including covariates (age, gender, country, education, marital status).

Results: 28,756 older adults from 14 countries were included in the analysis. Mean age of the respondents was 65.4 and 58% were female. Preliminary analysis indicate that greater social network at baseline has a positive effect on the decline in functional disability and the degree of QoL four years later. However, more advanced analysis will be performed to look at specific interactions.

Conclusions: Being able to live in your own home requires physical (e.g. being able to walk 100 meters), mental (QoL) and social health (having friends and neighbors to talk to). The social networks of older adults seem to play a vital role in their ability to 'age in place', and should be a high priority in future intervention studies, rather than focusing on physical activity or specific built environmental changes alone.
Delivery mode choice and attrition in an online and print delivered physical activity intervention for older adults

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Healthy ageing (Chair: Paul Gardiner), Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Objective: Among older adults with mobility limitations, insufficient physical activity (PA) is highly prevalent. Although online delivered PA-interventions have the potential to reach large groups and can be provided at low costs, they often are subject to a low reach and high attrition. This study compares the online and printed delivery mode of a computer tailored PA-intervention for older adults (> 65 years). It assesses which individual characteristics predict the choice of delivery mode and attrition. These insights may help to improve the effectiveness of future interventions, thus increasing their public health impact.

Methods: A single group pre-test post-test study (N=409) was performed among community living single older adults with mobility impairments caused by chronic diseases (mean age = 77 ±smn;8). Participants could freely choose between an online and printed delivery mode. Self-report questionnaires were used at baseline and three months after the start of the intervention. Hierarchical logistic regression analyses were applied to assess at three months whether individual characteristics (e.g. age, gender, BMI, educational attainment, loneliness, social support, modeling, self-efficacy, attitude, intention and physical activity) could predict delivery mode preference, and which characteristics or delivery mode predict attrition.

Results: 58% of the participants chose the printed delivery mode and 42% chose the online delivery mode. A higher age (B = -0.10; SE = 0.02; Exp(B) = 0.91; p=0.000) and lower levels of social support (B = 0.38; SE = 0.14; Exp(B) = 1.46; p=0.008) were predictors of choosing the printed delivery mode. Participating in the online delivery mode (B = 1.28, SE = 0.28, Exp(B) = 3.58; p=0.000) and low educational attainment (B = -0.53, SE = 0.28, Exp(B) = 0.59; p=0.049) were predictors of attrition. Conclusions: Participants who are older and have less social support are more attracted to a printed delivery mode. Attrition was higher in the online delivery mode and for those with a lower educational attainment. Although printed delivery modes may generally be more expensive to implement, it may be advisable to offer a printed and online delivery mode alongside each other in order to maximize participation in these subpopulations.
Physical activity for the prevention of falls in older adults with vision impairment: exploring habit formation and participant perspectives

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Healthy ageing (Chair: Paul Gardiner), Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Objectives: Despite positive findings in other populations, exercise-based programs have yet to be shown as effective in preventing falls in people with vision impairment (VI). Low exercise program adherence by participants with VI has been cited as the reason for this lack of effect. The current study aims to explore habit formation and participants' perspectives of an adapted home-based fall prevention exercise program for older people with VI.

Methods: Participants were from the intervention group in a randomised controlled trial investigating the effect of an exercise-based program on falls in adults aged 50 years or above with VI. The intervention was based on the Lifestyle-integrated Functional Exercise (LiFE) falls prevention program which was adapted to people with VI, ‘v-LiFE’. Program elements were adapted to improve adherence and accessibility for people with VI, including mode of teaching and program resource format. Following completion of the 12-week v-LiFE program, habit formation was explored using the Self-Report Habit Index (SRHI), where scores of 36 or above indicated the presence of a habit. Participant perspectives were also explored using the Attitudes to Falls-Related Intervention Scale (AFRIS), where higher scores indicated more positive attitudes (range 6-42), as well as semi-structured interviews.

Results: Forty-eight Orientation and Mobility Specialists delivered an average of 6±5 sessions to 157 participants between February 2017 and October 2018. Average age of participants was 74±10 years, 60% (94/157) were female, average logMAR was 1.32±1.4 and 41% (65/157) were legally blind. Average SRHI scores (n=153, 49±5) indicated habit formation for a nominated program activity that the participant was able to implement. Participant perspectives were also explored using the Attitudes to Falls-Related Intervention Scale (AFRIS), where higher scores indicated more positive attitudes (range 6-42), as well as semi-structured interviews.

Conclusions: This approach shows promise for increasing physical activity and improving strength and balance in older people with VI. The study participants developed a habit for at least one program activity, which continued past program completion, and also had positive attitudes to the program. This research contributes to our understanding of the type of program older adults with VI consider appropriate for themselves, and how existing programs could be adapted to encourage adherence to fall prevention exercise.
Group-based exercise and older adult stigma consciousness: Findings from the ‘GOAL’ randomized controlled trial

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Healthy ageing (Chair: Paul Gardiner), Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Objective: The purpose of this study was to examine the extent to which group-based exercise classes, informed by the self-categorization theory (SCT), resulted in reductions in age- and gender-related stigma consciousness among older adults. Stigma consciousness corresponds to the extent to which people expect to be stereotyped by others and has implications for one's physical and psychological health. Methods: In the GrOup-based physical Activity for oLder adults (GOAL) randomized controlled trial (clinicaltrials.gov; NCT02023632), older adults (≥ 65 years) were randomized to similar age same gender (SASG), similar age mixed gender (SAMG), or 'standard' mixed age mixed gender (MAMG) group-based exercise programs. Participants represented a subgroup from the larger trial (n = 485; Mage = 71.40 years, SD = 5.46, 71.8% female) who completed at least one assessment of stigma consciousness. Age- and gender-related stigma consciousness were assessed using items adapted from the Stigma Consciousness Questionnaire (SCQ) on six occasions over the 24-week intervention, and represented secondary outcomes in the trial. Multilevel growth models, using multiple imputation to handle missing data, examined the effects of the intervention on SCQ scores, over time, and after controlling for age and gender. Results: Results of the study demonstrated significant main effects of time for both age- and gender-related stigma consciousness. Specifically, age-related SCQ scores decreased over the intervention regardless of assigned condition (b = -0.03, t = -2.80), whereas gender-related SCQ scores demonstrated overall increases (b = 0.04, t = 3.183). With respect to age-related stigma consciousness, significant main effects for the SASG (b = -2.17, t = -4.17) and SAMG (b = -2.32, t = -4.78) conditions were observed, with participants reporting lower SCQ scores relative to the MAMG condition. Similarly, for gender-related stigma consciousness, significant main effects for SASG (b = -1.03, t = -2.17) and SAMG (b = -1.16, t = -2.62) conditions were observed, with participants reporting lower SCQ scores relative to the MAMG condition. However, no time by group interaction effects were observed. Conclusions: The results support the utility of group-exercise programs, informed by SCT, to reduce age- and gender-related stigma consciousness among older adults.
Community-wide physical activity promotion and its impact on population-level musculoskeletal pain: a cluster randomized trial

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Healthy ageing (Chair: Paul Gardiner), Congress Hall Foyer Level 2, June 5, 2019, 10:50 AM - 12:05 PM

Purpose: Musculoskeletal disorders are the second greatest cause of disability worldwide. In our first such cluster randomized trial of a 5-year community-wide intervention (CWI), we previously showed the population-level improvement in physical activity (PA). This study sought to examine the population-level impact of the CWI on musculoskeletal pain in middle-aged and older adults.

Methods: In this trial, we randomized 12 communities in Unnan, Japan to intervention (9) or control (3). Additionally, intervention communities were randomly allocated to three-community subgroups by different PA types promoted; aerobic activity promotion (Group A), flexibility and muscle-strengthening activities promotion (Group FM), or aerobic, flexibility, and muscle-strengthening activities promotion (Group AFM). Randomly-sampled residents aged 40 to 79 years responded to serial cross-sectional surveys at baseline (n=4414) and 7-year follow-up (n=3718). The intervention was a 7-year CWI (5-year intensive intervention + 2-year low-intensity maintenance) using social marketing to promote PA, and it comprised information, education, and support delivery. The outcomes were changes in the prevalence of chronic low back and knee pain and pain intensity scores using a visual analogue scale. Generalized linear mixed models adjusting for potential confounders and clustering effects were used.

Results: Compared with control communities, the prevalence of chronic knee pain and the intensity of knee pain decreased in AFM communities where all forms of PAs above were promoted (adjusted change difference= -3.3 percentage points [95%CI: -5.9, -0.6] for prevalence; -2.3 [-3.7, -0.8] for intensity). However, there was little change difference in knee pain outcomes in Groups A and FM (P=0.19) and low back pain outcomes in all intervention groups (P=0.06), compared with control communities.

Conclusions: The 7-year CWI promoting multiple-types of PA (aerobic, flexibility, and muscle-strengthening activities simultaneously) decreased the prevalence of chronic knee pain and the intensity of knee pain among middle-aged and older adults. To our knowledge, this is the first randomized study to show long-term effectiveness of community-wide PA promotion on the improvement of population-level musculoskeletal health.
Preschool personnel’s perceptions and parent’s interests in the preschool-based family involving DAGIS intervention study

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Nutrition and physical activity research in preschoolers (Chair: Amy Yaroch), Club B, June 5, 2019, 12:05 PM - 1:30 PM

Purpose: Previous findings suggest that preschool based interventions which promote children's energy-balance related behaviors (EBRBs) are more successful when including a family component. Preschool personnel are key agents for implementing a family component. The aim is to describe preschool personnel's perceptions about parent's interest in a EBRBs preschool based program, and additionally parent's opinions about the program.

Methods: The DAGIS (Increased Health and Wellbeing in Preschools) intervention study was conducted by preschool personnel as a 5 month randomized controlled study in 2017-2018. Project preschool personnel participated in two trainings at beginning and in the middle of the program. Questionnaires were filled in during trainings and at the follow-up of the intervention. Preschool personnel was asked about whether they perceive that parents are interested in the program. Parents in project preschools filled in a process evaluation questionnaires during follow-up measurements.

Results/findings: The percentage of preschool personnel who agreed totally or nearly totally on the statement that the DAGIS program interested parents was 33% (n=116) at first training. Corresponding answers at training in the middle of the program was 17% (n=110), and at follow-up measurements 18% (n=92). In the follow-up process evaluation, 93% to 96 % of parents reported that they were familiar with the four home packages sent home through preschools (n=229). The results of base-line measurements of each child's EBRBs was sent to parent's as feedback and it had been read at least once by 82% of parents. 53% of parents strongly or somewhat agreed on that the DAGIS program had motivated to promote children's EBRB's and 52 % agreed or somewhat agreed that the program had been a useful tool for promoting EBRB's. 45 % agreed or somewhat agreed that the program gave new knowledge about EBRB's.

Conclusions: The process evaluation of the DAGIS preschool-based family involving program showed that only few of the personnel perceived that the program would interest parents. Contrary to the answers of preschool personnel, a high proportion of families reported that they had received the program material, and that the material was useful in promoting EBRB's in the family.
Current implementation of recommended healthy eating and physical activity policies and practices in the family day care setting

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Nutrition and physical activity research in preschoolers (Chair: Amy Yaroch), Club B, June 5, 2019, 12:05 PM - 1:30 PM

Early care and education (SIG)

Purpose: Supporting early childhood education and care services to implement policies and practices to encourage child healthy eating and physical activity has the capacity to make an important contribution in reducing the health burden of childhood obesity. While extensive research examining the implementation of such practices has been conducted in centre-based services (e.g. preschools, long day care services), a limited number of studies have assessed implementation within the family day care setting (also referred to as family childcare homes, home-based childcare). This presentation will describe the findings and implications of a study conducted to examine the current implementation of recommended healthy eating and physical activity policies and practices in a sample of Australian family day care services.

Methods: All family day care service providers (managing organisational structures) (n=16) and a sub-sample of family day care educators (n=174) located across the Hunter New England region of NSW, Australia participated in a telephone survey in 2018. The survey with service providers assessed service characteristics together with current implementation of 13 recommended policies and practices associated with improved child dietary intake and physical activity in care. The survey with educators assessed current implementation of seven of these practices.

Results/Findings: The most prevalent practices implemented by service providers and educators included ensuring educators have access to suitable physical activity equipment to encourage active play (>98%) and communicating with families when children's lunchboxes were not compliant with dietary guidelines (>80%). However the majority of policies and practices assessed were found to have much lower rates of implementation, including the implementation of physical activity (31%) and small screen (19%) policies, having educators trained in physical activity (19%), appropriate use of small screen recreation for children (19-36%) and the provision of daily fundamental movement skill activities for children (31-76%).

Conclusion: There is considerable scope to improve the implementation of healthy eating and physical activity policies and practices in the family day care setting. Future research examining barriers and enablers to implementation, together with establishing effective approaches to improve the implementation of evidence-based policies and practices is required to ensure health benefits for children attending these services.
PreSchool@HealthyWeight: A preschool-based intervention for Early Childhood Education and Care (ECEC) teachers in promoting healthy eating and physical activity in toddlers

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Nutrition and physical activity research in preschoolers (Chair: Amy Yaroch), Club B, June 5, 2019, 12:05 PM - 1:30 PM

Objective:
Preschools are identified as important environments for interventions to prevent overweight and obesity. Early Childhood Education and Care (ECEC) teachers in preschools are potential key actors in promoting healthy eating and physical activity. The aim of this study was to gain insight in the effect of a preschool-based intervention for ECEC teachers on promoting healthy eating and physical activity in toddlers.

Methods:
In a cluster randomized controlled trial, 37 preschools of child care organization Impuls in Amsterdam Nieuw-West, the Netherlands, were randomly allocated to an intervention or control group. In total, 115 female ECEC teachers (mean age 42 ±smn; 9 years) participated. The intervention for ECEC teachers consisted of modified versions of two existing Dutch programs: 'A Healthy Start' and 'PLAYgrounds'. In 'A Healthy Start', ECEC teachers learn to provide a healthy and active environment for toddlers. The 'PLAYgrounds' program, coaches ECEC teachers to stimulate physical activity in the playgrounds of preschools. The practices and knowledge of ECEC teachers concerning healthy eating and physical activity, and the level of confidence in promoting healthy eating and physical activity in toddlers were assessed at baseline and 9 months of follow-up. To examine the effect of the intervention linear mixed models were used.

Results:
Preliminary analyses of the practices indicated that Activity-related-Teaching/Autonomy-Support increased in the intervention group (mean difference: 0.181), but not in the control group (mean difference: -0.048; p-value group*time: 0.025). Food-related-Pressure-to-Eat decreased in the intervention group (mean difference: -0.580), but not in the control group (mean difference: -0.158; p-value group*time: 0.014). No effect of the intervention was found on knowledge (p-value group*time: 0.24) and the level of confidence (p-value group*time: 0.98) of ECEC teachers.

Conclusions:
The intervention seems to increase Activity-related-Teaching/Autonomy-Support and to decrease Food-related-Pressure-to-Eat. No effects were seen on knowledge and level of confidence of ECEC teachers in promoting healthy eating and physical activity in toddlers. The effect of the intervention on the bodycomposition of toddlers will be examined in further analyses.
O07, O07.4

Association between autonomy supportive feeding practices of family child care home providers and fruit and vegetable intake

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Nutrition and physical activity research in preschoolers (Chair: Amy Yaroch), Club B, June 5, 2019, 12:05 PM - 1:30 PM

Early care and education (SIG)

Purpose: To examine the association between family child care home (FCCH) providers' autonomy-supportive feeding practices and diet quality, specifically fruits and vegetables, of the children they care for.

Methods: Data from the ongoing Healthy Start cluster-randomized trial were used for these analyses. FCCH provider feeding practices were assessed over two days of meals and snacks using a modified version of the Environmental Policy Assessment Observation Tool. Data on provider feeding practices from all meals and snacks over the two days were summarized into weighted average scores. Based on previous literature, we created an autonomy support score based on 10 practices that are supportive of children's capacity to self-regulate their food intake (i.e., encouraging or praising to eat healthy foods, enthusiastically role modeling, sitting with children and talking to them about the foods they are eating, etc.). This score can range from 0 to 3, with a higher score indicating better autonomy support. Foods that children consumed in FCCH were captured via the Dietary Observation in Childcare protocol and 2015 Healthy Eating Index (HEI) fruit and vegetables component scores were calculated. Linear regression models were run adjusting for significant covariates including: Child and Adult Care Food Program (CACFP) participation and birthplace of provider.

Results: All FCCH providers (n=119) were female, 67% Hispanic, the majority (71%) were born outside of the US and 82% participate in CACFP. The mean autonomy supportive score was 0.86±smn;0.39, Cronbach's alpha=0.82. Autonomy support scores were positively associated with total vegetable and whole fruit component HEI scores ($\beta_a=0.8$, SE: 0.32 $p=0.01;\beta_a=0.7$ SE: 0.28, $p=0.02$, respectively). There were no significant associations between autonomy support and total fruit HEI component score (which includes whole fruit in addition to 100% juice).

Conclusion: FCCH provider feeding practices consistent with autonomy support were positively associated with whole fruit and total vegetable consumption of the children they cared for. Future programs and interventions should continue to focus on the education of FCCH providers to promote positive feeding practices and ultimately to help improve the diet quality of the children they care for.
Family child care provider predictors of child diet quality among 2-to-5-year-olds

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Purpose: To identify Family Child Care Provider (FCCP) characteristics associated with higher diet quality, measured via the Healthy Eating Index 2015 (HEI-2015), among 2-to-5-year-olds enrolled in Family Child Care Homes (FCCHs).

Methods: Baseline data from the ongoing Healthy Start cluster-randomized trial were used for these analyses. FCCP demographics were collected via in-person and phone survey. Children (n = 375; 2-5 years old) enrolled in study FCCHs, were observed all day for at least a meal and snack following a standardized protocol across two days. Foods and beverages consumed were entered in the Nutrition Data System for Research for daily nutrient data and food group serving counts to calculate HEI-2015 total scores. Predictor variables selected were: FCCP ethnicity; Language spoken outside work day hours; Income; Education; and Child and Adult Care Food Program participation. Child HEI-2015 total score (FCCH-level) was selected as the primary outcome. Multiple regression and ANOVA were conducted.

Results: All FCCPs were female, and primarily (67%) Hispanic. Over half (55%) spoke primarily Spanish, and most (64%) reported an annual household income of less than $50,000 (USD). Mean child total HEI score (out of 100 possible points) was 62.0±smn;11.0. Both primary language (B 4.3, 95%CI 0.02, 8.7) and annual household income (B -2.7, 95%CI -4.8, -0.7) were significantly associated with total mean HEI scores. Mean HEI score was higher for Spanish as primary language (M=64.8, SD=10.5) than English as primary language (M=58.6, SD=10.6), (p=0.002). Mean HEI score was inversely related with FCCP annual household income, with the highest HEI score among the lowest income category (M=66.0, SD=10.2), and lowest HEI score among highest income (M=52.1, SD=10.4), p=0.005.

Conclusions and Implications: Mean HEI-2015 score suggests suboptimal diet quality among 2-5-year-olds attending FCCH. However, FCCP primary language as Spanish, and reported lower annual household income was positively associated with diet quality among 2-5-year-olds attending FCCHs. Future efforts should examine the relationship between other FCCP contextual factors influenced by ethnicity and income, (e.g., health-related attitudes and beliefs, likelihood of serving home-cooked meals and less junk food) and diet quality in young children.
Effectiveness of an online menu-planning intervention to improve childcare service compliance with dietary guidelines: a randomised controlled trial

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Nutrition and physical activity research in preschoolers (Chair: Amy Yaroch), Club B, June 5, 2019, 12:05 PM - 1:30 PM

Early care and education (SIG)

Purpose: Despite recommendations, few childcare services in Australia, and internationally, provide foods consistent with sector dietary guidelines. Online systems are an innovative method to support services with implementing dietary guidelines. The primary aim of this study was to assess the effectiveness of an online menu-planning intervention in increasing the mean number of food groups on childcare service menus compliant with dietary guidelines. Secondary aims assessed the impact of the intervention on the proportion of service menus compliant with recommendations for i) all food groups; ii) individual food groups; and iii) mean servings of individual food groups.

Methods: A single–blinded parallel group randomised controlled trial was conducted with 54 childcare services that provided food to children in NSW, Australia. Services were randomised to a 12-month intervention or usual care control. Intervention services received access to an online menu-planning program, in addition to face-to-face training and phone support, and online and physical resources. Childcare service compliance with dietary guidelines, and servings of food groups was assessed at baseline, 3 and 12 month follow up. Generalised logistic and linear mixed models, were used to assess intervention effectiveness via a group by time interaction.

Results: No significant differences in the mean number of food groups compliant with dietary guidelines, the proportion of service menus compliant with recommendations for all food groups, or for individual food groups, were found at 3 or 12 months follow-up between the intervention and control group services. Intervention service menus provided significantly more servings of fruit (p<0.001), vegetables (p=0.03), dairy (p=0.03) and meat (p=0.003), and reduced the provision of discretionary foods (p=0.02) compared to control group at 3 months. This difference was maintained for fruit (p=0.03) and discretionary foods (p=0.003) at 12 months.

Conclusions: Whilst improvements in childcare service overall menu and individual food group compliance with dietary guidelines were not statistically significant, findings indicate an online menu planning intervention can improve the servings for some individual healthy food groups, and reduce the provision of discretionary foods, to children in care. Future research exploring the effectiveness of differing strategies in improving the implementation of dietary guidelines in child care services is warranted.
A randomised 3 arm trial of high and low intensity interventions to support implementation of nutrition guidelines in childcare centres: menu compliance at 12 months

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Nutrition and physical activity research in preschoolers (Chair: Amy Yaroch), Club B, June 5, 2019, 12:05 PM - 1:30 PM

Objective:
To assess the long-term effectiveness of 2 implementation interventions of varying intensities on the implementation of menu dietary guidelines in childcare services.

Methods:
This study was conducted in sample of 106 long day care services within the Hunter New England Region of NSW. Sixty-nine services were randomly allocated to a 6-month guideline implementation intervention of either low intensity (n=24) or high intensity (n=25) or a control condition (n=20). The interventions were designed utilizing the Theoretical Domains Framework and depending on the intensity, consisted of numerous intervention strategies. The low intensity intervention included the provision of staff training, the provision of resources, and audit and feedback; in addition the high intensity intervention included securing executive support and ongoing support. To assess the effectiveness of the interventions, comprehensive two-week menu reviews were completed by a dietitian, blinded to group allocation, at baseline and two post-intervention time points (6 months and 12 months post baseline). This study presents the results of the 12-month follow-up.

Results:
At 12-month follow-up compared to the control group, the services receiving the high intensity intervention had significantly higher menu compliance with 4 of the 5 core food groups from the Australian Guide to Healthy Eating (AGHE): Breads & cereals (p<0.05); Fruit (p <0.05); Dairy (p<0.05); Vegetables (p<0.05) and discretionary foods (p<0.05). Whereas, compared to the control group, the low intensity intervention only had a significant increase in compliance with 1 AGHE food group (Dairy (p<0.05)). A direct comparison of the high vs low intensity intervention shows that compliance was only different for one food group (discretionary foods) with the effect favouring the high intensity intervention.

Conclusions:
This trial provides strong evidence to advance guideline implementation research in this setting. The strengths of this trial include its 3-arm randomised design, the use of the theoretical domains framework to guide intervention strategy selection and the long-term follow up outcome measure. This study provides important information for policy makers and practitioners to consider when targeting the implementation of menu dietary guidelines in the childcare setting.
Examination of the ‘Active 30 minutes’ school day using traditional and novel physical activity metrics

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Objective

In the UK it is recommended that children accrue at least 30 minutes of moderate-to-vigorous physical activity (MVPA) during the school day. Lack of consensus over accelerometer measurement protocols and data processing decisions hampers comparability between studies investigating the prevalence of children achieving this 'active 30 minutes' goal. This study aimed to apply recently introduced accelerometer metrics to examine children's school day physical activity.

Methods

Seven UK primary schools participated in the study in 2016 and 2017. Informed consent and assent were obtained for 371, 9-10 year olds (187 girls) who wore ActiGraph GT9X accelerometers on their non-dominant wrists for 7-days. Raw acceleration data for the school day were processed to obtain estimates of time spent in MVPA, school day average acceleration, intensity gradient, the minimum acceleration threshold for the most active accumulated 30 minutes, and time spent in 50 mg intensity bins ranging from 50-1000 mg. Sex differences in the accelerometer metrics were examined, with analyses adjusted for BMIz, maturation, and cardiorespiratory fitness.

Results

The 'active 30 minutes' was achieved by 55.1% of girls and 57.6% of boys. Boys spent 34.9 min/day in MVPA compared to 31.1 min/day for girls (p<.001). School day average acceleration, intensity gradient, and minimum acceleration threshold for the most active accumulated 30 minutes were significantly higher among boys and children who achieved the active 30 minutes (p<.01 - .001). Compared to girls, boys spent longer in each 50 mg intensity bin above 150 mg (p<.001). The most active 15 and 30 minute bouts occurred between 11.25am and 1.30pm, irrespective of sex.

Conclusions

Hypothesised sex differences in children's habitual physical activity were observed in the context of the school day, irrespective of accelerometer metric used. Boys were more active at all acceleration intensities above 150 mg, which is equivalent to slow-to-moderate walking pace. Using the full range of raw acceleration data can provide insights into children's school day physical activity beyond accumulation of MVPA, which accounted for only 8.5% of the school day. Interventions to increase the volume and intensity of school day activity are warranted, particularly targeting less active periods of the day.
Classification of physical activity intensities for exergaming using a hip-worn accelerometer in 8-to-12-year-old children

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Accelerometry-based assessment of physical activity in adults and children (Chair: Kerem Shuval), Club C, June 5, 2019, 12:05 PM - 1:30 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: We aimed to determine the cut-points for a hip-mounted accelerometer among children aged 8-12 years in an exergaming setting.

Methods: Forty-six children (M=9.8±smn;1.5; 63% boys) performed a 5-min seated rest and three 10 min-interval Xbox One exergames (Fruit Ninja, Kung-Fu for Kinect, Shape Up) while wearing an ActiGraph GT9X accelerometer on their non-dominant hip and a mask through a Cosmed K4b2 metabolic analyzer. The three exergames required different bodily movements (upper, whole, lower) and physical activity intensities (light, moderate, vigorous). Vector magnitude (VM) counts per 10 seconds were used for the purpose of data processing. Receiver operator characteristic (ROC) curves and regression (REG) analyses were used to develop an equation for predicting energy expenditure [metabolic equivalent, MET (ml/kg/min): activity VO2 divided by measured resting VO2] and cut-points for computing time spent in sedentary behavior (SB, <1.5 METs), light physical activity (LPA, 1.5 to 2.9 METs), and moderate-to-vigorous physical activity (MVPA, >3 METs; 96% within moderate physical activity). Repeated measures ANOVAs were used to compare time spent (min) in SB, LPA, and MVPA between measured METs vs. predicted METs (obtained from ROC or REG analyses).

Results: VM (counts/10-sec) were positively correlated with METs (r =0.76, P <0.001). ROC analyses resulted in area under the curve values, which were 0.99 (P <0.001), 0.43 (P =0.103), and 0.88 (P <0.001) for SB, LPA, and MVPA. REG analyses resulted in prediction equations with R2value (0.58, P < 0.001). For SB, LPA, and MVPA, ROC cut-points were <76, 77-to-361, and >362, respectively, and REG cut-points were <10, 11-to-384, and >385, respectively. Compared to measured METs (5.9±smn;2.6) for MVPA, ROC-predicted METs had similar time spent (5.3±smn;1.5,P=0.16) whereas REG-predicted METs had less time spent (5.1±smn;1.3,P <0.05). Additionally, both indicated that METs significantly overestimated SB (Ps <0.001); and ROC-predicted METs underestimated LPA (P <0.001).

Conclusions: Our cut-points established and validated for the ActiGraph GT9X hip-worn accelerometer can be used in an exergame setting (requiring bilateral movements in different directions) to objectively categorize the time spent especially for MVPA, which is a recommended physical activity intensity level for physical activity promotion among children.
Estimating accelerometer wear time in physical activity research: can machine learning improve traditional count-based methods?

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Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: Accelerometers are the preferred device-based measure of physical activity. Adequate device wear time over multiple days is important for deriving accurate estimates of habitual activity patterns. When analysing these data, the selection of arbitrary 'non-wear criteria' (e.g., using 30 or 60 minutes of consecutive 0 counts to define non-wear) can significantly alter physical activity estimates. This study aimed to compare the accuracy of these traditional count-based methods with more advanced machine learning techniques for classifying accelerometer data into wear time and non-wear time.

Methods: 90 adults and 90 children wore two Axivity AX3 accelerometers for seven days. These were attached to their thigh and lower back using adhesive medical tape. Time-series data from the skin temperature sensor embedded within these devices were visually inspected to identify true periods of wear and non-wear (ground truth). Accelerometer counts (congruent to Actigraph proprietary counts) were derived from the data using published methods [1]. Wear time was first estimated using the widely used Troiano algorithm (60 minutes of consecutive 0 counts) [2], and secondly, a deep learning neural network was trained to predict minute-by-minute wear time using various features of the sensor data (e.g., axis means). Both methods were compared to the ground truth. The accuracy of the machine learning model was evaluated using leave-one-out cross-validation.

Results: Six million minutes of data were classified. The Troiano method achieved an overall accuracy of 89.95% (95% CI: 89.92–89.97), with a higher sensitivity (94%) than specificity (85.3%). The deep learning approach achieved an overall accuracy of 99.48% (95% CI: 99.47–99.48), with high sensitivity (99.44%) and specificity (99.52%).

Conclusions: Machine learning approaches to predict accelerometer wear time are a promising alternative to widely used count-based methods. Future work to integrate these techniques into accelerometer analysis workflows may help researchers to avoid arbitrary decisions about device wear time, improving the validity of their physical activity estimates.

Validity of a dual-accelerometer system for accurately detecting postures and movement patterns in a free-living environment

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Purpose: A dual accelerometer system recently showed promising results for accurately classifying a broad range of postures and activities in a lab setting [1]. These are essential for developing 24-hour movement profiles. The purpose of this study was to examine the criterion validity of the same dualaccelerometer system in free living conditions. The efficacy of other placement sites (e.g. wrist) were also evaluated for comparison.

Methods: Thirty participants (15 adults, 15 children) wore three Axivity AX3 accelerometers: (1) thigh, (2) dominant wrist, and (3) lower back. An automated clip camera was clipped to the lapel to capture video of the free-living environment (physical activity ground truth). Participants were encouraged to complete several types of physical activity (e.g., walking, running) and sedentary behaviour (e.g., sitting, lying) within a 2-h period. Various time- and frequency-domain features were extracted from raw accelerometer data, which were then used to train a random forest machine learning classifier. Three different placement combinations were compared (thigh-back, thigh-wrist, back-wrist) against labelled video ground truth. Prediction accuracy was evaluated using leave-one-out cross-validation for the child and adult samples separately.

Results: Machine learning models developed using the thigh and back accelerometer achieved the highest overall accuracy (at least 11.0% higher than thigh-wrist or wrist-back). This model was able to differentiate between seven distinct activity classes with an overall balanced accuracy of 95.5% in the adult sample, and eight distinct activity classes with an overall balanced accuracy of 92.0% in the child sample.

Conclusions: This validation study demonstrates that a dual accelerometer system previously validated in a laboratory setting, also performs well in free-living conditions. Although these results are promising and progressive, further work is needed to expand the scope of this measurement system to detect other components of behaviour (e.g., activity intensity, sleep) that are related to health.

References:
Associations of wrist-worn accelerometry with all-cause mortality in 94,863 adults: The UK Biobank Study

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Purpose: Compliance rates are higher for wrist-worn accelerometry compared to other bodily placements due to their convenience, social acceptability, and suitability for 24-hour wear protocols. This increases the potential scale of studies, resulting in better quality and less biased data, and unique opportunities to quantify dose-response relationships of activity intensity with mortality outcomes. We investigated this in a sample of 94,863 adults from the UK-Biobank.

Methods: Previously-recruited participants (aged 43-79) were invited to wear a tri-axial Axivity accelerometer on their dominant wrist for seven consecutive days between 2010-2013. Vector magnitude was calculated after removing sensor noise and the gravity component, and summarised in 5-second epochs. Non-wear time was imputed from similar times on other days. Our exposures were average daily waking time spent above 125mg and below 30mg. These approximate 3 and 1.5 METs when using prediction equations from doubly-labelled water. Self-reported sleep time was subtracted from the low-intensity category. Cox proportional hazard regression 5-knot cubic splines modelled relationships with all-cause mortality. Analyses were adjusted for demographic, lifestyle and medical history. Exposures were mutually adjusted for, using categories based on the spline shape.

Results: After a median 1.2 years of follow-up, there were 285 deaths. Daily time spent above 125mg was beneficially associated with all-cause mortality, with the strongest associations between 0 and 30 minutes [hazard ratios for 0, 15, and 60 compared to 30 minutes: 3.28 (2.37-4.52), 1.68 (1.47-1.91) and 0.79 (0.57-1.08)]. There was a trend towards a higher mortality risk as daily time spent below 30mg increased, but with considerable uncertainty around the estimates [hazard ratios for 7, 11, and 14 compared to 9 hours: 0.81 (0.50-1.31), 1.12 (0.76-1.63) and 1.73 (1.19-2.51)].

Conclusions: This is the largest study to date investigating activity intensity derived from wrist-worn accelerometry. A dose-response relationship between moderate-to-vigorous intensity physical activity and all-cause mortality was observed, as previously shown with self-reported measures; however, a stronger association was evident in the lower ranges. The relationship for time spent in very low-intensity activity behaviours was less clear. We expect some attenuation but an increase in precision as we obtain longer follow-up time.
Compositional data group based trajectory analysis for activity and dietary data

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Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Advancing modeling approaches for describing how behaviors change over time is needed to better understand the life course risk of health behaviors and to evaluate the efficacy of interventions. In the last decade, trajectory analysis has attracted growing interest with the increasing availability of longitudinal data from cohort and experimental studies. Our aim was to develop group-based trajectory methods for compositional data (i.e., wearable monitor data collected over 24 hours and macro-nutrient dietary data) to better understanding dynamic changes in daily physical activity, sleep, time use, and dietary intake.

Methods:
Group based trajectory assumes that a sample is composed of distinct groups, each with a different trajectory. Group based trajectory involves in a first stage to estimate these trajectories and groups. Group membership is then used to build statistical models linking the trajectory with either outcomes or correlates. We used the k-means clustering framework to identify trajectory and group membership. Compositional data at each time point were entered using isometric log-ratio coordinates into the clustering algorithm so that their similarity is adequately assessed. Compositional geometric means were calculated for each group and were used to summarize and compare trajectories. The algorithm was tested against synthetic data representing the trajectory of 24 hour activity measured at 3 time points over 10 years.

Results:
Our proposal was able to isolate trajectories of 24 hours activity (sleep, sedentary behavior, light and moderate physical activity) in a principled way. Trajectories were then used as exposure for synthetic obesity outcomes to show how the output of the clustering analysis can be used to understand how to link trajectories with health outcomes. This can be replicated with dietary data.

Conclusions:
Group based trajectory analysis for compositional data (activity and diet) is possible using a k-means clustering approach. Open source R code for this is available at http://www.OpenCoda.net.
Association between mortality and time-use composition of the 24 hour day

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Accelerometry-based assessment of physical activity in adults and children (Chair: Kerem Shuval), Club C, June 5, 2019, 12:05 PM - 1:30 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Introduction:
Previous studies of the association between mortality and physical activity (PA) have generally not fully taken into account other movement behaviors. A compositional approach accounts for co-dependency between PA behaviors and the relative scale of time-use data.

Methods:
A prospective analysis of NHANES 2005-06 on N=1468 adults (d=135 deaths) between ages 50-79 was undertaken using compositional Cox regression. Daily composition of time spent in sedentary behavior (SB), light intensity (LIPA) and moderate to vigorous physical activity (MVPA) was determined from waist-mounted accelerometers (Actigraph 7164) and supplemented with self-reported sleep data to determine the time-use composition of the day. Its association with mortality was assessed with respect to multiple models incorporating nested sets of confounding variables and covariates. We also considered an alternative split of the day, distinguishing screen time and other forms of SB.

Results/findings:
The composition of time spent in SB, LIPA, MVPA and sleep was associated with mortality rates allowing for age and sex (p < 0.001), and the association remained statistically significant after incorporating lifestyle factors (p < 0.001). The association was driven primarily by the ratio of MVPA to other behaviors, however statistically significant changes in mortality risk are attributable to LIPA relative to SB and Sleep, and SB relative to Sleep. The balance between Sleep and SB ceases to be statistically significant after incorporating lifestyle factors. The effects of replacing screen time with other forms of SB were inconclusive, but exploratory data analysis suggested screen time may be replacing MVPA and LIPA more often, which could account for previously reported deleterious associations.

Conclusions:
The results demonstrate an association between survival rates and the physical activity composition of the day that remains statistically significant after allowing for other lifestyle factors. This is driven primarily by the time spent in MVPA relative to other behaviors, but time spent in LIPA relative to SB and sleep (after allowing for MVPA) is also a significant factor. Our method is readily extensible to other questions in time-use epidemiology. We also offer a potential explanation for the deleterious associations of screen time, relative to other forms of SB.
Effectiveness of diet and physical activity interventions in pregnancy: an umbrella review


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Behavior change and health outcomes (Chair: Sofie Compernolle), Club D, June 5, 2019, 12:05 PM - 1:30 PM

Objective: Pregnancy is argued to be a teachable moment. Women undergo a life transition while in frequent contact with healthcare professionals. An underlying assumption is that behaviours change due to women prioritising fetal health and responding to social norms on acceptability of maternal behaviours. Multiple public health interventions aim to change women's behaviours during pregnancy. This umbrella review sought to establish the existing systematic review evidence-base on effectiveness of interventions at changing maternal diet, physical activity (PA), smoking and alcohol behaviours(1,2). This abstract reports results for diet and PA behaviours.

Methods: Searches included 21 peer-reviewed and grey literature databases. Inclusion criteria were quantitative systematic reviews with or without meta-analysis, published in English language since 2008, reporting on the effectiveness of dietary and/or PA interventions in pregnancy. All results were screened by two reviewers independently. Standardised templates were used for screening, data extraction and quality assessments. Analysis will provide an overview of the evidence-base relating to the effectiveness of interventions at changing behaviours, or impacting on health-related outcomes. Further analysis will explore factors which may be important determinants of effectiveness of the interventions (e.g. mode of delivery).

Results: Searches are currently being updated and analysis is ongoing. There were more than 27,000 records identified in the original searches, of which 49 were systematic reviews meeting the inclusion criteria. The included reviews reported a combination of outcomes including both the effectiveness at changing the behaviours explicitly (e.g. improving nutritional quality of diets or increasing PA levels) or health-related outcomes (e.g. gestational weight gain, gestational diabetes, large for gestational age). The majority of reviews report data on the health-related outcomes rather than behaviours. Preliminary analysis suggests that interventions appear to be effective at changing maternal behaviours and minimising gestational weight gain, but have limited effect on other health-related pregnancy outcomes.

Conclusions: There is a wealth of evidence published to date on the effectiveness of behaviour change interventions in pregnancy; however, this disproportionately represents the impact on health-related outcomes rather than behavioural outcomes.

1Dinsdale et al. JBI Database of Systematic Reviews and Implementation Reports. 2016.14(10):p29–47
2PROSPERO Identifier CRD42016046302
Get moving and beat stress: The effect of a sensory garden on stress levels in University staff and students

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Behavior change and health outcomes (Chair: Sofie Compernolle), Club D, June 5, 2019, 12:05 PM - 1:30 PM

Motivation and behavior change (SIG)

Purpose: Stress is a known predictor of future health and subjective well-being (SWB), and inversely associated with physical activity (PA). Generally, we exercise to reduce stress, but can reducing stress affect PA? Sensory gardens are known to reduce stress and prompt health-affirming behaviours. The purpose of this study was twofold, to test the effect of a sensory garden on healthy people and compare the effects of exposure with a traditional park space on stress, SWB, and PA indicators.

Methods: In a randomised control trial, 240 University staff and students (M±smn;SD, 34 ±smn;15 years) were recruited. Participants were allocated either to the sensory garden (SG), planted plaza (PP) or control groups. Intervention participants were prescribed 30-minute session once per week for four weeks in the garden or plaza. Outcome data were collected at baseline and immediately post-intervention. Saliva stress cortisol, well-being (flourishing scale), PA and productivity were included as outcome measures. Participants kept journals, participated in semi-structured interviews and focus groups and completed a questionnaire. Laboratory and survey data were analysed through generalised linear mixed models. Thematic analysis was used to extract key themes from the qualitative data.

Results/findings: Compared with the control group, the garden group showed a significantly greater decrease in stress cortisol post-intervention, -16.1% (95% CI: -32.0%, 0.2%; p = 0.04). The only other significant differences were between the garden group and the plaza group, with intervention effects of 6.9% (95% CI: 2.7%, 11.1%) for the flourishing scale and 2.8% (95% CI: 0.1%, 5.5%) for perceived work output. Themes of thriving, increased leisure time PA, positive outlook, enhanced well-being, and increased nature relatedness were related to sensory garden participation in the qualitative analyses.

Discussion: Sensory gardens are generally used with at-risk populations for sensory, mobility and cognitive impairment; however, this study established their efficacy in reducing stress, promoting wellbeing and increasing physical activity in apparently healthy people. Educational campuses should invest in the development of a sensory garden for staff and students for the promotion and facilitation of accessible healthy lifestyles.
Social-cognitive and implicit attitudinal mediators of the RCT physical activity intervention for adults at risk of, or diagnosed with, Type 2 Diabetes

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Behavior change and health outcomes (Chair: Sofie Compernolle), Club D, June 5, 2019, 12:05 PM - 1:30 PM

Background: Regular physical activity (PA) is essential for the prevention and treatment of type 2 diabetes (T2D). However, little is known regarding the mechanisms responsible for PA change among this population because few studies have conducted mediation analyses. It's increasingly recognised that complex health behaviours including PA are explained not only by explicit motivational processes (e.g., intention), but also by implicit attitudes or processes. Despite promising cross-sectional findings regarding the relationship between implicit association and behaviour change, there is limited evidence from experimental studies. It is not known if implicit attitudes for PA can be changed and if such changes can lead to increases in PA. The study aim was to examine i) social-cognitive and ii) implicit attitudinal mediators of PA change in a multi-component randomized controlled trial (RCT) among adults diagnosed with, or at risk of, T2D.

Methods: The RCT included two phases: Phase 1 (Weeks 1-10) integrated group sessions (outdoor physical activity and cognitive mentoring) and the use of the eCoFit smartphone application (app), and Phase 2 (Weeks 11-20), which included the use of the app only. Participants (n=84) were assessed at baseline, 10- and 20-weeks from baseline. Physical activity was assessed using pedometers, and the following mediators (validated constructs) were tested: action self-efficacy, barrier self-efficacy, recovery self-efficacy, implementation intentions, intention to have regular physical activity, outcome expectations, risk perception, and implicit associations related to physical activity and sedentary behaviour. The PROCESS Indirect Macro was used to perform mediation analyses.

Results: Significant mediation pathways were found for implementation intention measured at 10-weeks, AB [95% CI= 486.04 [128.19, 1073.42] which explained significant increases in the number of daily steps of 486. No significant pathways were found for the other social-cognitive or implicit attitudinal mediators.

Conclusions: The eCoFit study highlighted the importance of developing 'if-then' plans and successfully operationalised implementation intentions which was incorporated in the smartphone app (designed to promote outdoor physical activity). Implicit processes did not mediate PA change, however, this RCT appears to be the first to test the effects of implicit attitudes on physical activity in adults with or at risk of T2D.

Trial registry: ACTRN12615000990527
Sedentary behaviour and diabetes information as a source of motivation to reduce occupational sitting time in office workers: an experimental study using the health action process approach

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Behavior change and health outcomes (Chair: Sofie Compernolle), Club D, June 5, 2019, 12:05 PM - 1:30 PM

Objective: Sedentary behavior (SB) is associated with all-cause mortality, as well as numerous chronic diseases such as diabetes and cardiovascular disease, even after controlling for BMI and moderate-to-vigorous physical activity (PA). Hence, it is important to promote strategies to mitigate this risk. Using the motivational phase of the Health Action Process Approach (HAPA) framework, this study examined whether SB and diabetes information is a meaningful source of motivation to increase frequency and duration of breaks from sitting among office workers.

Methods: Participants (n = 218) were randomized into one of three conditions: HAPA-intervention (SB), HAPA-attention control (PA), or control (no treatment). Using an online slide show the material for the HAPA-intervention group targeted pre-intentional motivational constructs related to sitting by presenting research on SB and diabetes risk markers, the effectiveness of breaking up prolonged sitting, and providing strategies to break up sitting. The attention-control group material followed the same approach but focused exclusively on PA. Following treatment, purpose-built sedentary-related HAPA motivational constructs (i.e., risk perception [RP], outcome expectancies [OE], self-efficacy [SE]) and goal intentions [GI] were assessed.

Results: All HAPA constructs underwent factor and reliability analysis before being computed. Compared to the other groups, the HAPA-intervention group reported significantly higher RP, OE, and SE to increase frequency of breaks from sitting at work (p values = .05; ?p2 values = .04). No significant differences between groups were found for GIs related to increasing break frequency and duration. To explore this issue further we re-examined GI among participants who had given little thought to how much they sit (n = 70). GIs to increase frequency (p = .05; ?p2 = .08) and duration (p = .04; ?p2 = .09) of breaks from sitting at work were significantly higher for the intervention group compared to the other groups. OE (βa; = .20) and SE (βa; = .425) predicted break duration GI whereas only SE (βa; = .357) predicted break frequency GI, explaining between 18-25% of the response variance.

Conclusions: This study provides preliminary evidence that a brief, HAPA-based online intervention providing information regarding SB and diabetes risk may be an effective source of motivation.
Increasing employees’ health by workplace physical activity counseling: The mediating role of step-based physical activity behavior change

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Objective: This study aimed to evaluate the effects of a 3-month workplace physical activity (PA) intervention on employees' health-related fitness and well-being. Moreover, mediational pathways were examined.

Methods: A longitudinal, quasi-experimental trial was evaluated in Belgian employees. The intervention group (IG: n=246) received 3-months individualized, tailored PA counseling, consisting of face-to-face counseling and follow-up e-mail and telephone contacts. The reference group (RG; n=54) received no PA counseling. Outcome measures (assessed at baseline, three months (short-term) and nine months (long-term)) included body composition (BC), cardiorespiratory fitness (CRF), well-being and step-based PA.

Results: With no changes in the RG, the IG showed short-term improvements in BMI (-0.24 kg/m2, p<0.001), body fat (-0.88%, p<0.001), waist circumference (-1.47 cm, p<0.001) and muscle percentage (+0.47%, p<0.001). Moreover, with respect to CRF, IG participants improved on perceived exertion, both in the short- (-0.91, p<0.001) and long-term (-0.83, p<0.001). Furthermore, perceived physical well-being increased in the IG, both in the short- (+0.57, p<0.001) and long-term (+0.57, p<0.001). The observed intervention effects on BC, perceived exertion and well-being were mediated by (increases in) step-based PA.

Conclusions: Workplace PA counseling programs have the potential to enhance employees' health-related fitness and well-being. Importantly, step-based PA behavior change was found to contribute to the post-intervention improvements.
Latent patterns of unhealthy lifestyle behaviors in relation to depressive symptoms: A cross-sectional study among German medical care patients

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Behavior change and health outcomes (Chair: Sofie Compernolle), Club D, June 5, 2019, 12:05 PM - 1:30 PM

Motivation and behavior change (SIG)

Objective
The majority of disease burden is attributable to unhealthy lifestyles including the presence of physical inactivity, overweight, poor diet, smoking and alcohol consumption. Epidemiological studies revealed that presence of multiple unhealthy lifestyle behaviors is common. Depressive symptoms are highly prevalent as well and might be seen as a key factor impeding motivation and adoption of a healthy lifestyle. We aimed to model underlying patterns of unhealthy lifestyle behaviors and explore their association with depression.

Methods
Two independent samples consisting of consecutive medical care patients (18-64 years) from three sites in Germany were screened for physical inactivity, overweight/obesity, low fruit/vegetable consumption, tobacco smoking and alcohol consumption (n1=2886, n2=13763, participation rates 89% and 87%). The presence of subclinical or clinical depression was assessed via the Patient Health Questionnaire-8. Latent class analysis (LCA) was performed to identify patterns of unhealthy behaviors in sample 1. Analysis was repeated in sample 2 to confirm the found class solution. Models were chosen according to Bayesian-Information-Criterion and Vuong-Lo-Mendell-Rubin-Likelihood-ratio-test. The final model from sample 2 was extended by a multinomial logistic regression to analyze the association of latent classes with depression using 3-step LCA modeling with depression and socio-demographics as distal auxiliary variables.

Results
Data from sample 1 indicated a 3-class solution, which was confirmed in sample 2. The found class solution separates individuals with a healthy lifestyle (38%), unhealthy inactive/substance use lifestyle (25%), and an unhealthy inactive/overweight lifestyle (37%). Both unhealthy lifestyle classes included low fruit and vegetable consumption. The unhealthy lifestyle classes were more likely to report subclinical and clinical depression compared to the healthy lifestyle class (inactive/substance use class: RRRadj=1.83, p<.001 and RRRadj=1.85, p<.001; inactive/overweight class: RRRadj=1.31, p=.008 and RRRadj=1.45, p=.001). Individuals allocated to the inactive/substance use lifestyle class were more likely to report subclinical (RRRadj=1.40, p=.003) and clinical depression (RRRadj=1.28, p=0.049) than those allocated to the inactive/overweight lifestyle class.
Conclusions Depression might be considered for public health interventions addressing multiple unhealthy lifestyle behaviors. In particular, interventions targeting individuals characterized by physical inactivity and substance use might benefit from including intervention content addressing depressiveness. Future prospective and experimental studies are necessary to further investigate causal relations of depression with health risk behaviors.
Association of total sedentary time with skeletal muscle mass in community-dwelling Japanese older adults

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Behavior change and health outcomes (Chair: Sofie Compernolle), Club D, June 5, 2019, 12:05 PM - 1:30 PM

Motivation and behavior change (SIG)

Objectives: Time spent sitting (and sedentary) has been shown to be associated with adverse health outcomes in older adults, after taking into account moderate- to vigorous-intensity physical activity (MVPA). Nevertheless, it is not clear how sedentary time may be related to appendicular skeletal muscle mass (ASM), a key attribute of sarcopenia, in older adults. This cross-sectional study examined associations of total sedentary time with ASM among community-dwelling Japanese older adults.

Methods: Participants (n=281, 38.5% women, 74.3±5.2 years) wore an accelerometer for x days. BMI-adjusted ASM was calculated using the body composition measures (obtained from the bioimpedance analysis), height and weight. Analyses adjusted for age, marital status, educational status, living status, working status, presence of chronic diseases, current smoking, MVPA and accelerometer wear time. Multivariate linear and quadratic regression models examined the associations of BMI-adjusted ASM with accelerometer-measured total sedentary time, stratified by gender. Restricted cubic spline models were further fitted to estimate non-linear associations of total sedentary time with BMI-adjusted ASM.

Results: Mean BMI-adjusted ASM was 0.88 ±0.09kg/BMI for men and 0.62±0.08 kg/BMI for women. Total sedentary time was 9.2 ±1.9 hr/day for men and 8.1±1.6 hr/day for women. After adjustment, total sedentary time had a significant linear and negative association with BMI-adjusted ASM among women (β=-0.013; p=0.023). For men, total sedentary time had a significant quadratic association with BMI-adjusted ASM (p=0.020 for quadratic). Spline models indicated a reverse U-shaped nonlinear association (p<0.001), with total sedentary time over 9.3 hr/day associated with lower BMI-adjusted ASM (β=-0.023).

Conclusions: The study found that longer sedentary time was generally associated with lower ASM in this sample of Japanese older adults, accounting for MVPA and other potential confounding factors. However, a gender difference was found in this relationship: there was a linear association among women; and, a non-linear association among men, in which there was a steeper decline after more than nine hours of total sedentary time. Further studies employing prospected designs are needed to better understand the potential effects of sedentary behaviour on the development of sarcopenia among the elderly.
Physical activity during and after pregnancy: findings from 2015 Pelotas (Brazil) Birth Cohort Study

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Purpose
The aim of this study was to describe changes in leisure time physical activity (PA) and high sitting time (ST) from 16-24 weeks of pregnancy to 12 and 24 months postpartum, and to examine whether these changes vary according to socioeconomic position in Brazilian mothers.

Methods
Data from the 2015 Pelotas (Brazil) Birth Cohort were analysed (n=3,199). Women were interviewed between 16 and 24 weeks of pregnancy, and when their children were aged 12 and 24 months. Leisure time PA was measured with a structured questionnaire, which asked about type, frequency and duration of activities in a typical week. The total energy expended in MET-minutes per week was calculated and those reporting more than 500 MET-min/week were classified as active. Habitual daily ST (h/day) was calculated by summing time spent sitting for TV, computer, work and travel.

Results
Of the 3,199 women enrolled during the antenatal period, 2,722 (86%) and 2,569 (81%) had valid information for PA and ST at 12 and 24 months respectively. Only 6.9% (95% CI: 5.9-7.8) of mothers reported >500MET.mins PA/week during pregnancy, and this declined to 3.5% (95% CI: 2.8-4.2) at 12 months postpartum. By 24 months, the prevalence was 8.8% (95% CI: 7.7-9.9). Leisure time physical activity was consistently higher among more educated mothers. Participants spent on average 6.4 (SD: 3.9), 4.2 (SD: 3.2) and 4.3 (SD: 3.3) hours per day sitting at the antenatal period, 12 months and 24 months after gestation, respectively. There was a marked difference in the prevalence of high sitting time by education, with more educated mothers reporting more sitting time. This difference was consistent at the three time points.

Conclusion
Compared with antenatal estimates, both leisure time physical activity and sitting time decreased at 12 months postpartum. One year later, PA levels had returned to pregnancy levels but ST remained lower than during pregnancy. Women with higher education levels reported more PA and ST during and following pregnancy.
The impact of sport on family meals and dietary practices among Latino high school soccer players: A mixed methods study.

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Socio-economic and ethnic differences in physical activity (Chair: Anna Timperio), Club E, June 5, 2019, 12:05 PM - 1:30 PM

Socio-economic inequalities (SIG)

Purpose: Youth participation in organized sports has been associated with positive health benefits, yet recent research indicates that youth sport may negatively influence family meals and dietary practices. Research examining parental support for healthy eating among Latino youth is limited. The aim of this study was to examine parental social support for healthy eating behaviors among adolescent Latino high school soccer players, including family meal time.

Methods: Mixed methods using a convergent parallel design examined perceived parental support of healthy eating and frequency of family meals among Latino youth soccer players (n= 220; 47% female, mean age =15.2 years). Thematic analysis of semi-structured in-depth interviews with a random sample of mothers (n=30; mean age = 41.5 years) was conducted to explore the contextual environment of family meal time, mothers' perceived benefits of family meals, the barriers and facilitators impacting family meals, and the strategies employed to preserve family meal time.

Results/ Findings: Results showed that Latino soccer players in our study reported eating with family on average 4.6 times per week, with no differences observed by sex (p = 0.087). Most of the soccer players (74%) perceived that 'parents make fruits, vegetables and whole grains available in the home'. Among mothers, four major themes were identified: (1) family unity, (2) schedule conflicts, (3) the importance of healthy, fresh foods, and (4) family meal time as a priority. Increased family communication was identified by all mothers as a benefit of family meal time. Mothers described youth's sport schedule and parents' work schedule impacted the timing and frequency of family meals. Also, mothers highly valued eating meals together in the home in order to assure highly nutritious meals. Due to family meal as a priority, mothers describe planning and prepping meals ahead of time in order to accommodate sport schedules.

Conclusion: Mothers view family meal time as an opportunity to reinforce values for healthy, fresh foods prepared at home- primarily traditional Latin American dishes. Recognizing the importance of family meals for Latino high school soccer players is important to preserve cultural food practices and family unity.
Prevalence of children and youth meeting physical activity guidelines: a 49-country comparison

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Socio-economic and ethnic differences in physical activity and nutrition (SIG)

Purpose: Evidence on the prevalence of children and youth meeting the WHO physical activity (PA) recommendation of 60 minutes of moderate-to-vigorous PA daily is lacking, particularly in low and medium human development index (HDI) countries. The aim of this study was to estimate the prevalence of children and youth meeting the PA guidelines from 49 countries of varying HDI.

Methods: This study used the subjective and objective PA data synthesized by the Active Healthy Kids Global Alliance for the Global Matrix 3.0 of Report Cards on PA for children and youth aged 5 to 17 years to provide global estimates of the proportion of children and youth meeting the WHO PA guidelines. Data that were used to inform PA Report Card grades in 49 participating countries from all inhabited continents was compiled and analyzed to determine the proportion of children and youth meeting the guidelines globally and by HDI classifications (low/medium, high, and very high). Measurement method (subjective/objective) was also examined. Results: Data on 1,367,783 children and youth were available from 45 countries. Two participating countries (Botswana and Japan) had insufficient evidence to provide a grade for the overall PA indicator and two countries (Ethiopia and Ghana) provided no sample size. Two countries used only objective data collection methods, 31 used only subjective data collection methods and 14 used a combination to determine their grades. No relationship between measurement method and grade/prevalence meeting guidelines was observed. The global average (47 countries) grade was a "D" (27-33% meeting guideline). Low/medium HDI countries (n=8) had an average grade of "C-" (40-46% meeting guideline); high HDI countries (n=10) and very high HDI countries (n=29) had an average grade of "D-" (20-26% meeting guideline). A significant negative correlation was observed between HDI and PA grade (-0.31). Slovenia reported the highest grade ("A-", 80-86% meeting guidelines) and six countries (Belgium (Flanders), China, Scotland, South Korea, Taiwan, United Arab Emirates) reported "F" grades (<20% meeting guidelines). Conclusions: The prevalence of children and youth meeting WHO PA guidelines is low, providing evidence of a global physical inactivity crisis. Grades were generally higher in low/medium HDI countries.
Evaluating the acceptability and potential impact of culturally tailored dance to prevent T2D in South Asians living in Europe – a mixed method pilot study

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Objective:
The few available Type 2 Diabetes (T2D) prevention interventions for European South Asians (SA) show that the Physical Activity (PA) element is still underused and underdeveloped. The purpose of this study was to identify whether culturally tailored dance is acceptable to engage SA-women with a medium/high T2D risk in PA and whether culturally tailored dance may have an impact on PA and PA related determinants.

Methods:
A community based culturally tailored dance intervention, choreographed to Bollywood music (Bollywood dance), was piloted among twenty-six SA-women for 10 weeks using a quasi-experimental mixed-method 'Pre-Post Test Without Control Group' design, combining questionnaires, accelerometer data, focus groups and individual interviews.

Results:
Key reasons for participation were the non-competitive nature and the direct fit in the lifestyle and culture of SA-women. The pilot showed high attendance (73%), retention (88%) and satisfaction (96%). On average across all 19 sessions participants spent 30.8 minutes in light activity, 14.1 minutes in moderate activity and 0.3 minutes in vigorous activity, and took 2100 steps. At 11 weeks follow-up, MVPA per day increased by 7.8 minutes (95% CI: 3.1 to 12.5) and with 784 steps (95% CI: 173 to 1394). In light activity a decrease was shown of 12 minutes a day (95% CI: -21.9 to -2.2). There was still an increase of 3.7 minutes of MVPA after separating the effect of participation in the dance sessions (95%CI: -0.6 to 7.9). Significant improvements were observed in PA determinants, i.e. confidence to take part and acceptance by important others to participate in PA. No negative side effects or compensation behavior on PA and diet were observed. In particular, the combination of historically and emotionally embedded Indian music and dance had been helpful for supporting the women's PA behavior and expressing themselves.

Conclusions:
Bollywood dance seems an acceptable PA form to engage SA-women living in the Netherlands in a PA program and has the potential to enhance PA with the aim to prevent T2D. Future large scale intervention trials have to corroborate the present findings on PA promotion and T2D prevention in various European settings with high rates of SA populations.
Socioeconomic and ethnic differences in children’s health behaviors: a cluster analysis in the Generation R Study

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Socio-economic and ethnic differences in physical activity (Chair: Anna Timperio), Club E, June 5, 2019, 12:05 PM - 1:30 PM

Objectives:
Health behaviors at early school age are important for current and future child health. This study examined whether and how obesity-related health behaviors clustered in a multi-ethnic child population in the Netherlands. We investigated how the identified clusters of health behaviors are associated with socioeconomic status and ethnic background.

Methods:
We analyzed data from 4,089 ethnically diverse 6-year-old children (Mean age: 6.0, SD: 0.5) from the Generation R Study, a population-based cohort study in the Netherlands. Indicators of socioeconomic status included maternal educational level and net household income. Child ethnic background was based on the country of birth of the parents (Dutch/non-Dutch). Children's physical activity, sedentary behavior, eating calorie-rich snacks and having sweet drinks were measured by parent-reported questionnaire. Z scores were calculated for those health behavior indicators. K-means cluster analysis was applied to identify clusters with similar health behaviors. The association between the identified clusters and sociodemographic factors was assessed using logistic regression models.

Results:
Five behavioral clusters were identified: 'high calorie-rich snacks' (20.5%), 'high sweeten drinks' (20.3%), 'healthy lifestyle' (14.4%) characterized by average physical activity and screen time, and low snacks/drinks, 'active lifestyle' (37.9%) characterized by high physical activity, 'unhealthy lifestyle' (6.9%) characterized by high screen time and moderate high snacks/drinks. Children from low and mid-low educated mothers were less likely to be allocated in the 'healthy lifestyle' cluster and more likely to be allocated in all other clusters (all P<0.001). Children from low and middle income family were more likely to be allocated in 'unhealthy lifestyle' cluster (both P<0.05). Compared with Dutch children, non-Dutch children were more likely to be allocated in the 'unhealthy lifestyle' cluster (OR=2.31 [1.70, 3.15]), less likely in the 'active lifestyle' cluster (OR: 0.62 [0.49, 0.79]), and less likely in the 'high calorie-rich snacks' cluster (OR: 0.78 [0.64, 0.95]).

Conclusions:
Our study showed that health behaviors in early school age are clustered. Low socioeconomic status and non-Dutch ethnic background are associated with both healthy and unhealthy lifestyles. The results suggest that tailored health education interventions should focus on disadvantaged children and address the lifestyle pattern to prevent obesity in children more effectively.
Predictors in home environment of preschool children's sedentary time (SED) moderated by parental education

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Objective: Childhood obesity is a major public health concern, especially in low socioeconomic status (SES) groups. Energy balanced-related behaviors (EBRBs), including sedentary behavior, are important predictors of obesity. To be able to improve children's EBRBs and to narrows SES differences (in what), it is important to find modifiable predictors of EBRBs especially among children with low parental SES. The aim of this study is to examine whether modifiable factors in home environment are associated with objectively measured sedentary time (SED) of 3-6-year-old children and whether the associations vary depending on parental education.

Methods: This research is part of the cross-sectional DAGIS study (www.dagis.fi). The parents (n=809) reported (fall 2015 - spring 2016) their educational level and several home physical and social environment factors related to the child's physical activity (PA) and screen time (ST). The children wore an ActiGraph accelerometer during seven days (valid data for n=784). Association between predictors and children's SED was tested with regression analyses. Moderating effect of parental education for the associations was tested by interaction analyses.

Results: Children's ST, parental opinion about suitable amounts of ST per day, and spending more time using screens when their child was present were positively associated with children's SED. Spending time with the child in nature, forest or own yard, being physically active when their child was present, finding it important to limit children's ST and finding PA to be important were negatively associated with children's SED Self-efficacy to get the child physically active and parental opinion about suitable amount of PA for children and being pleased with own child's ST was negatively associated with children's SED mainly among the low parental education group.

Conclusions: Several modifiable factors in home environment are associated with objectively measured SED in 3-6 year old children. Interventions to balance EBRBs should focus on changing these predictors. Intervention aiming to narrow SES differences should, in addition, focus on predictors associated with SED mainly among children with low parental SES.
Differences in diet quality and socioeconomic patterning of diet quality across ethnic groups: cross-sectional data from the HELIUS study

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Objective
Socioeconomic inequalities in diet quality are consistently reported, but few studies have investigated whether and how such inequalities vary across ethnic groups. This study aimed to examine ethnic differences in diet quality and to explore socioeconomic patterning of diet quality across ethnic groups using a large, innovative, multi-ethnic dataset with high quality dietary data and multiple measures of socioeconomic position.

Methods
Cross-sectional data from the Healthy Life in an Urban Setting (HELIUS) cohort were used. Adults (aged 18-70 years), who were of Dutch, South-Asian Surinamese, African Surinamese, Turkish, or Moroccan ethnicity were randomly sampled from the Amsterdam municipality register stratified by ethnicity (n=4602). Dietary intake was estimated from 200-item, ethnic-specific food frequency questionnaires, and diet quality assessed using the Dutch Healthy Diet Index 2015 (DHD15-Index). Higher DHD15-Index indicated higher diet quality, with scores ranging 0-130. Wald tests were used to compare DHD15-Index in non-Dutch participants to Dutch participants, stratified by sex. Adjusted linear regression models were used to examine socioeconomic differences in DHD15-Index, stratified by ethnicity and sex, using three self-reported indicators of socioeconomic position: educational level, occupational status and presence of financial difficulties.

Results
Dutch participants had lower DHD15-Index, median 83.3 (LQ 71.5, UQ 94.8), than most other ethnic groups (medians 87.0-89.4) except for African Surinamese participants, median 82.5 (LQ 71.7, UQ 92.6). Only among South-Asian Surinamese men, Dutch men and Moroccan women did the lowest educational level have lower DHD15-Index compared to those with the highest educational level, -5.4 (95% CI -10.4, -0.4), -11.9 (95% CI -19.4, -4.4) and -5.7 (95% CI -10.6, -0.9), respectively. Lower occupational status was associated with lower DHD15-Index in Dutch men, -7.8 (95% CI -11.7, -3.9) and all women (ranging -4.4 to -8.8), except Turkish women. DHD15-Index was not associated with presence of financial difficulties in most groups.

Conclusions
Low socioeconomic position was only associated with poor diet quality in some ethnic groups. Similarities in diet quality across the socioeconomic spectrum in some groups may be due to retention of elements of traditional diets irrespective of socioeconomic position. Future interventions may consider the role of culture and tradition in maintaining dietary habits.
How does local government use the planning system to regulate hot food takeaway outlets? A survey of current practice in England

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Macro level policies (Chair: Steve Allender), Club H, June 5, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Objective: Takeaway food is typically high in energy, salt and saturated fat. Greater neighbourhood access to takeaway food outlets, or 'takeaways', has been associated with increased takeaway food consumption, less healthy diet and higher body weight. English planning guidelines describe the potential of the planning system to promote healthier food environments, through regulation of planning permission for new takeaways. But in England, little is known about how widely this approach is used or the variety of different strategies adopted.

The purpose of this work was to identify, describe and characterise planning policy approaches adopted by English local government to regulate new takeaways.

Methods: We completed an England-wide census of local government areas with planning responsibility. We reviewed adopted planning policy documents and identified policies that specifically addressed takeaway food outlets. We grouped those with a health (diet and obesity) and non-health focus. Through content analysis, we categorised approaches in order to develop an intervention typology.

Results: Across 325 local government areas, planning policies specific to takeaway food outlets were adopted by 51% (n=164). Of these, 34% (n=56) had a health focus.

We developed a typology with two axes: place ('retail areas', 'residential areas', 'places for children and families', 'immediate vicinity of outlets', 'all areas') and strategy ('exclusion zones', 'limit density', 'minimise impact', 'other'). The most frequent health focused approaches were exclusion zones around places for children and families (n=33) and limiting takeaway density in retail areas (n=18)

We created an interactive online tool for policymakers, where users can view the results of our census, descriptive summaries of policy types and access full planning policy documents.

Conclusions: Over half of English local government areas use their planning powers to regulate new takeaways. Planning policies are not always health-focused, but all approaches may impact on public health outcomes. Strategies are varied and target a range of different places. However, there remains scope for further policy innovation. Our tool will help local government areas who are considering a planning-led approach to review policies successfully adopted elsewhere. Further research should engage with local policymakers to explore the perceived acceptability and successes of these approaches.
Impact of a state-wide policy to remove sugar-sweetened drinks in hospitals in New South Wales (NSW), Australia: availability, consumer awareness and support

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Macro level policies (Chair: Steve Allender), Club H, June 5, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Purpose: To examine changes in availability of sugar sweetened drinks (SSDs) in NSW hospitals from before to after implementation (1 January 2018) of the 'Healthy Food and Drink in NSW Health Facilities for Staff and Visitors Framework' and explore consumer awareness and support.

Methods: A convenience sample of 79 retail outlets within 25 NSW hospitals were audited in November 2017 for availability of SSDs (57 vending machines, 13 cafes/9 other) as part of an inter-rater reliability study of the data collection tool. In February 2018 the same outlets were audited for SSDs as part of the 2018 state-wide audit of all retail outlets. The before and after proportions of SSD availability were tested for equivalence using McNemar's ?;2 test. An interviewer-administered intercept survey was conducted at hospital entrances and the main café in 10 randomly selected NSW hospitals in March-May 2018. Staff and visitors were asked about awareness of the removal of SSDs, and support for the initiative. Descriptive and ?;2 analyses assessed differences in awareness and support between staff and visitors and demographic characteristics. Open-ended data were thematically analysed.

Results:
The proportion of sampled outlets with no SSDs for sale increased from baseline to follow-up (49.4% vs 94.9%; p<0.001), with some outlets having already removed SSDs before baseline. Intercept surveys were conducted with 2,394 participants (49% staff; 51% visitors). More staff than visitors were aware of the removal of SSDs (61.9% vs 31.2%; p<0.0001). The majority of staff (79.6%) and visitors (79.5%) surveyed supported the policy initiative. Many cited the health complications associated with high sugar consumption, the burden on the health system and the role of hospitals to lead by example and promote a consistent health message, as reasons for support. Reasons for opposing the action were concerns about restricting choice, perceived effectiveness, and belief in individual responsibility.

Conclusions
This study highlights the significantly reduced proportion of sampled outlets selling SSDs after the policy implementation. The removal of SSDs was supported by most staff and visitors.
The direct healthcare costs of sedentary behaviour in the UK

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Policies and environments (SIG)

Background
Growing evidence indicates that sedentary behaviour increases the risk of several chronic health conditions and all-cause mortality. Sedentary behaviour is prevalent among adults in the United Kingdom (UK). Quantifying the costs associated with sedentary behaviour is an important step in the development of public health policy. Currently, no estimates of the economic cost of sedentary behaviour exist in the UK.

Purpose
The aim of the study was to estimate the annual cost of sedentary behaviour related disease to the NHS in the financial year 2016/17 using a prevalence-based approach. A secondary aim was to estimate the number of avoidable deaths due to sedentary behaviour in the UK.

Methods
We calculated population attributable fractions (PAFs) for five health outcomes (type 2 diabetes, cardiovascular disease [CVD], colon cancer, endometrial cancer, and lung cancer) related to sedentary behaviour using data extracted from previously published meta-analyses. National Health Service (NHS) costs associated with sedentary behaviour (=6 hours/day) were estimated over a one-year period in 2016-17 costs. Adjustments were made for potential double counting due to co-morbidities. We also calculated the avoidable deaths due to sedentary behaviour using the PAF for all-cause mortality.

Results
The PAFs for sedentary behaviour's association with a range of chronic non communicable disease ranged between 4.9% and 16.9%, with variation across the specific conditions as follows: 16.9% of type 2 diabetes; 4.9% of CVD; 7.5% of lung cancer; 9.0% of colon cancer; and 8.0% of endometrial cancer. The total NHS costs attributable to sedentary behaviour in the UK in 2016-17 were £0.8 billion, which included expenditure on CVD (£424 million), type 2 diabetes (£281 million), colon cancer (£30 million), lung cancer (£19 million), and endometrial cancer (£7 million). After adjustment for potential double-counting, the estimated total was £0.7 billion. If sedentary behaviour was eliminated, 48,024 UK deaths might have been avoided in 2016.

Conclusions
This conservative analysis presents the first estimate of direct healthcare costs due to sedentary behaviour in the UK. Sedentary behaviour causes a considerable burden to the NHS each year. These results may be used to inform decision-makers when prioritising healthcare resources and investing in preventative public health programmes.
Reducing children’s sugar intakes: Development of sugar reduction targets for New Zealand packaged foods and beverages

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Macro level policies (Chair: Steve Allender), Club H, June 5, 2019, 12:05 PM - 1:30 PM

Objective: Reducing children's sugar intakes is important for their future health. Packaged foods and beverages contribute substantially to children's sugar intakes, and there is a need for a robust approach to setting sugar reduction targets for these foods. Our aim was to develop targets which would reduce, by ~20%, the total sugar contents of food and beverage products commonly consumed by New Zealand (NZ) children.

Methods: An eight-step process was used to develop phase 1 (to be met in ~2 years) and phase 2 (to be met in ~5-10 years) targets. The process was informed by the UK sugar and salt reduction programmes; similar to these programmes, targets were intended to be applied as maximum values for individual products and average values for each food group.

Results: Major food groups contributing ≥2% or more to children's total sugar intakes were identified using national nutrition survey data. Sales-weighted (by kg sold) mean sugar contents for food groups were calculated using a food composition database of packaged supermarket foods (2018; n=15,193 products) linked with Nielsen Homescan; household food purchasing data (2018; n~1,600 households). Phase 2 targets were set based on 20% reductions in sales-weighted mean sugar contents adjusted for demonstrable feasibility i.e. ~1/3 of existing products already met the target and where possible there was alignment with existing, relevant national and international targets. Phase 1 targets were set as 25% of Phase 2 targets. Nineteen food groups were identified as major contributors to children's total sugar intakes. Changes required in key product categories to meet Phase 2 targets were: -0.6 g/100g for yoghurt and yoghurt drinks, -1.2g/100mL for soft drinks, -2.5g/100mL for energy drinks, -4.1g/100g for breakfast cereal, -4.8g/100g for ice cream, and -26.2g/100g for beverage powders.

Conclusions: Achieving a meaningful reduction in NZ children's sugar intakes will require substantial reformulation efforts across a range of key food categories. The targets should be adopted as part of a wider Government-led food reformulation plan to improve NZ population diets.
16536

O11, O11.5

Interactions between urban design and financial incentive design for adoption of physical activity


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Macro level policies (Chair: Steve Allender), Club H, June 5, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Purpose: Few prospective studies designed to increase moderate-to-vigorous physical activity (MVPA) address the ecological model principle of interactions across levels of influence. The purpose of this study was to test for interactions between neighborhood walkability and an individual-level behavioral intervention to increase MVPA. We hypothesized greatest treatment improvements for MVPA in higher-walkable neighborhoods.

Methods: All Census block groups in the Phoenix, Arizona, USA were stratified a priori into one of four neighborhood types defined by high/low walkability crossed with high/low SES. A balanced sample of insufficiently-active adults was recruited across types. Participants (N=512) were then randomized within strata into one of four individual-level treatments to compare financial reward (immediate vs. delayed) and goal setting (adaptive vs. static) conditions for promoting MVPA in a 2x2 factorial trial. Participants wore an ActiGraph daily to assess MVPA bout-mins. Using GIS, a 500m network buffer around the home assessed individual-level walkability (z-scored sum of residential, intersection, and transit densities; and land use mix). Zero-Inflated Negative Binomial Mixed Model predicted daily MVPA bout-mins from main effects of phase, reward condition, and individual-level walkability, along with all 2-way and 3-way interactions. Models accounted for nesting of repeated observations and participants within block groups, and covariates including SES sampling stratum, sex, smoking status, goal condition, wear time, and BMI. Significant interactions were examined for differential patterns of reward effects on baseline-to-intervention MVPA deltas at low (25th %ile) and high (75th %ile) levels of walkability. This analysis included the first 4 months of data (50,797 daily observations) from the 1-year trial.

Results: Immediate Rewards outperformed Delayed Rewards from baseline to intervention phases (unadjusted mean deltas: 15.9 vs. 10.5 MVPA bout-mins/day). There was a Phase x Reward Condition x Walkability interaction (p < .001), adjusting for covariates. Walkability interacted with Phase and Reward Condition such that Immediate Reward (vs. Delayed) participants in higher-walkable areas showed a stronger MVPA difference between groups (mean delta difference = 4.84 min/day), while Immediate Reward participants from lower-walkable areas showed a weaker difference (mean delta difference = 1.62 min/day).

Conclusions: Results support cross-level interactions. Immediate rewards for MVPA adoption were more salient in higher-walkable neighborhoods.
Assessing policies to increase physical activity in Australia – the ASAPa project

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Macro level policies (Chair: Steve Allender), Club H, June 5, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Objective: There is growing recognition of the value of using a systems approach to tackling entrenched public health problems such as physical inactivity. This study comprised an assessment of policies related to physical activity (PA) across multiple sectors in Australia to identify opportunities to improve alignment, implementation and impact.

Methods: Policies relevant to PA among adults, were identified through desktop searches and input from 33 nominated government representatives from health (n=14), sport (n=12) and planning/transport (n=7) sectors across Federal, State and Territory jurisdictions attending two national workshops. Policies were audited according to a defined set of criteria, spanning policy development, approaches used to address PA (e.g., relationship of PA to the policy's primary objectives, PA policy targets, domains and mechanisms), and processes for implementation and evaluation (e.g., allocation of responsibility, monitoring and coordination mechanisms, and commitment of resources). Audit data were analysed using descriptive statistics.

Results: 110 policies were included in the audit, almost half of which were led by the health or planning/infrastructure sectors (n=54, 49%). A single agency approach to policy development was most common (n=45, 41%), although a whole of government approach was reported in 40% of documents. Most policies facilitated PA through achieving another primary objective (n=63, 57%), and were mainly aimed at the whole of population level (n=75, 68%). Policy actions relevant to PA most commonly addressed urban design and infrastructure (n=67, 61%), and transport and environment domains (n=58, 53%). Over half described some form of coordination body for implementation and/or monitoring (n=61, 55%), however few were independent structures (n=5, 5%). Most indicated some intention to monitor progress (n=94, 85%), however less than half (n=52, 47%) were considered to contain evaluable goals/actions relevant to PA. Descriptions of resourcing/funding arrangements were absent or only expressed in general terms in most policies (n=67, 61%).

Conclusions: This study characterises current PA-relevant policy in Australia, while also identifying policy opportunities across different sectors, and areas of implementation and evaluation that could be improved to strengthen policy impact. Addressing these opportunities could accelerate progress towards a stronger, whole-of-system approach to increasing PA in the population.
Decision-making for ‘active living’ infrastructure – a qualitative study of key stakeholders in three English local government areas

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Policies and environments (SIG)

Objective
Urban design has the potential to influence population levels of physical activity and subsequent health impacts. Built environment decision-making for walking and cycling infrastructure and open spaces ('active living' infrastructure (ALI)) predominantly occurs at a local level by decision-makers outside the health remit. Better understanding of local influences for ALI is needed for healthy designs and physically active communities. This qualitative study investigates how decisions are made for ALI, including how evidence is used by key stakeholders in the public and private sectors.

Method
The research was conducted in three purposively selected local government areas in England. Qualitative data were collected through semi-structured interviews (35 interviews with 40 participants), and ethnographic observations (2 urban planning meetings). Participants were chosen using snowball sampling with key stakeholders such as urban and transport planners, public health practitioners, elected councillors and developers. Data analysis was supported using qualitative data analysis software NVivo 12. Thematic analysis was guided by the research questions about the use of evidence, information and data in decision-making for ALI, and what else influences designs at different stages.

Results
Decision-making for ALI was influenced by multiple stakeholders in different ways. Public health practitioners were most likely to use academic evidence, supported by local health data, which allowed them to act as knowledge brokers. However, it was their relationships with non-health stakeholders, such as urban planners, which had the potential to make them influential and good ALI designs more likely. This meant motivating other stakeholders to start considering health, whilst also supporting their non-health outcomes, such as tackling traffic congestion, which often had more political support. Evidence could be used retrospectively to justify a solution, such as providing green spaces which increased house prices. Contextually relevant examples of ALI were considered lacking, such as designs for cycling infrastructure, and this limited political acceptability for change.

Conclusions
Public health practitioners have potential to support and motivate non-health decision-makers for ALI by acting as knowledge brokers. This requires skills, resources and leadership, as well as locally-relevant examples, to inspire stakeholders who historically have not considered health outcomes.
Fruit and vegetable selection and intake in Title I Schools with and without salad bars: A Plate Waste Study

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School policies for physical activity and nutrition (Chair: Courtney Parks), South Hall 2A, June 5, 2019, 2:30 PM - 3:45 PM

Purpose: Despite widespread support for salad bars as a means to increase fruit and vegetable (FV) intake within the National School Lunch Program (NSLP), there is little empirical support for their use. There is a particular need to investigate strategies to increase FV intake in schools serving children from low-income and racial/ethnic minority backgrounds, who are most likely to rely on school meals and are at greatest risk for obesity and related chronic illnesses. This investigation examined dietary consumption patterns in schools with salad bars (SB), compared with schools serving pre-portioned FVs only (Control).

Methods: In central Virginia, three pairs of Title I elementary schools were matched on % racial/ethnic minority students and the cafeteria environment and randomly selected (half with a SB; half served pre-portioned FVs). Students in grades 1-5 were eligible (92.5% NSLP participation; 98.6% minority; 100% free meals). Objective digital images of students' lunches were taken before and after consumption; reference portions were weighed in triplicate. In the laboratory, raters (interrater reliabilities [IRR] = .81-.90) documented FV selection and consumption (20% increments); starting portions of SB FVs (self-serve) were estimated to the nearest ¼ cup (IRR = .91-.99; validity = .74-98, based on ICCs). Multilevel models assessed group, pair, and group*pair differences, accounting for sex, grade and nesting within schools.

Results: Overall, 92.1% of students participated; N=1560 trays were matched and rated (n=756 SB; n=804 Control). Students in SB schools selected a greater number (p<.001), portion (g; p<.001) and variety (p=.004) of vegetables compared with Controls. While overall vegetable consumption was not significantly different between SB (43.7g) and Control (38.0g; p=.078) schools, there were pair differences: in two pairs, SB schools consumed +17.0g (p=.002) and +8.1g (p=.009) more vegetables than Controls. SB schools selected more (+25.42g; p<.001), but consumed less (-8.9g p=.018) fruit than Controls overall. Note that in practice, SB schools served fruit pre-portioned (thus primarily vegetables were on SBs).

Conclusions: Within Title I schools with universal free meals, SBs were associated with higher FV selection and mixed results related to consumption. Prospective studies are needed to examine school-level factors associated with differential FV intake, and potential adjunctive strategies to enhance SB use.
Evaluation of a statewide dissemination and implementation of healthy eating intervention in afterschool programs: A nonrandomized trial

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School policies for physical activity and nutrition (Chair: Courtney Parks), South Hall 2A, June 5, 2019, 2:30 PM - 3:45 PM

Objectives: Evaluate the dissemination, implementation, and effectiveness of a statewide healthy eating intervention designed to improve the healthfulness of the snacks served (i.e., increase fruits/vegetables (FV) and water, and to eliminate sugar-sweetened beverages) in 97 YMCA-operated afterschool programs (ASPs).

Methods: The evaluation was a three-year single-group, quasi-experimental design evaluating changes in a sub-sample of 19 YMCA-operated ASPs that served snacks in one southeastern US state. Baseline was collected in spring 2015 and the intervention delivered during fall 2015 and fall 2016. The intervention consisted of professional development training that targeted developing menus, storage, purchasing, and role modeling healthy eating. The main outcome was measured via direct observation of foods/beverages served. Multi-level logistic regression using the intent-to-treat and as-treated approach were estimated.

Results: Intent-to-treat models indicated no statistically significant changes in the targeted foods or beverages served from baseline vs. during the intervention years. As-treated models showed ASPs (n=9) that attended trainings offered both intervention years and purchased their own snacks increased the odds of serving FV (odds ratio [OR] 3.97, 95CI 1.69-9.32) compared to ASPs (n=4) that attended both trainings but were provided snacks by a third-party, such as school food service (OR 1.01, 95CI 0.35-2.92), and ASPs (n=6) who only attended the 2016 training (OR 0.62, 95CI 0.29-1.35).

Conclusions: Overall, no improvements were observed from this statewide dissemination trial. However, receiving two years of training was associated with increasing the number of days FV were served for snack, but only for ASPs that had direct control of over the types of foods/beverages served. Challenges associated with changing the snacks served from third-party providers and low attendance at trainings were encountered. These issues highlight the need for broader state or federal oversight if improvements to the healthfulness of snacks are to be made.
School nutrition successes and opportunities for improvement post healthy hunger-free kids act: The Healthy Communities Study

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School policies for physical activity and nutrition (Chair: Courtney Parks), South Hall 2A, June 5, 2019, 2:30 PM - 3:45 PM

Policies and environments (SIG)

Objective: Children spend a substantial portion of their time in school and consume approximately half of their calories in these settings, making these locations critical environments for instilling lifelong habits for healthy eating. In 2010, the Healthy Hunger-Free Kids Act (HHFKA) introduced significant changes to the school nutrition environment to address these concerns. While it has been recommended that schools be the hub of efforts to improve child nutrition, research describing how nutrition environments vary in U.S. public schools is limited. The objective of this study is to describe the foods and beverages available to students with regards to policy implementation and compliance to HHFKA and determine whether any socioeconomic differences in implementation exist.

Methods: This study uses cross-sectional observational data from the Healthy Communities Study (2013-2015) with a sample of 401 U.S. elementary and middle schools. Descriptive statistics and multivariate regression were used to examine HHFKA variables. Differences were examined by school poverty, while adjusting for other school and community-level covariates.

Results: Most schools met reimbursable school meal nutrition standards (74%), had a wellness coordinator (82%). Additionally, most grains offered were 100% whole grains (82%) and the majority of competitive foods were in compliance with competitive food standards (81%) before they were required. Few differences by school poverty level were found.

Conclusions: Most schools reported successfully implementing reimbursable meal school nutrition standards. Findings suggest that elementary and middle schools in this sample were early adopters in complying with HHFKA guidelines, especially whole grain-rich standards. Future school nutrition policies should include other aspects related to HHFKA, such as having guidelines for classroom event foods, serving a variety of fruits and vegetables, and reducing the amount of high fat snacks available in a school setting.
Implementation of school nutrition and physical activity policy within a predominantly Hispanic school setting: findings from case study research

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School policies for physical activity and nutrition (Chair: Courtney Parks), South Hall 2A, June 5, 2019, 2:30 PM - 3:45 PM

Objective: School personnel have been urged by governing bodies to reduce childhood obesity prevalence by implementing health and wellness policies. The literature documenting key stakeholders' experiences with policy implementation in schools is limited, however, particularly in low-income settings and those serving racial/ethnic minorities. The purpose of this study was to understand the perceptions of key school stakeholders regarding wellness policy implementation and fidelity in a low-income and predominantly Hispanic school located in an urban area of the United States.

Methods: A semester-long case study was conducted within a school nationally recognized for health promotion that serves a predominantly Hispanic population (~500 students). Data included formal and informal interviews with teachers, students, parents, and administrators (N=67); observations of physical education lessons and school wellness programming (N=38); and documents and artefacts (i.e. newsletters, meeting minutes, schedules). In addition a wellness policy analysis (WellSAT) was completed to assess the strength and comprehensiveness of school wellness policy in areas that included nutrition education, nutrition programming, and physical activity. Qualitative data analysis followed a constant comparison approach, including open and axial coding.

Results: According to the WellSAT results, school policy was strongest in the category of Nutrition Education and Wellness Promotion and Nutrition Standards for Competitive Foods and Beverages, indicating that policies were stronger for nutrition-related education than for physical activity and physical education programming. Findings revealed the importance of acquiring stakeholder input (student feedback), outreach to parents and staff, and on-site nutrition and fitness programming for families. Although school personnel established high nutritional standards for breakfast and lunch menus, they demonstrated low cultural sensitivity in relation to the kinds of foods offered to students, such that few reflected the Hispanic culture. Further, a lack of outside space hindered quality of scheduled daily physical education and other physical activity opportunities such as recess. Additional issues such as administrator turnover and lack of teacher education about wellness programming impeded the capacity of school staff to fully implement wellness policies.

Conclusions: Further research on school wellness policy implementation may attenuate the gap between policy and practice.
A convergent mixed methods approach to understanding students’ perceptions of the health-promoting environment in low-income schools

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School policies for physical activity and nutrition (Chair: Courtney Parks), South Hall 2A, June 5, 2019, 2:30 PM - 3:45 PM

Policies and environments (SIG)

Objective: Schools are logical settings to reach most children with evidence-based obesity prevention policies/practices, which aim to create opportunities for healthy eating (HE) and physical activity (PA). These policies/practices are only effective if well-implemented. Students can offer a critical perspective on how or for whom these opportunities are accessible; however, this perspective is rarely captured. This study describes students' perceptions of health-promoting environments in urban, low-income schools using a convergent mixed methods assessment.

Methods: Elementary (4th/5th grade) and middle (7th/8th grade) school students in one urban district participated. Students reported demographic information and completed Perceptions of the Environment at School (PEAS), a 33 items (5-item Likert responses, "never" to "always") survey in 2 subscales: PEAS-HE (21 items; Cronbach's alpha=0.72), and PEAS-PA (12 items; Cronbach's alpha=0.75). Focus groups were conducted during lunch using a semi-structured guide. Students described barriers/facilitators to HE and PA during school. Quantitative data were analyzed using multi-level linear regression models to examine group differences in mean scores. Qualitative data were deductively coded using PEAS subscales to integrate and connect the data sources.

Results: The quantitative sample included 156 students (87 elementary, 69 middle; 66% female; 72% African American) in 6 schools. Of these, 53 participated in 10 focus groups (average 5.3 students, 79% female). The overall mean PEAS score was 1.99/5 (SD=0.53), and PEAS-HE and PEAS-PA scores were 2.00 (SD=0.52) and 1.97 (SD=0.73), respectively. After adjusting for clustering, elementary schoolers had significantly higher PEAS-PA scores than middle (b=0.68; p=0.008), and males had higher PEAS-HE scores (b=0.28; p=0.001) than females. Emerging themes corroborated low survey scores. Students identified environment, policy, and cultural barriers to HE/PA, including gym/recess length and quality, quality and availability of food options, teacher rules, rewards, and role modeling, and school cleanliness. Peer influence emerged as a barrier not identified by the survey.

Conclusions: In this urban, low-income sample have low perceptions of their school environment and can identify barriers to making healthy choices during school. Mixed methods assessments aid in understanding students' perceptions, identifying barriers that limit reach and impact of HE and PA opportunities, and leveraging facilitators for future tailored implementation.
Are school environments, policies and practices associated with children’s physical activity and active transport?

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School policies for physical activity and nutrition (Chair: Courtney Parks), South Hall 2A, June 5, 2019, 2:30 PM - 3:45 PM

Policies and environments (SIG)

Objective: The school environment may influence children's physical activity (PA) levels given the time they spend in school. This study explored the association between school environment, policies and practices with children's PA and active school transportation (AST).

Methods: Children (N=1699; 10.2 ±smn; 1.0 years old) were recruited from 37 schools in 3 diverse regions of Canada. Data were collected by questionnaires (child and parent) and by pedometers. An administrator from each school also completed the School Health Environment Survey. Schools were classified into initiation, action or maintenance stages for each of four environmental components: Healthy Physical Environment, Instruction and Programs, Social Environment, and Community Partnerships.

Gender-stratified generalized linear mixed models (school as random effect) were used to investigate the associations between school environment and children's PA (average steps/day during weekdays). Multinomial logistic regression was used to predict the frequency of AST (never, occasionally and usually) among children living within one mile from school. Models were adjusted for age, independent mobility (IM), distance to school, site (region), school-area income, and urbanization.

Results: Regarding PA, older boys walked fewer steps (βa; = -708, p < 0.001), and boys with more IM licenses walked more steps (βa; = 359, p = 0.002). Girls attending schools in the maintenance phase for "community partnership" accumulated more steps than those from schools in the initiation phase (βa; = 3022, p = 0.043).

Participants with more IM licenses were more likely to be in a higher category for AST (ORgirls = 1.32, p < 0.001; ORboys = 1.26, p = 0.003). Conversely, increased distance to school (in meters) decreased the odds of AST (ORgirls = .997, ORboys = .998, both at p < 0.001). Girls from schools in the action phase for "healthy physical environment" were more likely to engage in usual AST than girls from a school in the initiation phase (OR = 2.04, p = 0.048).

Conclusions: This study showed few associations between school environments and girls' PA and AST, but none among boys. Better tools could help to measure school environments, in order to capture their associations with children's PA and AST.
Cross-cultural comparison of the patterns of influence within the theory of planned behavior in predicting physical activity among Chinese and Western samples

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Objective: The present study aimed to (1) develop and validate the Chinese version of the theory of planned behavior (TPB) questionnaire in the domain of physical activity, (2) test the applicability of the TPB model to predict Chinese college students' leisure-time physical activity, and (3) compare the strength of relationships among the TPB variables (attitude, subjective norm, and perceived behavioral control) on intention across Chinese and Western samples.

Methods: 892 Chinese college students (49% female) participated in the study. A Chinese TPB questionnaire was developed based on Ajzen (2006) and its psychometric properties were examined with confirmatory factor analysis. Thereafter, a path analysis was conducted to test whether the TPB model fits the Chinese data. Finally, the strength of relationships among the TPB variables across Chinese and Western samples was conducted using the test of the difference between two correlations. The data for the Western sample was inferred from a meta-analysis by Hagger et al. (2002).

Results: The questionnaire showed an adequate model fit, \( c_2 = 402.30, p = .001, CFI = .97, TLI = .96, RMSEA = .07, SRMR = .04 \). When physical activity was added as the criterion, the hypothesized TPB model adequately represented the data and predicted physical activity behavior, \( c_2(2) = 7.37, p = .03, CFI = .99, TLI = .98, RMSEA = .06, SRMR = .02 \). However, differences emerged between Chinese and Western samples. The subjective norm-intention relationship was significantly stronger in the Chinese sample (\( b = .18 \)) than Western sample (\( b = .05 \), \( z = 3.81, p = .001 \)). Furthermore, the perceived behavioral control-intention association was stronger in the Chinese sample (\( b = .38 \)) than Western samples (\( b = .33 \), \( z = 1.70, p = .04 \)). No difference was found in the strength of the attitude-intention relationship across the samples, \( b = .39 \) and \( b = .40 \), respectively.

Conclusions: The Chinese TPB questionnaire has good psychometric properties and the TPB model can be applied to predict physical activity among Chinese student population. However, there are differences on the relative contributions of the TPB variables on intention to exercise across Chinese and Western samples.
The influence of parent perceived health on food parenting practices used in parents with young children

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Purpose: Food parenting practices have been identified and described as factors that influence a child's eating behaviors. As feeding is a bidirectional relationship, the health of the parent may relate to the use of different food parenting practices in parents with young children. Therefore, the purpose of this mixed-methods study was to identify how the health of the parent influences the use of food parenting practices in parents with young children.

Methods: Twenty parents of three to nine year-old children completed an online survey and an in-person interview. The online survey obtained demographic data including parent height, weight, self-rated health, and the semi-structured interview was developed to describe communication, food parenting practices, and motivation of parents in healthy eating behaviors for themselves and their children. This mixed-methods study used a convergent design with intensity sampling to develop quartiles with the highest and lowest five participants indicating high (HPH) and low perceived health (LPH). Grounded theory and open coding was used to analyze the qualitative data and determine differences in food parenting practices in parents with HPH and LPH.

Findings: Participants indicated that they were relatively healthy (mean of 74.8, range 50-93). LPH participants provided structure and choices for their children, described modeling healthy eating behaviors for their children, and wellness as a motivation for healthy eating. Alternatively, participants in the HPH group had higher levels of coercive control in feeding their children and described the importance of healthy eating to avoid a concern.

Conclusions: Factors within the parent are often overlooked in interventions to develop healthy eating behaviors in children. While previous research on how the health of the parent impacts food parenting practices is limited, the results of the current study seem counterintuitive. Food parenting practices used in HPH parents tend to have a negative impact on children's eating habits, while those used in LPH support the development of healthy eating behaviors. These findings suggest the need for a better understanding of how factors in the parent affect the development of healthy eating behaviors, and the importance of incorporating parent factors in interventions to support the development of lifelong healthy eating behavior.
A qualitative exploration into momentary impacts on food parenting practices among parents of pre-school aged children

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Parental feeding practices in preschoolers (Chair: Froydis Vik), South Hall 2B, June 5, 2019, 2:30 PM - 3:45 PM

Purpose: Food parenting practices have been identified as a potentially significant correlate of weight-related outcomes in children. Although experts generally agree that food parenting practices are goal-directed behaviors sensitive to circumstance, the extent to which food parenting practices are static or fluctuate across time or context is not well characterized. In particular, situational factors are thought to shape the types of food parenting practices used in the moment, but the nature of those factors remain unclear. Thus, in-depth qualitative interviews with parents of preschool aged children were conducted to achieve the following three aims: 1) to describe parents' day-to-day lived experiences of food parenting within broad theoretical domains outlined by Vaughn: coercive control, structure and autonomy support, 2) to identify salient momentary factors that influence the use of these food-related parenting practices, 3) and to understand how momentary factors impact the use of different types of food parenting practices.

Methods: A semi-structured interview guide was used to conduct interviews with parents (n=40) of preschool-aged children either in-person or over the telephone. Audio-recorded interviews were transcribed verbatim and coded using a hybrid deductive and inductive content analysis approach with NVivo10 software.

Results: The feeding practices described by parents align well with the three overarching themes described within the extant child feeding literature: coercive control, autonomy support, and structure. Parents described using a combination of practices from within each of these domains; they also indicated that their feeding practices were easily influenced by momentary factors that impacted their food parenting within and across eating occasions. For the most part, parents described momentary factors (e.g. schedule changes, parental stress, child behavior) that shifted them away from structure and autonomy support feeding practices, towards indulgent and coercive feeding practices.

Conclusions: Researchers should be aware of the likely interplay between different types of feeding practices as well as the potential that momentary factors may shift parents from one type of practice towards another. The use of novel data collection methods, such as ecological momentary assessment, that allow for exploration of food parenting practices as dynamic, rather than static, behaviors should be explored.
Waste not, want not: A comparison of maternal feeding responses to child fussy eating in low-income food secure and food insecure households

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Parental feeding practices in preschoolers (Chair: Froydis Vik), South Hall 2B, June 5, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Objective: Young children learn to like foods that are familiar. Parents familiarise children to a wide variety of foods through exposure in the early feeding environment. Children often reject foods during this learning process, but parents may perceive persistent rejection as 'fussy eating'. Emerging research shows that low-income parents may provide a narrow range of already-liked foods to fussy eaters to avoid food and economic waste. Narrowing children's food exposure may be particularly salient in food insecure households, where resources are further constrained. We extend this theory by testing if household food insecurity intensifies parents' healthy food exposure practices in response to fussy eating.

Methods: Mothers residing in a low-income Australian community (N=260) completed a survey on their preschool-aged child's 'food fussiness', household food insecurity and food exposure practices. Food exposure practices included the home availability of fruit and vegetables and 'family meals' (i.e., whether alternative meals were prepared for their child). The moderating role of food insecurity on 'food fussiness' and individual food exposure practices was tested using the SPSS PROCESS macro with bias-corrected bootstrapping Confidence Intervals (CI) at 95% for 5000 resamples, adjusting for covariates.

Results: Food insecure mothers (11%) reported a lower availability of fresh (p=.004) and frozen/canned/dried fruit (p=.008) in the home but reported more family meals (p=.02) than food secure mothers. The interaction between 'food fussiness' and food insecurity was significant for the 'family meals' model (B[SE]=.47[.19], p=.02). Simple slopes analyses revealed that food secure mothers were more likely to make alternative meals for fussier children (B[SE]=-.39 [.06], p<.001, 95%CI: -.51 to -.27). This relationship was not significant in food insecure mothers.

Conclusions: Low-income families with or without food insecurity are at risk of providing or engaging in feeding practices that limit children's exposure to a variety of foods. Mechanisms underlying these relationships appear to differ according to household food insecurity. With one in six Australian children living with poverty, family economic circumstances are an important contextual factor in food provisioning and feeding. Future research must critically consider food security in child nutrition interventions to support the individual needs of families.
17402

O13, O13.5

The influence of cost, time, child resistance, support from co-parents and friends on parents’ provision of snacks to their children: A discrete choice experiment

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Objective
Cost, time and resistance from children are commonly reported barriers to healthy food provision. However, little is known about the influence of such barriers in parents’ provision of unhealthy foods, both in social and non-social occasions. This study compared the relative importance of physical resources and social supports when parents are choosing snacks to provide to their three to seven year old child in social and non-social occasions.

Methods
An online discrete choice experiment was designed to determine parents stated preferences within repeated hypothetical snack provision scenarios, in non-social and social occasions. Parents were randomised to choice blocks within the online survey, and completed questions regarding parent and child characteristics. Six factors (cost, time, child resistance, co-parents, friends, type of food) were included, with 2 or 3 levels for each factor. A discrete choice experiment requires parents to trade-off factors, prioritise influences on choice and attenuates risk of social desirability bias. Parent's chose between two snack provision alternatives (with varying factor levels) or neither choice. Choice data was analysed using multinominal logit models.

Results
Two-hundred and twenty-five parents completed the study (N=1125 choice decisions/context). In both non-social and social occasions, cost (utility weights -0.33 and -0.32), child resistance (-1.62 and -1.50), support from co-parents (1.00 and 1.08), friends (0.44 and 0.79) and type of food (1.94 and 1.38) were found to significantly (p<0.01) influence parents snack decision making. Time to prepare was not significant. Relative importance score highlighted type of food as the most important consideration in the non-social context, followed by child resistance and support from co-parent; whereas in the social context child resistance was considered more important than type of food.

Conclusions
Findings suggest both the type of food and child resistance are important in parents' decision making, yet their priority differs in non-social and social occasions. To support parents' to reduce unhealthy food provision to their children intervention designers could consider the type of food and children's resistance. Future studies should explore the effects parent and child characteristics, such as socioeconomic status or child temperament, have on parents' decision making to tailor intervention strategies.
Changes in parental feeding practices and children’s food intake: A randomized controlled trial of obesity treatment in preschoolers

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PURPOSE: Intensive childhood obesity treatment targeting parents is most effective during the preschool age; however, the mechanisms of change are unknown. To identify possible mechanisms, we examined changes in parental feeding practices, child dietary intake, and the effect of their interactions on child weight following a parenting intervention, a randomized controlled trial conducted in Sweden.

METHODS: Parents of children with obesity (n=174), aged 4-6, were randomized to: 1) standard treatment (ST); 2) a parenting program with booster sessions (PP booster); 3) the same program without booster sessions (PP no-booster). Parents reported on their feeding practices, measured by the Child Feeding Questionnaire (4 timepoints), and their child's obesogenic food intake (Food Frequency Questionnaire at baseline and after 12 months). Data were analysed using linear mixed models, one-way ANOVA and paired t-tests. Interactions between parental practices and child food intake over 12 months, and their effect on changes in child weight during the same period were examined in the total sample.

RESULTS: Mothers in all groups uniformly decreased pressure to eat (-0.39, 95% CI -0.67 to -0.11 for PP no-booster) and increased monitoring (0.20, 95% CI 0.01 to 0.40 for ST) compared to baseline. Fathers in all groups showed uniform improvements only in monitoring (0.36, 95% CI 0.06 to 0.67 for PP no-booster) compared to baseline. In the group with booster sessions, children's obesogenic food intake decreased more compared to baseline. Across all groups, increased maternal monitoring over 12 months predicted a decrease in child weight, while higher pressure to eat after 12 months predicted an increase in weight among children who increased their consumption of obesogenic foods (juice).

CONCLUSION: The study is the first to provide evidence regarding the effects of childhood obesity interventions on parental feeding practices and child food intake. Effective early obesity treatment may, thus, operate through changes in proximal outcomes (child food intake), influenced by parental feeding practices. The findings suggest that different treatment conditions might affect mothers’ and fathers' feeding practices differently. A comprehensive evaluation of the combined effect of maternal and paternal feeding practices would shed light on key mechanisms of change.
Examining the effects of active versus passive parental support on children’s activity behaviors using proximity tagging data from accelerometers

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Determinants of children's nutrition, physical activity and sedentary behavior (Chair: Lauren Aurundell), North Hall, June 5, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Objective:
The Bluetooth-based proximity tagging feature of ActiGraph accelerometers can be used to capture interactions between parent and child, in terms of their physical activity behaviors, while they are in close proximity. In this study, we defined parents' "passive support" as time parents are sedentary, and in close proximity with a child who is doing moderate-to-vigorous physical activity (MVPA). Whereas "active support" was defined as time when parents and child are engaging in MVPA at the same time and in close proximity. The effects of both passive support and active support on students' overall MVPA was examined.

Method:
A cross-sectional design was used in this study. Data was collected from 207 pairs of parent-child dyads. Children in this study were aged between 6 to 11 years (Grades 1 to 5). Parents and children wore wGT3X-BT during a seven-day period with the proximity tagging function turned on. Proximity data was used to compute parents' passive and active support to children's physical activity. The strength of relation between these two variables and children's 7-day MVPA was examined using multiple regression, adjusting for students' grade level.

Results:
154 dyads provided sufficient wear time (i.e., at least 3 weekdays and 1 weekend day, 8 hours per day) and their data were used for the main analysis. The model was significant with an R-squared of .160. Both passive (beta = .238, 95% CI [.051, .218], p = .002) and active support (beta = .286, 95% CI [.103, .329], p < .001) were found to be significantly related to children's overall MVPA.

Conclusions:
Our results suggested that parents' being supportive by merely being present while their children engage in physical activity, or by engaging in co-activity with their children, are related to overall activity levels of their children. Engaging in co-activity may have additional positive outcomes such as better parent-child relationships, and therefore should be promoted.
Child and family related factors of physical activity levels of 9-year-old girls in Ireland – Cross sectional analyses

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Determinants of children's nutrition, physical activity and sedentary behavior (Chair: Lauren Aurundell), North Hall, June 5, 2019, 2:30 PM - 3:45 PM

A gender-based difference in physical activity (PA) among youth, whereby girls are less active than boys is a consistent finding in the literature. A greater understanding of the mechanisms underlying this difference has potential to effectively inform intervention development, implementation and evaluation. Purpose: The purpose of this study was to examine the relationships between child and family related factors and children's PA in a nationally representative sample of 9 year-old Irish girls. The aim was to identify predictors of high PA participation. Methods: A secondary analysis of cross-sectional data of a sample of 4,404 nine-year-old girls and their primary care giver (PCG) from the Growing Up in Ireland (GUI) survey was administered. All participants completed the survey at home with a researcher present to assist with clarifications on survey questions. 'Child' and 'Parent and Family' factors included in the secondary data analysis were identified by consensus methodology and influenced by existing theory and gaps in the literature. Self-reported PCG data from the adapted Leisure Time Exercise Questionnaire was used to group girls into high active or low active PA categories. Results: The association between 'Child' and 'Parent and Family' factors and PA participation of the child as reported by the PCG was established using binomial logistic regression with simultaneous entry of variables (child variables entered, n=27; parent and family variables entered, n=20). Analysis controlled for income, location and education and issues pertaining to multicollinearity and extreme values were examined and resolved. Both the 'Child' ($\chi^2(62) = 284.2, p < .000; \text{Nagelkerke R}^2 = 12\%$) and 'Parent and Family' ($\chi^2(51) = 147.9, p < .000; \text{Nagelkerke R}^2 = 7\%$) PA models were significant. A number of variables were found to be significantly associated with child PA e.g. spending time with family members, time with friends, guardian facilitation of child PA, closeness to the PCG (majority of cases was the mother) and child membership of sports/PA clubs. Conclusion: This comprehensive analysis of potential factors which may influence PA levels provides further and new insights into factors which should be targeted in existing and planned PA interventions for young girls.
Socio-ecological predictors of non-organized physical activity participation between childhood and adolescence

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Determinants of children’s nutrition, physical activity and sedentary behavior (Chair: Lauren Aurundell), North Hall, June 5, 2019, 2:30 PM - 3:45 PM

Objective: Physical activity (PA) is prone to decline during adolescence. In Australia this decline has been shown to particularly occur in the domain of non-organized PA (including active play and informal sport). The predictors of non-organized PA may be useful to inform targeted PA interventions, although the existing evidence base is dominated by cross-sectional studies that have investigated only a few correlates in isolation. Therefore, this study aimed to explore a wide range of potential socio-ecological predictors of non-organized PA in the transition from late childhood (11 years) to early adolescence (13 years) using a national Australian dataset.

Methods: Data were sourced from Waves 4 and 5 of the Longitudinal Study of Australian Children (n=2,803). Participation in non-organized PA (e.g. unstructured active play, ball games, bike riding for fun) was measured at 11 and 13 years using a 24-hour time-use diary (TUD) completed by children. Fifty socio-ecological predictors were reported at 11y by parents and children, including physical, psychosocial, behavioral, family, peer, school and neighborhood characteristics. Cragg hurdle regression and linear regression models were used to test predictors, controlling for season of measurement and whether the child attended school on the day of the TUD.

Results: The average duration of non-organized PA declined between 11y (72min) and 13y (35min). The likelihood of participating in non-organized PA at 13y was positively predicted by sex (males) (OR = 1.53, 95%CI=1.36-1.71), enjoyment of PA (OR = 1.36, 95%CI=1.09-1.69) and number of siblings (OR = 1.11, 95%CI=1.05-1.16), and negatively predicted by home computer use at 11y (OR = 0.98, 95%CI=0.97-0.99). Males also spent more time in non-organized PA at 13y (ßa = 77.77, 95%CI=0.53-155.00) and were more likely to maintain or increase their participation between 11y and 13y (ßa = 10.50, 95%CI=1.91-19.08).

Conclusions: Potential strategies to promote non-organized PA among youth may include targeting girls in the transition to adolescence and emphasizing the benefits of non-organized PA relative to computer use. Future research may explore the most amenable types of non-organized PA for youth who do not enjoy PA, and potential underlying normative factors related to non-organized PA during adolescence.
**O14, O14.4**

“I feel like less of a mom.” Mothers’ experiences of courtesy and affiliate stigma attributable to their children’s weight status.

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Children and families (Chair: Lauren Aurundell), North Hall, June 5, 2019, 2:30 PM - 3:45 PM

*Children and families (SIG)*

Objective: Parents are near-exclusively identified as the cause of childhood obesity. Courtesy stigma, or the experience of being blamed for another's medical condition, is a concept born in the mental health literature. Affiliate stigma is a closely related concept characterized by negative self-evaluation due to messages that one is responsible for another's illness. Despite our growing understanding of the harms of weight stigma, the concepts of courtesy stigma and affiliate stigma have not been applied to the context of parenting children of higher weight. The objective of the current study is to characterize mothers' experiences of courtesy and affiliate stigma in relation to their children's weight.

Methods: US mothers of 5-16 year old children who identified their children as overweight and reported concern about their children's weight were recruited. Mothers participated in semi-structured interviews led by trained staff that assessed feelings about their children's weight, their experiences of negative comments or actions because of their children's weight, and personal attributions regarding childhood obesity. Themes in responses were identified through the constant comparative method.

Results: Twenty-eight mothers completed the study: 54% were non-Hispanic white and 75% had a BMI =30. Two-thirds of mothers described being the target of comments about their children's weight by family members; 38% reported being hurt by these comments. One-quarter of mothers expressed negative feelings about their children's medical provider due to previous interactions related to their children's weight. Nearly all mothers discussed witnessing their children being bullied because of their weight and 71% reported that family members have made comments to or behaved differently toward their children because of their weight. Overall, 89% of mothers expressed negative feelings about themselves or their children due to their children's weight, including sadness, guilt, and discomfort.

Conclusions: Many mothers of children of higher weight experience courtesy and affiliate stigma. Just as weight stigma and internalization of weight bias are harmful to physical and mental health, these similar and frequent experiences among parents may also harmful. Further research is needed to reliably measure courtesy and affiliate stigma due to child weight and identify their effects on parent and child outcomes.
The family health climate and children’s nutrition and physical activity behavior: how are they related to each other?

**Objective**
Parents have an influential role on children's energy balance-related behaviors. Studies show the relationship between general and lifestyle-related parenting practices and children's behaviors. In these studies, the focus is on the dyadic interaction between the parent, e.g. the mother's logistic support, and the child's behavior, e.g. physical activity. However, in line with systems theories, parents and children are part of a broader system: the family. Studies on the influence of the family on children's energy balance-related behaviors are limited. In this study, the relation between the Family Health Climate (FHC), a recently developed concept, and children's nutrition behavior, physical activity behavior and sedentary behavior is studied.

**Methods**
Baseline data of a longitudinal intervention study were analyzed. Parents (N = 329) filled in a questionnaire. The family nutrition climate (FHC-NU) and the family physical activity climate (FHC-PA) were assessed using the validated Family Health Climate scale (Niermann et al., 2014). The FHC-NU assesses four concepts: value, cohesion, communication and consensus. The FHC-PA assesses three concepts: value, information and cohesion. Children's nutrition behavior was reported by their parents. Children's physical activity levels were objectively measured with an accelerometer (Actigraph). The relation between FHC and nutrition behavior and PA levels were investigated using regression analyses.

**Results**
Mainly mothers (82.4%) filled in the questionnaire. Most parents lived together (82%), had a middle or high educational level (73.6% and 73.4%) and a Western nationality (77.1% and 71.2%). Children were on average 8.4 years. A small majority (57.1%) of the children were boys. FHC-NU value was correlated with children's vegetable intake, candy intake and soda consumption. FHC-NU communication was correlated with children's fruit intake, vegetable intake and soda consumption. FHC-NU cohesion was correlated with children's candy intake. FHC-PA information was correlated with children's fruit intake, cookie intake, soda consumption and juice consumption. No effect of FHC-PA on children's physical activity levels was found.

**Conclusions**
First indications were found for the relation of FHC and children's nutrition level, but not of children's PA levels. Future studies should further investigate the influence of the Family Health Climate on children's nutrition and physical activity behaviors.
Like me, like you - relative importance of sibling and peer behavior on children's lifestyle


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Determinants of children's nutrition, physical activity and sedentary behavior (Chair: Lauren Aurundell), North Hall, June 5, 2019, 2:30 PM - 3:45 PM

Purpose: It is often assumed that peers exert more influences on children's lifestyle behaviors than family members as children get older. However, to date, no study has compared children's lifestyle with that of their peers and siblings considering different developmental ages. We aimed to: 1) examine whether children's fast food intake, screen time and sports club participation is predicted by that of their peers and sibling, overall and by children's age groups (<7, 7-8, 9-10, =11 years) and 2) investigate longitudinally whether children approach their peers or sibling in these behaviors.

Methods: The IDEFICS/I.Family cohort was recruited from 17 communities in 8 European countries between 2007-2014. The present study included all 2-18 year old children from 2-child families (n=5,280). Peers were identified as same-sex same-aged children in the same community, excluding the target child. Lifestyle variables were assessed by questionnaire (for children <12 years by parental proxy-reports). Data were analyzed using linear models.

Results: Children’s fast food intake (frequency/week) was more strongly predicted by that of their peers (ßa=0.89, 95% CI: 0.84, 0.94) than their sibling (ßa=0.13, 95% CI: 0.10, 0.16). For screen time and sports club participation, peer and sibling effects were similar in magnitude. For fast food intake, children <7 years did not resemble their peers and children =11 years did not resemble their sibling. The peer resemblance for fast food intake and screen time steadily increased, while the sibling resemblance steadily decreased with increasing age (Pinteraction <0.001). The behavior of the sibling was a stronger predictor for first-born than for second-born children's behavior (Pinteraction <0.01 for all 3 behaviors). Longitudinal results confirmed cross-sectional findings.

Conclusion: Understanding that with increasing age, children's fast food intake and screen time increasingly resembles that of peers and decreasingly resembles that of siblings is essential for the design of effective setting-based interventions.
An eHealth platform to support the development of web-based physical activity interventions

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E- & mHealth interventions to promote physical activity and/or sedentary behavior (Chair: Artur Direito), Terrace 2A, June 5, 2019, 2:30 PM - 3:45 PM

Background: Web-based interventions can extend the reach and improve the degrees of tailoring of traditional face-to-face programs. Although many health researchers and agencies are interested in using web-technology to deliver interventions, the development process requires extensive resources and technical expertise, making it a significant barrier. Additionally, disseminating web-based intervention after completion of a study remains a challenge due to scalability, cost and maintenance requirement. Thus, overcoming these limitations is critical to improving the development process of web-based interventions.

Objective: Develop and evaluate the usability of an eHealth platform with a set of web-based tools that allow researchers to create web-based interventions aimed to promote physical activity.

Methods: The eHealth platform development process consisted of the following three phases: 1) Identify essential web-based tools and features that are necessary for researchers to create tailored web-based interventions; 2) Use an iterative process to design and develop a series of web-based tools; 3) conduct usability testing on researchers using the platform to create and modify physical activity web-based intervention in order to further enhance user experience.

Results: In phase one we identified key web tools that enable researchers to improve intervention tailoring (i.e. display specific content based on user-action), self-monitoring behaviours (i.e. integrate data from wearables) and engagement (i.e. enable users to participate in online support). In phase two, we build an eHealth platform that consisted of a participant and a researcher portal. The participant web-portal allows end users to access a web-based intervention. The research portal enables the researchers to develop interventions use the web-tools identified in phase one, manage participants in the interventions, and view user engagement data. The usability testing revealed that the platform enabled researchers with minimal computer programming skills to quickly develop and evaluate web-based interventions.

Conclusion: This eHealth platform can have a significant impact in the field of web-based intervention by decreasing the programming cost and the learning curve required for development. The rapid and low-cost development will also enable researchers to evaluate the impact of various interventions components on intervention effectiveness. Future research needs to examine ways to apply this eHealth platform to other lifestyle behaviours.
O15, O15.2

A nationwide physical activity promotion in Singapore that uses smartphone apps and wearables

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E- & mHealth interventions to promote physical activity and/or sedentary behavior (Chair: Artur Direito), Terrace 2A, June 5, 2019, 2:30 PM - 3:45 PM

E- & mHealth (SIG)

Purpose: Wrist-worn activity tracking devices and smartphone apps are increasingly being used for the promotion of physical activity (PA). However, evaluations of such mHealth PA promotion strategies in a large-scale nationwide setting are scarce. We address this gap by providing a first evaluation of the Singapore National Steps Challenge (NSC) Season Three.

Methods: NSC is a yearly national PA promotion campaign that is rolled out by the Health Promotion Board (HPB) in Singapore. For activity tracking, NSC participants can either use their own tracker or use a tracker that HPB offers. Devices are paired with a purpose-build smartphone app that displays activity levels (including step counts) and facilitates the various activity-based rewards. Upon sign up, NSC participants provide information on sex, age, nationality, height and weight. Depending on sign-up date, daily step count data can be available between August 2017 and June 2018, and a valid day is defined to have at least 1500 steps/day. For participants aged between 17 and 79 years with complete socio-demographic data, the mean number of valid days and step-counts is provided for all participants, by participants' characteristics and the three periods in the NSC (before reward-based challenges: August to October 27th 2017, reward-based challenges: October 28th to March 31st 2018, after reward-based challenges: April to June 11th 2018).

Findings: 398,340 participants joined the NSC Season 3 with complete and valid data. Mean number of valid days was 95 and mean steps/day was 9060. Mean number of steps/day differed by sex (Females: 8797, Males: 9435), nationality (Singaporean: 9213, Foreigner: 8763), age (17-39 years: 8704, 40-59 years: 9259, 60-79 years: 9964), and weight categories (BMI < 18.5: 8795, BMI 18.5-22.9: 9138, BMI 23-<27.5: 9161, BMI >=27.5: 8735). Mean step counts increased from before reward-based challenges to the challenge period (pre-challenge: 8107, challenge: 9293, post-challenge: 9334) and this increase was significant (p-value < 0.001).

Conclusions: This study demonstrates the successful implementation of a large-scale national physical activity promotion campaign that uses apps and wearables. Preliminary results suggest meaningful increase in daily step counts. More detailed analysis will be performed to investigate activity patterns and challenge specific effects.
Effectiveness and cost-effectiveness of a loyalty scheme for physical activity behaviour change maintenance: a cluster randomised controlled trial

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Objective: The workplace is ideal to encourage habitual physical activity, but little evidence exists on effective behaviour change interventions that lead to sustained behaviour. We aimed to address this gap by evaluating the effectiveness and cost-effectiveness of a loyalty-based intervention on physical activity in public sector employees. 

Methods: We conducted a cluster randomised wait-list controlled trial in public sector organisations in Northern Ireland, UK. We randomly assigned clusters (1:1) using a computer-generated random sequence. Researchers were masked to allocation, but participants were not. Employees aged 18, 65 years with no medical contraindications to physical activity were included. The Physical Activity Loyalty scheme intervention was based on high-street loyalty cards where participants earned points for minutes of activity (monitored via remote sensing) that could be redeemed for rewards (1 min=about £0.03), complemented by evidence-based behaviour change techniques. The primary outcome was objectively measured mean steps per day at 6 months using a validated pedometer (Digi-Walker CW-701, Yamax, Japan) measured during 7 days, assessed with intention-to-treat analysis. Secondary outcomes used for economic analyses, nested within the study, included self-reported health, mental wellbeing, quality of life, work absenteeism and presenteeism, and use of health-care resources. Cost-effectiveness, cost-benefit, and mediation analyses were conducted.

Results: Between Sept 1, 2014, and Oct 31, 2015, we recruited and randomly assigned 37 clusters and 853 participants (71% female, mean age 43.6 years [SD 9.6]) to the intervention (19 clusters, 457 participants) or control group (18, 396). Primary outcome data were available for 249 (54.4%) intervention and 236 (59.6%) control participants. Mean steps per day were significantly lower in the intervention group at 6 months (adjusted mean difference 336, 95% CI, 612 to 60; p=0.02). The intervention was not cost-effective. There was a 60% probability of the intervention being cost-saving from an employer's perspective arising from reduced absenteeism.

Conclusions: Our mixed results pose challenges that are too infrequently exposed in public health intervention trials. Our incentive level might have been too low to incentivise change, even though it was designed a priori by a contingent valuation survey. Also, major re-structuring of several organisations presented substantial implementation challenges.
Which (combination of) self-regulation techniques are effective in an e- and m-health intervention “MyPlan 2.0” to promote physical activity and reduce sedentary behaviour in adults: a factorial trial

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E- & mHealth interventions to promote physical activity and/or sedentary behavior (Chair: Artur Direito), Terrace 2A, June 5, 2019, 2:30 PM - 3:45 PM

E- & mHealth (SIG)

Objective
E- and mHealth interventions are promising to change people's health behaviour. Many of these interventions use a range of behaviour change techniques, but it's unknown which (combination of) techniques are most effective in changing behaviour. Therefore, our aim is to investigate the efficacy of three behaviour change techniques (i.e. action planning, coping planning and self-monitoring) on adults' physical activity (PA) and sedentary behaviour (SB).

Methods
In a 2x2x2 factorial trial, 480 adults (mean age=36, 36% men) from the general population used the e- and m-health self-regulation based intervention 'MyPlan 2.0' for five weeks. Participants were randomly allocated to eight groups and received a different version of 'MyPlan 2.0', in which the three behaviour change techniques were combined. This means that people received none, one, two or all techniques depending on the group. Levels of PA and SB were assessed at baseline and post intervention using self-reported validated questionnaires. Repeated measures ANOVA's were conducted using SPSS 24.0.

Results
Participants receiving self-monitoring increased their total PA (F=4.41;p=0.04), moderate to vigorous PA (F=6.61;p=0.01) and reduced their levels of SB (F;5.87;p=0.02) in comparison with a decrease in total, moderate to vigorous PA and unchanged levels of SB in participants receiving no self-monitoring. Groups receiving coping planning improved vigorous PA compared to decreased vigorous PA in groups receiving no coping planning (F=4.56;p=0.04). Participants who had a combination of action planning and coping planning improved their total PA compared to participants only having action planning or coping planning (F=4.29;p= 0.04). No improvements in PA or SB were found in groups receiving a combination of action planning with self-monitoring and coping planning with self-monitoring compared to receiving these techniques alone.

Conclusions
Favourable intervention effects were found on adults' PA and SB receiving "self-monitoring". No further improvements were found using self-monitoring in combination with action planning and/or coping planning which states that using self-monitoring within interventions is important. Furthermore, when participants need to plan certain activities such as vigorous PA, it seems that coping planning is a fruitful technique. Finally, it's better to use action planning in combination with coping planning, rather than using these techniques alone.
O15, O15.5

Effects of a blended home-based exercise program and protein counselling in community dwelling older adults: results of the VITAMIN RCT

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E- & mHealth interventions to promote physical activity and/or sedentary behavior (Chair: Artur Direito), Terrace 2A, June 5, 2019, 2:30 PM - 3:45 PM

Purpose
With the ageing population, there is an increasing demand for strategies to optimise muscle mass, strength and physical performance in community dwelling older adults. We designed a new innovative e-health intervention "VITAMIN" to improve physical performance in older adults. The blended home-based exercise intervention contains digital support to improve personalised coaching as well as dietary protein counselling. This study evaluates the 6 months effectiveness of the intervention.

Methods
The cluster RCT included 245 community dwelling older adults (age = 55y) randomised to control, exercise, and exercise+dietary protein counselling group. Data was collected at baseline and after 6 months of intervention. The primary outcome was the modified Physical Performance test (mPPT) with an emphasis on daily functioning. Secondary measures were gait speed (GS; m/s), physical activity level (PAL), protein intake (g/kg/d), appendicular skeletal muscle mass by DXA (ASMM; kg), hand grip strength (HGS; kg). For statistical analysis SPSSv24.0 was used. A mixed models analysis was performed, with group, time and group*time interaction as fixed factors, subject and cluster as random factors, and additional posthoc Bonferroni test.

Results
Mean age of the 224 evaluated participants was 72.0±6.5y, 71% were females and 44% low educated. No significant intervention effect was found for mPPT (p=.889). Secondary outcomes showed a significant intervention effect: GS (p=.002), PAL (p=.014), protein intake (p<.001), ASMM (p=.029), HGS (p<.001). Posthoc Bonferroni showed that exercise+protein group had statistical improved outcome compared to control for these secondary outcomes (p<.001; p=.003; p=.001; p=.009; p<.001). Control group showed declined values at 6 months compared to baseline for GS (Δ - .23 m/s), PAL (Δ - .03), ASMM (Δ -.32 kg) and HGS (Δ -.96 kg).

Conclusions
Older adults had already very high scores for physical performance (mPPT), however the blended home-based exercise intervention with protein counselling was still effective for gait speed, physical activity level, dietary protein intake, muscle mass and strength. This personalised innovative e-health intervention showed to be a promising strategy for community dwelling older adults for maintenance instead of declining physical function.

Keywords: Ageing, Elderly, Nutrition, Physical Activity, Sarcopenia, Technology, Telehealth
Effects of two web-based interventions for the promotion of physical activity among older adults in Northwestern Germany: Results of the PROMOTE study

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E- & mHealth interventions to promote physical activity and/or sedentary behavior (Chair: Artur Direito), Terrace 2A, June 5, 2019, 2:30 PM - 3:45 PM

Objective: Regular physical activity (PA) is of central importance for healthy ageing. In Germany, 42% of older adults currently reach the PA recommendations of the World Health Organization. The aim of the PROMOTE study was to evaluate the effectiveness of two web-based interventions for promoting PA in older adults aged 65 to 75 years compared to a control group (CG).

Methods: 589 older adults were randomly assigned to three groups. Participants in intervention group 1 (IG1) received access to a web-based intervention for ten weeks assisting them in tracking their PA behavior. Participants in intervention group 2 (IG2) received the intervention of IG1 and additionally an activity tracker to objectively monitor their PA. Moreover, participants in IG1 and IG2 were offered weekly group meetings where participants exercised in groups. Moderate-to-vigorous PA in bouts of 10 minutes was objectively measured at baseline and 12-week follow-up using GT3X (Actigraph) accelerometers which were worn for seven days. To analyze differences in moderate-to-vigorous PA between baseline and follow-up, linear mixed models were used incorporating time and group effects, as well as their interaction.

Results: We found an interaction of time and group meaning a decrease in moderate-to-vigorous PA in bouts of 10 minutes per week in IG1 compared to CG participants (βa;=-6.46, 95% CI: (-31.59; 18.67)). In comparison, IG2 participants increased moderate-to-vigorous PA in bouts of 10 minutes per week at follow-up compared to the CG (βa;=9.33, 95% CI: (-17.09; 35.74)). Differential intervention effects were noted for men and women and persons with higher vs. lower/medium levels of education. Men increased moderate-to-vigorous PA at follow-up compared to women. Similarly, persons with higher levels of education displayed more pronounced increases in moderate-to-vigorous PA than those with lower education levels.

Conclusions: Participation in the two web-based interventions did not lead to overall increases in moderate-to-vigorous PA among older adults. However, men and persons with higher levels of education appeared to benefit more from the interventions than women and less educated older adults. Future studies need to investigate whether different modes of delivery or participants' individual preferences influence intervention participation and effects.
The reciprocal relationship between parents’ and peers’ social norms and physical activity

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Testing the theories of motivation and behavior change in physical activity (Chair: Borja del Pozo-Cruz), Terrace 2B, June 5, 2019, 2:30 PM - 3:45 PM

Motivation and behavior change (SIG)

Purpose: Parents are important figures in forming their children's behavior by serving as role models and motivators. Nevertheless, children are also influenced by their peers as soon as they go to school, and especially during adolescence. Peer norms have been identified as a powerful mechanism in determining youth's behavior and it has even been suggested that parental influences decline when competing with peer influences. Social norms are typically assumed to affect subsequent behavior; however, the impact of behaviors on perceived social norms has yet to be empirically tested. This is the first study that investigated whether role modeling ('descriptive norms') and social pressure ('injunctive norms') of parents and peers affect adolescents' physical activity (PA), and vice versa.

Methods: The study is part of the MyMovez research project that consists of a large-scale cross-sequential cohort study (N = 944; M age=11.36; 47.5% primary school). The study used three data waves collected in February/March 2016, 2017 and 2018. Daily PA was measured by a wrist-worn accelerometer (#steps and MVPA). Self-reported data (PA and social norm perceptions) were assessed via the MyMovez research-application on a smartphone. Data were analyzed by cross-lagged structural equation models. Model fit indices showed good fit for all three models.

Results: Perceived descriptive peer norms were significantly associated with changes in objectively measured PA (#steps and MVPA). Additionally, adolescent's own PA influenced their perceptions of norms (i.e., how much others move). These findings differed from the self-reported PA-model in which a weak association was found for parental descriptive norms on PA between T1-T2 only. In all models, there were no associations between injunctive norms and PA nor were there significant differences between school type and sex.

Conclusions: This was the first study that showed that peers as role models have more impact on changes in adolescents' PA than their parents and social pressure from their peers and parents. Therefore, it is important for social network interventions that use influential peers to target PA to select influencers who are able to give a good example (i.e., by increasing their PA) and not only promote PA by communicating about it.
Patterns of motivation for leisure-time physical activity among young adolescents over 3 decades

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Testing the theories of motivation and behavior change in physical activity (Chair: Borja del Pozo-Cruz)
Terrace 2B, June 5, 2019, 2:30 PM - 3:45 PM

Motivation and behavior change (SIG)

Purpose: Reasons for liking leisure-time physical activity (LTPA) indicate positive attitudes to LTPA, and are therefore expected to be related to higher motivation and intentions to engage in LTPA. Very little is known about changes in reasons for liking LTPA over time. Motivation for LTPA may have changed in accordance with societal changes, including those caused by processes of modernization and globalization. Increased societal attention to sports and LTPA suggests that these activities may be regarded as even more attractive than some decades ago. Accordingly, adolescents' views of PA and sports may have changed in terms of an increased approval of social, health and achievement benefits.

Methods: Data stem from nationally representative sample of 13 year-olds (n=3614) in the Norwegian HBSC surveys in 1985, 2005 and 2014. Motivation was measured by a list of nine reasons for liking LTPA and sports, which were grouped in three factors: social, health, and achievement reasons. Response categories were very important, fairly important, not important. Person-centered latent class analysis in MPlus was conducted.

Results
Five distinct patterns of perceived importance of the reasons were identified (percentage of respondents falling into each pattern in brackets):

- High (very important reasons for liking sport/LTPA) on social and health reasons, low on achievement reasons (40%).
- Medium importance on social and health, low on achievement (28%).
- High on all (21%).
- High on social, low on health and achievement reasons (6%)
- High on health, low on social and achievement reasons (5%)

A statistically significant interaction effect between study year and pattern indicated that pattern 3 had the highest increase across the three decades, seemingly at the expense of patterns 1 and 5. This development was similar across gender. The changes over time indicated that 13-year-olds in 2014 perceived sports and LTPA in a more positive way than in 2005 and 1985, and that the change was associated with a more favorable rating of achievement reasons. This finding can be interpreted in light of increased competitiveness due to globalization/modernization processes. Insight into such changes may contribute to improvements in health promotion and physical/sports education.
Measuring adolescent’s perception of autonomy support from teachers, family and peers in active commuting to and from school

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Testing the theories of motivation and behavior change in physical activity (Chair: Borja del Pozo-Cruz), Terrace 2B, June 5, 2019, 2:30 PM - 3:45 PM

**Motivation and behavior change (SIG)**

Objective: Active commuting to and from school is an opportunity to increase the daily physical activity levels in adolescents. Several studies point out that environmental and individual factors, and, particularly, social factors should be taken into account when trying to explain active commuting behaviour. However, the absence of a psychometrically robust instrument that measures autonomy support has limited the understanding of interpersonal influences on active commuting to and from school in adolescents. Based on self-determination theory, the objective of this study was to adapt the Spanish version of the Perceived Autonomy Support in Exercise Scale to active commuting. We tried to provide evidence for validity and reliability of the resulting instrument (Perceived Autonomy Support Scale in Active Commuting to and from School, PASS-ACS) in order to measure students' perceptions of autonomy support for active commuting from teachers (PASS-ACS-Teachers), parents (PASS-ACS-Family), and peers (PASS-ACS-Peers).

Method: Participants were 391 (182 men and 209 women; Mage = 14.16, SDage = 1.23) secondary school students from four Spanish cities who filled the teachers, family, and peers' versions of the PASS-ACS. An exploratory factor analysis was conducted to explore the internal structure validity of each version of the PASS-ACS, while the estimation of Cronbach's alpha was calculated to examine their reliability.

Results: Exploratory factor analysis of each version showed a four-item one-factor solution. The remaining eight items were removed given the criterion outlined by Hair, Black, Babin, and Anderson (2010) (i.e., primary factor loading > .50 and secondary factor loading < .32). Cronbach's alpha coefficients indicated acceptable levels of reliability for the three versions of perceived autonomy support: teachers (a = .83), family (a = .86), and peers (a = .89).

Conclusions: These preliminary results provide validity and reliability evidences to assess students' perceptions of autonomy support for active commuting to and from school provided from teachers, family, and peers. Grounded in self-determination theory, this instrument will allow understanding the role of social influences on active commuting behaviour, as well as to examine the effects of school-based interventions for promoting active transport on students' perception of autonomy support.
Autonomy support in physical education promotes autonomous motivation towards leisure-time physical activity: Evidence from a sample of Chinese college students

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Testing the theories of motivation and behavior change in physical activity (Chair: Borja del Pozo-Cruz), Terrace 2B, June 5, 2019, 2:30 PM - 3:45 PM

Motivation and behavior change (SIG)

Introduction: With the socio-economic development and urbanization, the level of physical activity in China has seen a dramatic decline during the last decades. Physical education has been recognized as a useful platform to support the adoption of health-enhancing physical activity. Based on the trans-contextual model (Hagger, Chatzisarantis, Culverhouse, & Biddle 2003), we conducted two studies to test whether autonomy-supportive physical education promotes autonomous motivation towards leisure-time physical activity among Chinese college students.

Methods: Study 1 used a cross-sectional design. Participants were students (N = 681) who provided data on perceived autonomy support and motivation for physical activity. Regression analysis was used to analyze the data. Study 2 employed an experimental design. Participants were ten physical education teachers and their students (N = 258). The teachers were randomized to either an intervention or a control group and those in the intervention group received a 3-month-long autonomy-supportive intervention program. Their students provided data on motivation. The data were analyzed with repeated measurement ANOVA.

Results: In Study 1, perceived autonomy support predicted autonomous motivation in physical education ($ß_a; = .18, p = .001$), which in turn predicted autonomous motivation towards leisure-time physical activity ($ß_a; = .51, p = .001$). In Study 2, students who were educated by the intervention teachers had significantly stronger autonomous motivation towards leisure-time physical activity than students educated by the control teachers after the intervention, $F(1, 256) = 12.41, p = .001, ?;p^2 = .05$.

Discussion & Conclusion: The results suggest that physical education may serve as an effective platform to promote an active lifestyle among Chinese college students when teachers provide students with an experience of autonomy. The findings also add to the discussion about whether or not autonomy support generates universal benefits across cultures by showing that the same positive effects as in Western countries are visible in China despite that group needs are typically superior to individual needs in Eastern collectivistic cultures (Markus & Kitayama, 2003).
An experimental test of theory-based message strategies to promote cycling for transportation

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Testing the theories of motivation and behavior change in physical activity (Chair: Borja del Pozo-Cruz), Terrace 2B, June 5, 2019, 2:30 PM - 3:45 PM

Motivation and behavior change (SIG)

Objective: Little is known regarding the effects of communication messages to support the promotion of active transportation. The aim of this study was to test the effects of theory-based messages on immediate information processing responses among adults.

Methods: A 2X2X2 factorial experimental design was adopted to test the main and interaction effects of messages pertaining to 1) attitude, 2) self-efficacy and, 3) implementation intentions (II). Messages' content was developed according to a preliminary study based on theory of planned behaviour (TPB). One week before randomization, 651 adults aged between 18 and 54 years completed a baseline questionnaire online. After being exposed to one of the eight experimental conditions (no message, messages pertaining to attitude, self-efficacy and II solely and a combination of messages), participants completed a second questionnaire. Based on the likelihood elaboration model, argument strength (aha;=0.91) and involvement (aha;=0.90) were the examined outcomes. Main analyses were conducted among the overall sample. Specificity analyses were conducted among a sub-sample of participants living = 15 km from their workplace. Analyses were controlled for the cycling-for-transportation behaviour, level of environmental concerns and education.

Results: 438 participants completed the second questionnaire. No significant difference was observed between the experimental conditions on sociodemographic and baseline TPB variables. Among the overall sample, fully adjusted ANOVAs showed a significant main effect of self-efficacy messages on argument strength (F(1, 10)=6.7, p=.01). A nearly significant main effect of the self-efficacy condition (F(1, 10)=3.3, p=.07) was observed on involvement as well as a nearly significant attitude X II interaction effect (F(1, 10)=3.3, p=.07). Among participants living nearer to their workplace (n=244), a significant effect of self-efficacy messages was observed on argument strength (F(1, 10)=4.0, p=.05). A significant attitude X II interaction effect was observed for this latter outcome (F(1, 10)=3.9, p=.05). No significant main or interaction effects were observed on involvement among this sub-sample.

Conclusions: Although present results pertain to early information processing stages, they suggest a potential positive contribution of different message strategies to support the promotion of active transportation. However, some theory-based messages are not likely to be effective or should be combined to be effective.
16820

O16, O16.6

Motivational working mechanisms of a tailored physical activity for adults aged over fifty

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Testing the theories of motivation and behavior change in physical activity (Chair: Borja del Pozo-Cruz), Terrace 2B, June 5, 2019, 2:30 PM - 3:45 PM

Motivation and behavior change (SIG)

Objective: Several studies have shown that online interventions can be effective in promoting physical activity (PA) behaviour, also among older adults. The current study aims to provide insight into the motivational working mechanisms of a previously proven effective online PA intervention for adults aged over fifty (Active Plus). For future intervention development and to improve their (cost-)effectiveness it is important to know which motivational determinants of PA (i.e. attitude, self-efficacy, intention, action planning and coping planning) are effectively influenced by the intervention, and whether any changes in these motivational determinants (i.e. the putative mediators) are responsible for the intervention effect on PA.

Methods: Mediation analyses were performed for this purpose. The mediation model of the intervention effect on self-reported PA at 6-months (N=822) was investigated in a clustered RCT using path analyses. Potential mediators were assessed at baseline, 3 and/or 6 months.

Results: The intervention resulted in a significant decrease in intention to be sufficiently physically active after 3 months (B = -.209; p = .017), an increase in action planning after 6 months (B = .214; p = .018), and an increase in PA after 6 months (B = .220; p = .002). Intention and action planning did not mediate the effect on PA. Self-efficacy, although not significantly influenced by the intervention, was found to be the only motivational factor that predicted change in PA behaviour (B = .164; p = .007).

Conclusions: Strategies used in the current intervention were effective in increasing action planning and PA behaviour. No working mechanisms were identified to explain the intervention effect on PA. Most likely, the intervention effect on PA can be explained by a combination or an interaction between the (limited affected) motivational factors together which indicates that a combination of strategies used in the current intervention will be effective in stimulating PA.
O17, O17.1

Home based stair climbing as an intervention for cardiovascular disease risk; a controlled study.

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Disease prevention and management (Chair: Els Clays), Club A, June 5, 2019, 14:30 AM - 15:45 PM

Objective

Stair climbing is a vigorous lifestyle activity that does not require specific equipment. This study explored the training effects of an 8-week stair climbing intervention on cardio-respiratory fitness, resting cardiovascular variables, body composition and lipoprotein profiles. The major innovation was to compare the effects of gym-based stair climbing with an equivalent dose of stair climbing completed in the participant's own home.

Methods

Sedentary women, 24 healthy weight and 26 overweight, were randomly assigned to gym-based and home-based stair climbing for five days.week-1 over an 8-week period. Participants progressed from two ascents.day-1 in weeks 1 and 2 to five ascents.day-1 in weeks 7 and 8. Each ascent was equivalent to a climb of 32.8m. Calculations based on the number and height of each participant's stairs at home matched the vertical displacement occurring with the gym-based stair climber. Repeated-measures analyses of variance tested for differences by weight status and location. Effects of home-based or gym-based stair climbing were compared with a non-intervention, healthy weight control group.

Results

Stair climbing improved body composition (weight -0.99 kg, 95% CI=1.38-0.60: body fat -2.18%, 95% CI=1.40-2.96), cardio-respiratory fitness (VO2Max +1.63 ml.min-1.kg-1, 95% CI=1.21-2.05) and serum lipids (HDL +0.13 mmol.L-1, 95% CI=0.10-0.16; LDL -0.20 mmol.L-1, 95% CI=0.09-0.31; Triglycerides -0.21 mmol.L-1, 95% CI=0.15-0.27). Effects were similar for gym-based and home-based interventions.

Conclusions

This study reveals that home-based and gym-based stair climbing can confer similar cardiovascular health benefits in sedentary women. Stair climbing does not require equipment or sporting ability and is non-competitive. Most of the population can climb stairs because they already do so as part of daily life. Belief that one can perform the behaviour, called self-efficacy, is rarely a barrier to stair climbing as it can be for formal sport. Home-based stair climbing may offer a cost-effective intervention for cardiovascular disease risk to public health.
What influences physical activity engagement post-myocardial infarction? A longitudinal qualitative study

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Objective: Engagement in physical activity (PA) post-myocardial infarction (MI) can reduce risk of reoccurrence and mortality. Yet uptake of PA through cardiac rehabilitation (CR) is poor, and little is known about the long-term PA behaviour of cardiac patients. We aimed to understand factors influencing PA engagement for post-MI patients during the 9-month period following an MI, from the perspective of both patients and family members.

Methods: Six family-dyads (1 patient, 1 family member) engaged in semi-structured interviews at 1, 4 and 9 months post-MI. Interviews explored PA experiences, attitudes, beliefs, behaviours, motivation and family support for PA. Interpretative Phenomenological Analysis involved reading transcripts, exploring the longitudinal journey for each family-dyad and identifying cross-case themes.

Results: Five themes were identified as influential in the PA engagement of post-MI patients: 1. Self-identity ("we've never been very active") 2. Values and beliefs ("there's nothing worse than sitting in four walls") 3. Behavioural regulation ("that's a bit too much for you") 4. Acceptance ("I'll be as fit as I'll be and that's that") 5. Teamwork ("[patient] is more reliant on people which impacts on the family because she needs support, but we don't mind"). Themes encompassed stable and dynamic factors related to the PA experiences of family dyads over the 9-month post-MI period.

Conclusions: Family PA identities, beliefs and values appear to interact in complex ways to influence how patients experience PA post-MI, and the nature of the influences appear to change over time. As the family appear to play a supporting role in shaping patients' PA post-MI, it is recommended the family are integrated into the CR pathway to help enhance PA amongst a post-MI population.
Sitting time and all-cause and cardiovascular mortality risk among 149,077 adults: what is the role of physical activity?

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Disease prevention and management (Chair: Els Clays), Club A, June 5, 2019, 14:30 AM - 15:45 PM

Objectives: High levels of sitting are thought to be detrimental for health, although it is less clear what level of moderate to vigorous intensity physical activity (MVPA) offsets such risks. The objective of this study was to examine the joint and stratified associations of sitting and MVPA with all-cause and cardiovascular disease (CVD) mortality; and to estimate the theoretical effect of replacing sitting time with physical activity, standing, and sleep.

Methods: Longitudinal analysis of the 45 and Up Study to calculate the multivariable-adjusted hazard ratios (HR) of sitting for each sitting-MVPA combination group; and within MVPA strata. Isotemporal substitution modelling estimated the per-hour HR effects of replacing sitting.

Results: 8689 deaths (1644 due to CVD) occurred among 149,077 participants over an 8.9 year (median) follow-up. Sitting time was associated with both mortality outcomes in a nearly dose-response manner in the least active groups (<150 MVPA minutes/week). We found inconsistent and weak evidence for elevated mortality risks with more sitting among those meeting the lower (150-299 MVPA minutes/week) or upper (=300 MVPA minutes/week) physical activity recommendation. Replacing sitting with walking and moderate and vigorous intensity physical activity showed stronger associations among high sitters (>6 sitting hours/day). Replacing sitting with standing showed beneficial associations among low sitters (= 6 hours/day).

Conclusion: sitting is associated with all-cause and CVD mortality risk among the least physically active adults; physical activity doses equivalent to meeting the current recommendations attenuate or effectively eliminate such associations. Replacing sitting with physical activity, but not standing, attenuated mortality risk among "high sitters" (>6 hours/day).
Game of Stones: developing and testing an endowment financial incentive intervention to support men with obesity to lose weight

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Disease prevention and management (Chair: Els Clays), Club A, June 5, 2019, 14:30 AM - 15:45 PM

**Disease prevention and management (SIG)**

**Purpose**
Commitment contracts linking financial incentives to behaviour change show promise and in theory, losses are more motivating than gains (loss aversion). However not everyone can afford to commit money up front, hence this type of intervention may be inequitable. Our aims were to i) co-produce with men with obesity a novel loss aversion endowment incentive for weight loss that does not involve participants depositing their own money ii) assess acceptability and feasibility of the incentives to men from across the socioeconomic spectrum in the Game of Stones pilot randomised controlled trial (RCT).

**Methods**
The incentive strategy was developed based on a Discrete Choice Experiment (DCE) survey (n=1045 men with obesity). A 12-month feasibility RCT tested SMS with incentives, SMS alone and a waiting list control. Qualitative interviews (26 at 3 months; 14 at 12 months) sought to understand men's experiences of the incentive.

**Findings**
Based on the DCE results, money was linked to weight loss targets of 5% at three (£50), 10% at six (£150) and 10% at 12 months (£200), with the total amount of money available (£400) reducing if weight loss targets were not met. Of 105 adult men with obesity, 36 were randomised to the SMS with incentives group, of which 23 (63.9%) attended at 12 months. Nineteen men in the incentives group lived in more deprived areas and more of these men (n=14) completed the study compared to men living in more advantaged areas. Qualitative findings suggest that some perceived the incentives as losses, but many referred to gaining rewards for meeting targets. Twelve participants received money by meeting weight loss targets, of which three met all their targets and secured the full £400.

**Conclusion**
The endowment incentives were feasible to deliver and some trial completers lost weight. However it was challenging to convey loss aversion. For men from across the socioeconomic spectrum, many of which may not be able to commit their own money up front, the endowment structure is acceptable and shows promise for further testing in a full trial.
16806

O17, O17.5

The Nutritious Eating with Soul Study: 6-month changes in body weight and blood pressure comparing a vegan vs. low-fat soul food dietary intervention

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Disease prevention and management (Chair: Els Clays), Club A, June 5, 2019, 14:30 AM - 15:45 PM

Disease prevention and management (SIG)

Background: African Americans (AAs) have been underrepresented in behavioral nutrition intervention work. Previous research examining different eating patterns among AAs found that AA vegetarians/vegans had significantly lower body mass index (BMI) and risk of hypertension as compared to omnivores. The Nutritious Eating with Soul (NEW Soul) study partners with local soul food restaurants/chefs as part of a 24-month randomized behavioral nutrition intervention for AA adults comparing a vegan vs. omnivorous low-fat diet (omni). The goal of this presentation is to test 6-month changes in weight and blood pressure (BP) by study arm in the first of two cohorts.

Methods: Objective measures of body weight (calibrated digital scale) and blood pressure (automated monitor with a minimum of 2 readings after 5-minute rest) were collected at baseline and 6 months. Participants were randomized to follow one of two healthy versions of a soul food diet (vegan or omni) and attended weekly group meetings/cooking classes for 6 months. Behavior change content was informed by Social Cognitive Theory and modeled after Oldways African Heritage topics. Between and within-subjects t-tests were conducted.

Results: A total of 67 participants enrolled in the study at baseline, with 58 (87%) completing 6-month assessments (n=27 vegan, n=31 omni). Participants had a mean age of 47.7±11.2 years and mean BMI of 36.6±8.0 kg/m2. They were all AA and mostly female (88.1%), and 73.1% had a college or advanced degree. Among those who completed 6-month assessments, both arms achieved significant within-group weight loss (-3.2±3.9 kg vegan, p<0.001; -2.6±4.9 kg omni, p<0.01), which did not significantly differ between arms. The omni group achieved significant within-group reductions in systolic BP (-6.2±13.2 mmHg, p=0.01), whereas the vegan group did not (-3.2±14.3 mmHg, p=0.25). The vegan group achieved significant within-group reductions in diastolic BP (-3.5±8.5 mmHg, p=0.04), whereas the omni did not (-1.9±6.5 mmHg, p=0.10).

Conclusions: Short-term reductions in body weight and BP can be achieved through a weekly behavioral nutrition intervention. The NEW Soul study partners with local soul food restaurants and chefs to deliver a culturally-tailored intervention that has the potential to be widely disseminated through community restaurants.
Effect of an m-health physical activity and sleep intervention on mental health and health-related quality of life: secondary outcomes from a randomized controlled trial

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Objective: Poor sleep health and physical inactivity are common and both increase the risk of poor mental health and health-related quality of life (HRQoL). This study aimed to compare the efficacy of a combined physical activity and sleep health intervention with a sleep health-only intervention and a wait-list control, for improving mental distress, symptom severity of depression, anxiety and stress, and HRQoL.

Methods: Physically inactive adults (40-65 years) reporting poor sleep quality but without a diagnosed sleep disorder (n = 275) were recruited for a three-arm randomized controlled trial (Physical Activity and Sleep Health (PAS), Sleep Health-Only (SO) or Wait-list Control (CON) groups). Intervention groups accessed a mobile "app" using behaviour change strategies for activity and/or sleep (e.g., self-monitoring, goal setting, feedback) with 12 weeks of additional email/SMS support. PAS group participants received a pedometer. Primary outcomes were mental distress (Kessler-6: scores range 0-24; scores =5 indicate increasing mental distress), symptom severity of depression, anxiety and stress (DASS-21: higher scores indicate poorer outcomes) and HRQoL (SF-12 mental and physical health components; RAND-36 energy/fatigue component: higher scores indicate better outcomes). Group differences were examined in a stepwise fashion, first between pooled intervention (PI) and CON groups, then PAS and SO groups.

Results/findings: The PI groups had significantly better scores relative to control for mental distress (between-group mean difference [95% CI] at 3 months, -1.28, [-2.14, -0.43]; p=0.003), HRQoL mental component (3 months, 5.31 [2.25, 8.36]; p=0.001), HRQoL physical component (6 months, 3.50 [0.89, 6.11]; p=0.009) and energy/fatigue (3 months, 7.87 [3.56, 12.18]; p <0.001; 6 months, 9.44 [3.51, 15.37]; p=0.002). There were no differences between any groups, at any time, for DASS-21 scores. There were no significant differences between SO and PAS, except significantly better HRQOL mental health scores for the SO group relative to the PAS group (6 months, 3.19 [0.22, 6.17]; p=0.036).

Conclusion and Relevance: Improving sleep quality in non-clinical populations may enhance mental health and HRQoL. The addition of physical activity to a sleep intervention did not result in additional improvements for any of the reported outcomes. Combined PA and sleep interventions warrant further exploration.
O18, O18.1

Associations between abdominal adiposity, body size and objectively measured physical activity in infants from Soweto, South Africa

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Pregnancy and early childhood (Chair: Jenna Hollis), Club B, June 5, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: In conjunction with increases in adiposity, populations are becoming more sedentary and less physically active from a very young age. This study aimed to determine associations between abdominal adiposity, body size, and objectively measured physical activity in infancy using novel imaging techniques and 24-hour accelerometry.

Methods: Infants (n=138, aged 3-24 months) from Soweto, South Africa were recruited to this cross-sectional study. Visceral (VAT) and subcutaneous abdominal fat (SAT) were measured using ultrasound. Physical activity was objectively assessed using 24-hour accelerometry and analysed at the hourly level. Multilevel linear regression analyses were run with body composition exposures adjusted for age, sex, and length; models with VAT and SAT were also adjusted for total abdominal fat. Physical activity was compared between tertiles of adjusted exposure variables using one way ANOVA.

Results: Mean (SD) age was 11.8 (7.6) months; 86% were normal weight, 7% were underweight and 7% overweight. In linear models, no body composition variable was significantly associated with physical activity. Physical activity was higher with each increasing length tertile (ANOVA p<0.01); with a mean(95%CI) 29(60-60)mg in the lowest tertile, 39(71-71)mg in the middle tertile, and 50(81-82)mg in the highest tertile. Infants with normal weight had higher mean(95%CI) physical activity (40(70-80)mg) than underweight (34(73-85)mg, p=0.01) or overweight infants (31(63-78)mg, ANOVA p<0.01). When also adjusting for total abdominal fat, infants in the lowest SAT tertile had higher physical activity than those in the middle or highest SAT tertiles (p<0.01). Infants in the middle VAT tertile had higher physical activity than those in the lowest or highest VAT tertiles (p<0.01).

Conclusions: Infants who appear to be thriving are more physically active than those who are malnourished. These findings lend support for higher physical activity as a marker of healthy growth in the first two years of life. These results provide the first insight into the effect that optimal growth may have on infants' physical activity, and may be important for understanding how non-optimal growth may negatively impact health outcomes in children.
Qualitative analysis of real-time motivations, facilitators, barriers and strategies for physical activity and healthy eating behaviour during pregnancy

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Pregnancy and early childhood (Chair: Jenna Hollis), Club B, June 5, 2019, 2:30 PM - 3:45 PM

Purpose: Qualitative interviews are limited by their cross-sectional nature and recall bias, especially during pregnancy this is a limitation given the constant changes happening in a woman's life. Therefore, we aimed to acquire insight into real-time motives, barriers, facilitators and strategies across pregnancy among overweight pregnant women following a lifestyle intervention.

Methods: In the European DALI-study pregnant women (BMI = 29 kg/m²) received a behavioural lifestyle intervention addressing healthy eating and/or physical activity. It consisted of five face-to-face sessions with a personal lifestyle coach trained in motivational interviewing. Face-to-face sessions of 26 Dutch participants were audiorecorded and transcribed verbatim (n=73 sessions). The data was analysed with AtlasTi7.

Results: Women were motivated because of benefits for their baby (related to both healthy pregnancy and normal delivery), and to feel good, healthy, fit and energized themselves. Facilitators comprised social support/companionship; fun; available equipment (e.g. pedometer created consciousness); work. However, women expressed many pregnancy-related barriers for being physically active, especially fatigue, physical complaints (e.g. lower back pain, pelvic pain), and anxiousness of the risks and dangers for their child. In addition, their growing belly prevented them to be physically active. Lack of time, prioritising other activities above physical activity, weather situation and lack of social support/companionship were mentioned as well. Strategies comprised incorporation of more physical activity in daily life activities (e.g. walking to work, taking the stairs), and alteration to more pregnancy suitable activities (e.g. swimming, walking). Women expressed pregnancy-related barriers for healthy eating, such as nausea, vomiting and tiredness. Other barriers were related to the interaction with the social environment, cravings, available time, and boredom. Most applied strategies comprised taking healthier alternatives or smaller portions, anticipation to certain situations, compensation with physical activity or with healthier eating the day after, not buying unhealthy products and tracking of calorie intake.

Discussion: Compared to recall interviews this research method comprises a more accurate representation of the actual struggles and solutions women made. The results could stimulate behavioural changes and inform future health interventions.
Pregnancy as a transition period and implications for improving health: perspectives from expectant mothers and fathers

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Pregnancy and early childhood (Chair: Jenna Hollis), Club B, June 5, 2019, 2:30 PM - 3:45 PM

Purpose: Interventions to support diet and physical activity during pregnancy are usually designed for a general population of pregnant women and often overlook the role of their partner. To inform the development of future interventions, this study explored the (1) factors that influenced women's diet and physical activity during pregnancy and (2) perspectives of fathers on their role and involvement in health during pregnancy.

Methods: This was a qualitative study. Individual interviews were completed with 17 women who participated in a trial of vitamin D supplementation and nurse support in pregnancy. Additional focus groups with 20 women and their partners (N=20) who were attending a 'Preparation for Birth and Beyond' group as part of usual maternity care were undertaken. Interview transcripts were coded thematically and analysed to characterise the perspectives of expectant mothers and fathers on health during pregnancy.

Results: Expectant mothers and fathers identified barriers to eating well or being physically active, and pregnancy-specific issues like nausea and pain were common. Women's interest in maintaining a healthy lifestyle and their engagement with lifestyle support reflected a continuum of the extent to which they self-identified as healthy people. Health-disengaged women were disinterested in talking about their lifestyles while health-focused women did not feel that they needed extra support. Women between these ends of the 'health identity' spectrum were interested in improving their health, and were able to engage with sources of support. Fathers actively prepared for fatherhood and made efforts to support their partner in what they perceived her needs to be during her pregnancy. The fathers felt they were not expected to engage closely with the mother's physical health during pregnancy and were not actively involved by maternity services.

Conclusions: Lifestyle interventions in pregnancy should be adaptable to meet the needs of individuals with different health identities, and encouraging a change in health identity may be one way of supporting sustained change in health behaviours. Including partners in interventions to support diet and physical activity during pregnancy could provide additional benefits and enhance maternal, child and family health.
Preconception dietary patterns during adolescence and risk of developing hypertensive disorders of pregnancy: a Norwegian prospective cohort study

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Pregnancy and early childhood (Chair: Jenna Hollis), Club B, June 5, 2019, 2:30 PM - 3:45 PM

Objective: Non-communicable diseases account for more than 75% of deaths and disease burden in Europe, with poor diet as one of the leading causes. It is known that nutrition in the first 1000 days of life plays a vital role in the etiology of these preventable disorders. To our knowledge, there is no evidence from longitudinal population-based studies regarding the relationship between maternal diet during adolescence and the health of the next generation. The general aim of this study is to examine if early preconception diet predicts pregnancy health outcomes in adulthood (i.e., gestational hypertension, pre-eclampsia) as these complications have adverse health impacts for both mother and child.

Methods: Demographic and dietary data of the Young-Health Study in Nord-Trøndelag (HUNT) has been merged with pregnancy data from the Medical Birth Registry of Norway (MBRN) to answer this research question. Diet was assessed with a valid and reliable food frequency questionnaire. Factor analysis was used to identify food indexes, i.e., healthy foods, unhealthy foods, fibre, and fruit and vegetable index. Pregnancy health outcomes have been collected by the maternity units in Norway, who notify this information to the MBRN. Our study included 5364 singleton pregnancies reported among 2817 participants between 1995 and 2018. Included pregnancies were free of chronic diseases (i.e., diabetes mellitus, hypertension) before pregnancy or previous hypertensive disorders during pregnancy. Generalized estimating equation models were used to estimate the relative risks and 95% confidence intervals adjusted for socio-demographic, lifestyle, dietary, and reproductive factors.

Results: During 23 years of follow-up of 2817 women, 251 women (4.7%) reported a first diagnosis of hypertensive disorders of pregnancy. None of the food indexes was significantly associated with hypertensive disorders of pregnancy, apart from one borderline significant association between the fibre index and pre-eclampsia during pregnancy (RR (95%) = 0.84 (0.71, 1.00); p=0.04).

Conclusions: In this study, a protective association has been found between early preconception consumption of fiber and pre-eclampsia risk. Additional studies are recommended to confirm these findings. Nevertheless, our study is the first to confirm the impact of early preconception diet during adolescence on the health of the next generation.
16821

O18, O18.5

Associations of pregnancy physical activity with maternal and neonatal cardiometabolic health in a biethnic cohort of 7,305 mother-child dyads

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Pregnancy and early childhood (Chair: Jenna Hollis), Club B, June 5, 2019, 2:30 PM - 3:45 PM

Other

Purpose: Regular physical activity is advocated for a range of benefits to the uncomplicated pregnancy. However, studies evaluating the health benefits of pregnancy physical activity have almost exclusively been in samples of white women. We investigated associations of pregnancy physical activity with maternal and neonatal cardiometabolic health in white British women and UK-born Pakistani-origin women, who are higher risk for complications such as gestational diabetes. Methods: The study was performed in 6,921 pregnant women (53% Pakistani-origin) who contributed data for 7,305 singleton births as part of the Born in Bradford birth cohort study. At ~26-28 weeks gestation, women were grouped into four activity levels (inactive / somewhat active / moderately active / active) based on their self-reported occupational physical activity level, physical exercise and walking. Maternal cardiometabolic health markers included adiposity (upper arm circumference and triceps skinfold thickness), blood pressure, fasting and postload blood glucose, fasting insulin and cholesterol levels. Neonatal health markers included gestational age, birth weight, and multiple measures of adiposity. Linear regression with robust standard errors were used to calculate adjusted mean differences in health markers between the four groups of maternal physical activity (reference group: inactive). Trend-tests across physical activity categories were also performed. Results: Three-quarters (74%) of Pakistani-origin women and 39% of white British women were classified as inactive. There was consistent evidence for effect modification by ethnicity. Trend tests revealed that more active white British women tended to be less adipose, had lower fasting and postload glucose levels, lower triglyceride concentrations, and their babies were less adipose (smaller triceps and subscapular skinfolds) than lower active white British women. Somewhat active Pakistani-origin women exhibited lower triglyceride concentrations and systolic blood pressure, higher HDL cholesterol levels, and their babies were less adipose (smaller upper arm and abdominal circumferences; lower cord-blood leptin concentration) compared to inactive Pakistani-origin women. No associations were observed for birth weight or gestational age. Conclusions: In both Pakistani-origin and white British pregnant women, three-quarters of whom and almost half (respectively) were inactive, even modest amounts of physical activity appeared to benefit markers of maternal and neonatal cardiometabolic health.
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Pregnancy and early childhood (Chair: Jenna Hollis), Club B, June 5, 2019, 2:30 PM - 3:45 PM

Objective
Participation in walking groups is associated with improvements in physical activity and mental health. Postnatal women are often inactive, with walking consistently reported by women as their preferred physical activity after having a baby. Whilst postnatal walking groups are often well-liked, little is known about what makes them acceptable to women. The aim of this study was to assess the acceptability of a free community-based walking group for postnatal women.

Methods
Seventeen women (mean age 33 years) attending two different walking groups in London, England were recruited to this study. All participants had a baby younger than 12 months. The interviews were based on the newly developed Theoretical Framework of Acceptability (Sekhon et al, 2017) which consists of seven constructs: affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs, and self-efficacy. Interviews were recorded, transcribed verbatim and analysed thematically.

Results
Overall, the walking group was found to be acceptable to the participants. The two most prevalent constructs reported by participants were affective attitude and self-efficacy; women felt they benefitted from meeting other mothers and walking in an accessible and convenient location. They also felt confident they could attend the walking group, and thought the group achieved its aim of increasing physical activity and supporting new mothers (perceived effectiveness). Most women reported that attending the group was little effort (burden) although for some the timing did not fit well with their baby's schedule. Participants consistently said that attending the group and being physically active aligned with their value system (ethicality). Finally, participants understood how the group worked (intervention coherence) and reported few activities that had to be given up to engage in the walking group (opportunity costs).

Conclusions
These findings contribute to the literature by using a new theoretical framework to assess aspects of intervention acceptability. Whilst the benefits associated with walking group attendance have been identified previously, this study provides novel findings regarding how attendance fits in with participants' personal values and women's views on burden and opportunity costs. These findings can be used to further develop postnatal walking interventions.
Diet quality of U.S. infants and toddlers 7-24 months old in the WIC Infant and Toddler Feeding Practices Study-2

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Behavioral nutrition assessment in youth (Chair: Louise Masse), Club C, June 5, 2019, 2:30 PM - 3:45 PM

Objective: Despite the important implications of childhood dietary intakes on lifelong eating habits and health, data are lacking on the diet quality of low-income infants and toddlers. The objective of this study is to characterize the diet quality of low-income U.S. infants and toddlers. This study will be the first of its kind to use diet quality indices to characterize the diet quality of the youngest participants in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC).

Methods: A national observational study was conducted of 7-12-month old (n=1,261), 13-month old (n=2,515), and 24-month old (n=2,179) children enrolled in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) prenatally/at birth from 2013-2016. 24-hour dietary recall and survey questions were used. For 7-12 months, an adapted Complementary Feeding Utility Index (CFUI) was used, and for 13 and 24 months, the Healthy Eating Index-2015 (HEI-2015) was used. Descriptive statistics were calculated for CFUI and HEI-2015 scores.

Results: For 7-12 months, the CFUI score (mean±smn;SE) was 0.56±smn;0.003 (range 0.34-0.90, maximum possible 1.0). Most children met CFUI standards for exposure to iron-rich cereal (86.7%), and low exposure to energy-dense nutrient-poor foods (72.2%) and teas/broths (67.5%). Conversely, at 7-12 months, exposure was low for vegetables (7.0%), fruits (14.4%), any sugary drinks (14.0%), and 12-month breastfeeding duration (23.8%). At 13 and 24 months, the HEI-2015 total score (maximum possible 100), on average, was 64.0. At both 13 and 24 months, participants achieved, on average, maximal HEI-2015 component scores for total and whole fruits, and dairy; however, scores for total vegetables, greens and beans, whole grains, seafood and plant proteins, fatty acids, and saturated fats were relatively low. Scores for refined grains, sodium, and added sugar, were lower at 24 than at 13 months, representing higher consumption, on average, over time.

Conclusions: While findings demonstrate that young children are doing well on some dietary components, there is room for improvement, especially as children age. Findings may be used to inform the Pregnancy and Birth to 24-mo (P/B-24) Project.
17258

O19, O19.2

Ecological momentary assessment of using food to soothe during infancy in the INSIGHT trail

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Behavioral nutrition assessment in youth (Chair: Louise Masse), Club C, June 5, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: Evidence on use of food to soothe (FTS) infant distress has relied on parent-reported questionnaires at a single time point. This study used ecological momentary assessment to evaluate a responsive parenting (RP) intervention on parents' use of FTS and if feeding mode moderated this association.

Methods: Primiparous mother-newborn dyads were randomized to the INSIGHT RP intervention or safety control. RP curriculum included guidance on using alternative soothing strategies (e.g. rocking), rather than feeding, as the first response to infant fussiness. After the initial intervention visit 3 weeks after delivery, mothers (n=152) were surveyed via text message every 4 hours, between 8:00AM-10:00PM, for two 5-8 days bursts, at infant ages 3 and 8 weeks. Infant fusses and feeds were reported for each 4-hour interval. FTS was defined as Fed First vs. Not Fed First in response to a fussy event. Feeding mode was defined as predominantly breastfed (n=92) vs. not predominantly breastfed (n=60) at age 2 weeks. FTS was modeled using random-intercept logistic regression.

Results: At 3 and 8 weeks, the greatest number of fusses and feeds occurred between 6:00, 10:00PM (2.6±smn; 1.5 fusses; 2.1±smn; 0.9 feeds). Among 10 soothing strategies assessed, feeding was the most common with 44.1% of fusses resulting in Fed First. For 54.9% of fusses, mothers reported feeding as the soothing strategy that worked best. There was a significant group by time interaction with the control group showing greater odds of having Fed First over the RP group, and a shrinking effect across time (3 weeks: Odds Ratio=1.2; CI=1.1-1.3; p<.01; 8 weeks: OR=1.1; CI=1.0-1.2; p=.02). Feeding mode moderated the relationship between study group and FTS, independent of infant age. For predominantly breastfed infants, the control group showed greater odds of Fed First, compared to the RP group (OR=1.2, 95% CI: 1.1-1.3; p<.01). For infants not predominantly breastfed, the use of FTS did not differ by study group. (p>.05).

Conclusions: INSIGHT’s RP intervention was associated with a reduction in FTS as the first response to infant fussiness for predominantly breastfed infants. Future work should explore how feeding mode (e.g. bottle vs. breast) affects mothers' use of FTS.
"Everyone can take photos": Assessing children’s diets using parent smartphones in a low-SEP population – a mixed methods feasibility and validation study

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Behavioral nutrition assessment in youth (Chair: Louise Masse), Club C, June 5, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose
To test if smartphone photography can overcome two well-known challenges: i) problems assessing diet objectively in children, ii) low study participation rates by populations of low socioeconomic position (SEP). Using both quantitative and, more unusually, qualitative data, we tested both the validity and feasibility of active image-based assessment by proxy.

Methods
Nineteen parents of mixed SEP with a child aged 5-7 were recruited from an unrelated study. Parents took photos on two weekdays, one weekend day, before and after every eating occasion, outside of schooltime. A fiduciary marker was provided (not compulsory) but no other directions were provided. Photos were sent by MMS immediately (or later if necessary). An SMS-question each evening captured information that may have been missed during the day. Photos were coded by nutritionists. Outcome variables were decilitres of fruits and vegetables, unhealthy foods (sweets, ice cream, cakes/biscuits, crisps) and drinks (soft drinks, sugar-sweetened milk and fruit juice). Reference intake: 3x24-hour recalls of photo-days by dietician interview. An online questionnaire captured barriers and facilitators (open-ended questions), analysed using qualitative content analysis.

Results
Absolute intakes were significantly correlated for all but one subcategory (sweets), but as expected, photos underestimated all (bar one) food categories. Differences in medians were significant only for fruits and vegetables and cakes/biscuits, and a Bland-Altman plot suggested that underestimation was fairly constant, implying correct ranking of intakes is possible. Photos correctly identified 100% of children who consumed healthy foods, 73% who consumed unhealthy foods, and 92% who consumed unhealthy drinks. When extra information was received by SMS, correlations were overall higher and misclassification lower than when no information was received. On the whole, parents found the method a positive experience, describing it as i.e. "interesting" and "simple". Parents could express themselves, did not have to explain, and ethnic foods could be included. Barriers mentioned were difficulties when away from home/usual routine, when a child was snacking, the time involved and simply having to remember to photograph.

Conclusions
The method showed acceptable validity and was feasible. This method holds promise for populations of high needs that are often difficult to engage in studies.
17306

O19, O19.4

Changes in energy and nutrient selection in school lunches: Findings from the SWITCH® Intervention

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Behavioral nutrition assessment in youth (Chair: Louise Masse), Club C, June 5, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objectives: Emerging evidence shows school lunchrooms influence students' eating behaviors. The SWITCH™ program (School Wellness Integration Targeting Child Health) helps schools implement system and practice change to promote school wellness, including promoting healthy eating. Previously we demonstrated that SWITCH™ programming had a positive influence on fruit consumption. The current study examined the influence of SWITCH™ programming on school lunch energy and nutrient selection.

Methods: In a mid-size Midwestern United States community suburban school district, a quasi-experimental design compared two self-selected SWITCH™ schools and two control schools. Before- and after-lunch photos were taken for a total of 740 trays over 16 plate waste measurements pre and post of the 12-week intervention phase on a sample of 5th grade students (n = 200 control and n = 201 SWITCH™). The selection (food or food+milk) of energy and six nutrients (sodium, fiber, protein, carbohydrate, total fat, and saturated fat) was calculated for each tray photograph, using the Quarter System rating scale. Linear mixed models were established to detect the influence of SWITCH™ programming on energy and nutrient selection. The energy and nutrients that were contained in selected food + milk were compared to the recommended nutrient targets of the National Academy of Medicine using generalized linear mixed models. Data shown are mean and standard error of the mean (M ±smn; SEM).

Results: For selection (food only), SWITCH™ participation was related to a significant decrease for students in sodium from 732 ±smn; 77 mg to 684 ±smn; 77 mg (p=0.04) and significant increase for students in fiber from 6.7 ±smn; 0.4 g to 7.5 ±smn; 0.4 g (p=0.04). For selection (food + milk), SWITCH™ participation improved the percentage of students who met the energy recommendations from 29 ±smn; 4 % to 47 ±smn; 4% (p=0.002) and fiber recommendations from 27 ±smn; 3 % to 38 ±smn; 3% (p=0.06).

Conclusions: The study demonstrates the potential of SWITCH to enhance selection and consumption of healthy foods but further research is warranted.
O19, O19.5

Influence of active (opt-in) consent versus passive (opt-out) consent on estimates of adherence to movement and dietary guidelines. Evidence from the Healthy Together Victoria and Childhood Obesity (HTVCO) Study

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Behavioral nutrition assessment in youth (Chair: Louise Masse), Club C, June 5, 2019, 2:30 PM - 3:45 PM

Purpose. Active (opt-in) consent in school-based research results in biased estimates of measured overweight/obesity; as high as -5.4 percentage points (p<0.0001). The influence of non-participation bias on estimates of self-reported physical activity (PA), screen-time (ST) and dietary guidelines is not well understood. In this study we quantified non-participation bias associated with opt-in consent on prevalence of meeting the Australian national PA, ST, fruit and vegetable (Veg) guidelines.

Methods. In this repeat cross-sectional study, primary schools spread across 26 local government areas were invited through random selection. Students in Grade 4 (aged approx. 9-10 years) and Grade 6 (aged approx. 11-12 years) at participating schools were invited through opt-in consent in 2013 and opt-out consent in 2014 to complete a self-report behavioural questionnaire. For the opt-in wave N = 38 schools (recruitment rate (RR) 24.3%) and N = 856 students participated (RR 36.3%). For the opt-out wave N = 47 schools (RR 32%) and N = 2557 students participated (RR 86.4%). Resampling was used to estimate selection bias due to opt-in consent. 10,000 samples (N=856) were drawn from the 2014 study sample to obtain the empirical distribution of prevalence meeting PA [= 60 mins/day of moderate-to-vigorous PA], ST (= 2hrs/day of screen-time for leisure), fruit (= 2 serves per day) and Veg (girls 9-18 years = 5 serves/day; boys 9-11 years = 5 serves/day; boys 12-18 years = 5.5 serves/day) guidelines under opt-out consent. Standardized bias (Std bias) estimates defined as bias/standard error are reported for all estimates.

Results

Opt-in consent overestimated adherence to ST (2013 proportion = 52%, 2014 proportion = 47%; Std bias = 4.0) and underestimated adherence to fruit guidelines (2013 proportion = 73%, 2014 proportion = 75%; Std bias = -1.8). No meaningful difference in PA (2013 proportion = 12%, 2014 proportion = 14%; Std bias = -1.8) or Veg was observed (2013 proportion = 10%, 2014 proportion = 10%; Std bias = -0.3). Results will be presented on gender and grade-level difference in bias.

Conclusions. Studies using opt-in consent for monitoring and intervention evaluation should move to opt-out consent for improved scientific outcomes.
Don’t make your users go bananas: Assessing the usability of the Automated Self-Administered Dietary Assessment Tool (ASA24)

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Behavioral nutrition assessment in youth (Chair: Louise Masse), Club C, June 5, 2019, 2:30 PM - 3:45 PM

Purpose: Accurate and detailed characterization of dietary intake is essential in nutrition research. The Automated Self-Administered Dietary Assessment Tool (ASA24) is a web-based tool that guides participants through completion of a 24-hour dietary recall and automatically codes the data. Despite the advantages of automation, eliminating interviewer contact may diminish data quality. Usability testing can offer a novel means to understand the extent to which individuals can use the ASA24 to report dietary intake with efficiency, effectiveness, and satisfaction, however it has not been used to evaluate automated dietary assessment tools. This mixed-methods study evaluated the usability of the ASA24 to quantify user performance and to qualitatively examine usability issues that may compromise the validity of dietary intake data.

Methods: Thirty-nine participants completed a 24-hour dietary recall using the ASA24 during moderated (n=10), semi-moderated (n=12), and un-moderated (n=17) sessions. Moderated and semi-moderated sessions involved real-time collection of audio (think-aloud interviews) and/or screen recordings. Quantitative data were analyzed to calculate task times, success rates, food-item counts, and usability issue frequency. Qualitative data were thematically analyzed to characterize usability issues. Un-moderated sessions provided an indication of participants' ability to complete the ASA24 in the most realistic real-use scenario.

Results: Participants took an average of 27 minutes to complete the ASA24, however only one participant was able to complete a dietary recall unassisted. Two-hundred-eighty-six individual usability issues, aggregated as 22 general usability issues, were identified. Seventy-one percent of participants knowingly misentered dietary information at least once. Other key usability issues included difficulties using the search function, misunderstanding questions, uncertainty regarding how to proceed to the next step and misclicks. Participants who encountered usability issues indicated that they may have exited the system or entered data incorrectly without the support of a moderator.

Conclusions: Usability issues may diminish participation rates and compromise the quality of dietary intake data collected using the ASA24. Researchers relying on the ASA24 should ensure on-demand technical support is available and allow participants to retrospectively report items entered incorrectly. Designers of the ASA24 should expand the intelligence and flexibility of the search functionality, simplify terminology and remove irrelevant questions.
WEDNESDAY JUNE 5 2019

ECR TALKS,
ECR TALK, ECR01

Advancing behavior science methods and theories: On the road to personalisation

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Maximizing the effectiveness of evidence-based behavior change interventions requires the application of interdisciplinary methods to answer variants of the big question: “What works, compared to what, how well, with what behaviours, for whom, in what settings, and why?” Advancing behaviour science methods and theories, as well as artificial intelligence-based systems, will allow us to answer variants of this question and move a step forward from a “one size fits all” to a “precision behaviour change” approach to influence health-related behaviours. This presentation will provide an overview of and challenges associated with current cutting-edge projects (e.g. the Human Behaviour Change Project), which aim to improve evidence- and theory-based behaviour change interventions by developing and applying ontological frameworks to identify factors that enable the development of personalised behaviour change interventions.
Physical activity and also physical fitness is associated with the built environment in adolescents

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The beneficial effect of regular physical activity and optimal physical fitness on human health has been previously confirmed. Especially in the adolescents, both physical activity and physical fitness seems to be crucial because individuals in this age form physical habits for adulthood. However, many developed countries documented negative trend of decreasing overall physical activity and physical fitness. Recent research studies outlined that the development of suitable built environment might be a key factor for improving physical activity in large scale population. Limited number of studies showed specific associations between built environment and physical fitness. The purpose of this contribution is to discuss the importance of physical activity measuring and physical fitness testing and describe associations of physical activity and physical fitness with the built environment in youth. On the example of own data from the Czech adolescent population, our Czech IPEN working group tried to prepare conclusions. Physical activity was monitored objectively by the Yamax pedometer and also by the ActiGraph accelerometer. Physical fitness was tested also objectively using a new set designed to assess health-related fitness in children and youth available in the INDARES system. Research has confirmed that the attributes of built environment have a positive or negative effect on physical activity behavior. Study has also revealed specific association between physical fitness and built environment. Our research contributes to the identification of the important conditions of the built environment in relation to physical activity that could increase its level in the future and at the same time lead to a positive impact on the level of physical fitness among the adolescent population.
ECR TALK, ECR03

Changes in non-organised physical activity in the transition from childhood to adolescence: what, who, and why?

Kemp B

1University of Wollongong, Australia

ECR Talk (Chair: Benedicte Deforche), North Hall, June 5, 2019, 3:50 PM - 4:20 PM

Background: Physical activity (PA) is prone to decline with age during childhood and adolescence. One emerging area of research is the context in which physical activity occurs, also known as domain-specific PA (e.g. organised PA, non-organised PA, active transport). This research seeks to explore changes in participation in PA domains during the transition from childhood to adolescence, with a particular focus on non-organised PA. Aspects of non-organised PA participation are explored, including socioecological predictors, social marketing ‘competitors’ and social norms relating to participation.

Methods: A mixed-methods research design is utilised, which includes: a systematic literature review; analysis of data from a national prospective cohort study (Longitudinal Study of Australian Children) (n=4,108); and semi-structured interviews including embedded life-history calendars (in progress).

Results: A significant decline in non-organised PA between 11y and 15y was observed (-48 min/day, p<0.001), alongside a simultaneous decline in overall PA (-45 min/day, p<0.001). Activities that competed with non-organised PA between 11y and 13y were: texting, emailing and social media use (d=0.26, p<0.001); verbal communication (d=0.25, p<0.001); other PA (d=0.16, p<0.001) and other internet use (d=0.15, p<0.001). However, the decline in non-organised PA between 11y and 13y was only predicted by sex (females) (β = 10.50, 95%CI=1.91-19.08).

Conclusions: Targeting non-organised PA may contribute to attenuating the longitudinal decline in PA among Australian youth. Strategies may include understanding the social normative context of dropout from non-organised PA and targeting girls in the transition to adolescence. Social marketing strategies may seek to replicate the perceived benefits of ‘competitor’ activities through the use of PA apps and emphasising forms of non-organised PA that involve verbal cooperation.

Supervisors: Dr Anne-Maree Parrish and Dr Dylan Cliff (University of Wollongong)
Complexity in public health interventions

Jawad A

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ECR Talk (Chair: Marie Lóf), Terrace 2A, June 5, 2019, 3:50 PM - 4:20 PM

Complex systems thinking is increasingly used as a tool to help conceptualise complex public health problems and identify policy responses. Complex systems theory describes the dynamic evolution of a given system that changes over time in response to actions and behaviours within it. Many chronic health conditions are inherently complex, yet much public health preventative research focuses on linear associations between causes and effects. To illustrate, the prevalence of obesity has generated policy approaches such as changing food packaging labels or promoting healthy weight by telling people to “eat less move more”. Yet reversing obesity prevalence requires interventions across a range of sectors: in homes, schools, communities and the workplace; changes to the built environment, taxation, and regulation of planning laws; as well as health promotion and literacy. Furthermore, interventions may have intended and unintended consequences that would need to be considered and investigated. However, evaluating any such intervention in isolation, as per the dominant methodological approach, is unlikely to capture the shift in systems and identify how to influence the system to improve health.

Using a complex systems approach to obesity incorporates a comprehensive examination of the problem. It provides not just an apt conceptual model but also tools such as the creation of ‘systems maps’ through engagement of stakeholders to identify key factors and potential leverage points for intervention. Current research, particularly for obesity, has focused on describing systems although there are few examples of this being used in policy development.

There are many barriers to complex systems research and evidence generation, including methodological challenges, limited resources and funding mechanisms, and the feasibility of implementing findings. Overcoming these barriers through substantial changes to the way research is conceptualised and conducted can reduce the over-simplication of complex public health problems to achieve a greater impact on population health and wellbeing.
WEDNESDAY JUNE 5 2019
SYMPOSIA SESSION 2,
Effectiveness and cost-effectiveness of urban green space interventions

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Policies and environments (SIG)

Purpose: To showcase results regarding the effectiveness and cost-effectiveness of urban green space (UGS) interventions, and identify and discuss research priorities and methodologies in this area.

Rationale: A systematic review demonstrated promising evidence to support the use of UGS interventions for health, social and environmental benefits, particularly among lower socioeconomic status groups. There are very few, if any, other public health interventions that can achieve all of this. However, given the narrow, unidimensional lens of previous interventions, research is yet to realise the true potential of UGS. Therefore, the aim of this symposium is to investigate the public health impact of UGS interventions on a range of physical activity, health, social, economic and environment outcomes, populations and settings to provide an understanding of the public health influence of systems-level interventions.

Objectives:
1) Present three studies from different countries investigating the effectiveness and cost-effectiveness of UGS interventions using natural experiment methodology;
2) Discuss different methodologies suited to address specific evidence gaps and population groups
3) Engage attendees in a discussion about research priorities, scale-up, implementation and translational factors, and methodologies that could advance this field.

Summary:
The chair person (Ruth Hunter, UK) will open the symposium with a brief introduction about the current state of the science in the field of UGS interventions and highlight important gaps and issues regarding knowledge implementation and translation. Hayley Christian (Australia), will present findings from a natural experiment of the impact of upgrades to early childhood education and care services outdoor physical environment on young children’s physical activity and educator physical activity practices. Jenny Veitch (Australia) will present a study assessing the cost-effectiveness of the installation of a play-scape in a large metropolitan park based on changes in physical activity compared to a control park that underwent no changes. Ruth Hunter will present a natural experiment which provides an overview of the public health impact of the development of a new urban greenway in Northern Ireland. This study focuses on the interaction between physical and social environmental characteristics. The discussant, Rodrigo Reis (Brazil/USA), will reflect upon the presentations and moderate a discussion on research priorities, knowledge implementation and translation.

Format:
1) Introduction by chair (5 minutes)
2) Three presentations (each 12 minutes + 3 minutes for questions)
3) Brief reflection by discussant (5 minutes)
4) General discussion moderated by the discussant (20 minutes)
Impact of upgrades to early childhood education and care services outdoor physical environment on children’s physical activity and educator physical activity practices: Findings from the PLAYCE study

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Purpose: Only one third of Australian preschoolers meet PA guidelines. Considering a high proportion of young children attend some form of early childhood education and care (ECEC) these services are an important setting for promoting PA. This natural experiment investigated how changes to the ECEC outdoor physical environment influences children's PA levels and educator PA practices.

Methods: Participants were 159 intervention (N=6 ECEC centres) and 138 control children (N=5 ECEC centres) aged 2-5 recruited from the PLAYCE study in Perth, Western Australia. The intervention involved a large upgrade to the ECEC outdoor space which was implemented by centres without input from study personnel. PA data was collected by 7-day accelerometry with data extracted for time at ECEC. The ECEC outdoor physical environment was assessed using a modified version of the Environment and Policy Assessment and Observation (EPAO) Instrument. Data were collected at baseline; and at 3-6 months post-intervention for intervention centres or 6-12 months after baseline assessment for control centres.

Results: Large playground structures, portable play equipment, flowerbeds, and the amount of outdoor space per child were associated with higher levels of PA in children while attending ECEC. Fixed musical equipment, fixed swinging equipment, portable rocking/twisting toys, secret/secluded areas, shrubs/bushes, vegetable/herb/fruit garden, rocks/pebbles, trees, and sloping grounds were significantly associated with less PA in children while in ECEC. Overall, changes to the ECEC outdoor physical environment in intervention centres were small and mostly to features that were not PA promoting. There was no significant impact from upgrades to intervention centres outdoor play spaces upon children's PA. The impact of the upgrades to ECEC outdoor spaces on educator PA practices is being analysed and will be presented.

Conclusions: Different features of the ECEC outdoor physical environment are associated with increased or decreased PA in children. To encourage children to achieve PA guidelines, it is important that PA promoting features and sufficient open space are provided in ECEC outdoor play spaces. Future intervention studies are required to focus on the effect of adding only PA promoting features to ECEC outdoor areas as well as the impact of interventions on child development.
The cost-effectiveness of a play-scape installation on physical activity: The REVAMP study


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15865: Effectiveness and Cost-effectiveness of Urban Green Space Interventions (Convenor: Ruth Hunter), South Hall 2A, June 5, 2019, 4:35 PM - 5:50 PM

Policies and environments (SIG)

Purpose: Public open spaces such as parks are important settings for recreational physical activity. Improving park design and amenity has been shown to increase visitation and park-based physical activity, however, there is little evidence of the cost-effectiveness of park refurbishment for increasing physical activity. This study assessed the cost-effectiveness of the installation of a play-scape in a large metropolitan park located in a low socioeconomic area of Melbourne, Australia based on changes in physical activity compared to a control park that underwent no changes.

Methods: Direct observations (on 4 weekdays and 4 weekend days) of visitors and their activities undertaken in the park were completed at the intervention and control parks before the play-scape installation (T1), and at two months (T2) and 14 months post-installation (T3). Observed counts of standing, and moderate and vigorous-intensity physical activity were converted to yearly metabolic equivalent hours (MET-h) according to estimated age groupings (1-12 years, 13-20 years and ≥21 years). Costs of the play-scape and ongoing maintenance were obtained from the state parks authority who managed the refurbishment. The incremental cost-effectiveness ratio (ICER) (ratio of incremental effect to incremental cost) was calculated based on the incremental increase in MET-h from T1-T3 assuming a 20 year lifetime of the play-scape.

Results: Compared with T1, at T3 the new play-scape resulted in an incremental net gain of 114,114 MET-h (95% UI: 80,476-us;146,096) compared with the control park, and an incremental cost per MET-h gained per park visitor of AUD $0.58 (95% UI: $0.44-us;$0.80). The sensitivity analysis combining moderate and vigorous activity showed an increase in estimated incremental MET-h of 118,190 (95% UI: 83,528-us;149,583) and a lower incremental cost per MET-h gained of AUD $0.56 (95% UI: $0.43-us;$0.77).

Conclusions: Based on physical inactivity healthcare costs and physical activity recommendations, the ICER of AUD $0.58 per MET-h gained falls within the range of cost-effectiveness for physical activity interventions. This study provides novel evidence for local and state governments that the installation of a new play-scape appears to be a cost-effective intervention to facilitate greater levels of physical activity. Replication in parks of varying size and amenity is required.
15867

S2, S.2.13

Investigating the health, social, environmental, and equity effects of an urban greenway: Results from a natural experiment

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15865: Effectiveness and Cost-effectiveness of Urban Green Space Interventions (Convenor: Ruth Hunter), South Hall 2A, June 5, 2019, 4:35 PM - 5:50 PM

Policies and environments (SIG)

Purpose: The aim of this study is to investigate the influence of a large urban regeneration project on a range of health, social, environment and equity outcomes to provide an understanding of the public health influence of a systems-level intervention.

Methods: The Connswater Community Greenway is a £40m urban regeneration project in Belfast. The greenway aims to regenerate and physically reconnect communities by creating a 9km linear park including the construction of bicycle paths and walkways. The PARC Study is a natural experiment evaluating the public health impact of the intervention. A repeated cross-sectional household survey of residents living within a 1-mile radius of the greenway was conducted with 2500 adults pre and post implementation of the greenway. Outcomes include physical activity behaviour, health, mental wellbeing, social capital and perceptions of the built environment using validated measures. A range of socio-economic factors (e.g. age, gender, deprivation) were collected at the individual and area level to enable us to assess equity impacts. Environmental outcomes include measures of biodiversity, water quality, and traffic volume.

Results: For each outcome, linear regression will be used to calculate the mean difference at baseline compared with post-intervention (and 95% confidence interval) after adjusting for age, season, education, car ownership and deprivation. Multi-levels model will also be fitted using a random intercept at the super output area (individuals within super output areas) to account for clustering within areas. Analyses will be repeated with physical activity category (as per groups defined by existing guidelines) as the outcome using multinomial logistic regression. The analyses will be stratified by distance from the greenway and deprivation. To investigate effects on health inequalities we will undertake a stratified analysis to assess whether any impacts on outcomes are socially patterned by subgroups of individuals. We will assess whether the differences in the social patterning outcomes have changed over time compared to baseline. Data is currently being analysed so results will be finalised by early 2019.

Conclusions: By evaluating a 'real world' natural experiment, this study adds to the evidence-base about impacts of UGS interventions on public health.

Funding: National Prevention Research Initiative
15889

S2, S.2.14

Streets as a resource and place for physical activity and active play for youth: innovative approaches and methods

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Children and families (SIG)

Purpose: Describe creative approaches and methods to identify, create, and assess safe spaces for physical activity (PA) and active play for children and youth, considering streets as a potential PA resource and space.

Rationale: Active outdoor play has been described as essential for healthy child and youth development. Benefits of regular PA and active play include improving healthy bones and muscles, reducing anxiety and stress, and increasing self-esteem; however, children today play outside less than their parents did, and many children and youth worldwide do not meet current PA guidelines. Children from under-resourced communities are especially challenged to participate in outdoor PA and active play due to lack of safe parks and playgrounds, crime, and traffic. Declines in outdoor play and equity challenges demand creative approaches and methods to create, identify, and understand PA spaces for all children and youth. Streets are a potential solution as they are available in most communities; however, streets are often overlooked as PA spaces.

Objectives: (1) Describe a creative solution to temporarily repurposing streets in an urban area for active play. (2) Identify creative ways to consider streets as PA resources in rural communities. (3) Outline innovative assessment approaches to investigate characteristics of PA spaces and streets. (4) Discuss how these innovative methods can be used to better understand creative approaches to increasing opportunities for active play and PA for all children and youth.

Summary: This symposium will begin with a brief overview of the need for creative approaches and methods to create, identify, and assess safe spaces for PA and active play among children and youth, framing streets as a contextual solution. Dr. Keshia M. Pollack Porter will describe how PlayStreets have been implemented in Chicago, a large U.S. Midwest city, since 2012 to enhance PA and address inequities in access to PA for youth. Dr. Renée Umstattd Meyer will describe creative approaches to conceptualizing active play and PA spaces in rural areas by examining streets as PA resources/places in low-resource rural U.S.-Mexico border communities. Dr. Lieze Mertens will describe two innovative approaches to assessing contextual characteristics of PA spaces and streets using manipulated photographs and virtual reality methods. This session will conclude with a moderated discussion between attendees and presenters about how these innovative assessment methods can be used to better understand creative solutions to creating more opportunities for active play and PA in diverse communities and contexts, and lessons learned.
Reclaiming streets for active play: implementing and sustaining play streets in an urban U.S. city

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Objective: PlayStreets is a creative community engagement initiative of the Chicago Department of Public Health that since 2012 involves creating safe spaces for youth-oriented physical activity (PA), and community building, during the summer in neighborhoods that lack access to safe parks and playgrounds. PlayStreets involve a single-day parking and traffic restriction on a residential block in a lower-income neighborhood, with high obesity rates, to create active play space for at least 3 hours. Hosting Partners from various Chicago communities are selected via an annual application process and receive a small stipend to host several PlayStreets. This research examines implementation of this creative way to provide access to PA and active play by temporarily repurposing streets.

Methods: Quantitative data were collected by PlayStreets Hosting Partners and analyzed by the researchers using SPSS 23.0. Information was collected on the day and time of the PlayStreets, attendance, activities, and resources offered. Qualitative data were collected from narrative text fields, 11 key informant interviews, and 6 focus groups. Deductive descriptive coding was used to analyze the qualitative data.

Results: PlayStreets were held across 52 of the City's 77 Community Areas between 2015-2018. PlayStreets included multiple movement activities; for example, in 2017 there was an average of 9 movement activities (range 3-16) at the PlayStreets. Hosting Partners provided meals, resources (e.g., dental care), back-to-school supplies, and information about available social services. Perceived community impacts included increased social interactions among neighbors, creation of safe violence- and traffic-free places to actively play, increased connections between residents and local resources, and reduction of inequities in access to play for kids. PlayStreets are viewed as beneficial for communities, and sustainable if implementation challenges such as funding and staffing are addressed.

Conclusions: Chicago PlayStreets provides a way for communities to transform streets to safe places for youth to engage in PA and active play. PlayStreets are also well attended, support community building, increase knowledge among residents about available local resources, and advance health equity. The identified implementation lessons are important for other cities worldwide interested in temporarily using streets to promote PA and active play.
16022

S2, S.2.14

Beyond walking: Conceptualizing and assessing streets as physical activity resources for children and families residing in low-resource, rural communities along the U.S.-Mexico border

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15889: Streets as a Resource and Place for Physical Activity and Active Play for Youth: Innovative Approaches and Methods (Convenor: M. Renée Umstattd Meyer), South Hall 2B, June 5, 2019, 4:35 PM - 5:50 PM

Policies and environments (SIG)

Purpose: Despite benefits of physical activity (PA), rural and low-income communities often have fewer and lower quality PA resources (PARs) like parks and playgrounds for active play. When present, barriers like traffic, distance, and crime often prevent access. Creative solutions and better understanding of current and accessible PARs are necessary for children and families to be active. Streets are often viewed and examined solely from the perspective of walkability and/or connectivity, and are rarely considered potential PARs despite their accessibility, proximity to home, and wide-spread availability. The aim of this presentation is to describe an innovative approach to conceptualizing and assessing streets as potential PARs in low-resource, rural communities.

Methods: Promotora-researchers conducted ground-truthed community assessments of all residential street segments (n=867) in 18 functionally-rural areas along the Texas-Mexico border, including a modified Physical Activity Resource Assessment (PARA). The PARA was modified to assess PAR characteristics of streets to describe availability and quality of PA features and amenities, as well as presence of incivilities on each street segment from the lens of conceptualizing streets as PARs.

Methods of modifying the PARA will be described.

Results: Modified PARAs revealed 70%-86% of street segments had homes with yard space, shaded areas, paved driveways, and fences (quality=good-to-fair), and 54.4% of streets had homes with bicycles, 47.2% swings, and 42.6% basketball hoops (quality=good-to-fair). Play equipment (e.g., balls, trampolines, slides) were also documented for over 35% of streets. The most common incivilities reported were litter (64.8%) and dogs loose on the street (49.6%; quality=a little to some). Traffic volume was described as low for 54% of streets. Overall, promotora-researchers perceived 38.1% of streets as safe and 47.4% attractive.

Conclusions: Future work should examine residents' perceptions of PA characteristics when considering their streets as PARs for PA and active play beyond walking, and the idea of sharing features and amenities among neighbors. Street PARA data should be combined with these perceptions to inform family and home-based PA interventions. Future family-based interventions should consider ways to incorporate streets as PARs to enhance PA and active play, as streets are widely available and sometimes the only PAR in low-resource communities.
Describing two innovative approaches to assess contextual characteristics of PA spaces and streets using manipulated photographs and virtual reality methods.

**Mertens L, J Van Cauwenberg, I De Bourdeaudhuij, J Veitch, B Deforche, D Van Dyck**  

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**Objective:** Accurate empirical evidence about which characteristics of the physical environment need modification or focus through interventions is still lacking. Most studies use a written description of environmental characteristics, which implies that participants had to imagine these environmental characteristics. This may lead to different interpretations compared to responses to the actual environment. Consequently, there is a need for innovative experimental approaches to investigate contextual characteristics of physical activity (PA). Therefore, this presentation describes (1) research using manipulated photographs to investigate potential differences in subgroup preferences regarding park characteristics for park-based PA among adolescents (12-16 years) and (2) the design and use of virtual reality 3D cycle environments to identify critical street characteristics influencing perceived safety and appeal for transport cycling among children (10-14 years).

**Methods:** Concerning the study using manipulated photographs (cross-sectional design), adolescents (12-16 years) were recruited via randomly selected secondary schools, located in Belgium. Class visits were conducted September-November 2016 and adolescents were asked to complete an online questionnaire. Latent class analyses using Sawtooth Software were used to identify possible subgroups (n=972 adolescents). Concerning the study using virtual environments (cross-sectional design), children (10-14 years) living in the neighbourhood of selected streets in Ghent will be recruited by invitation letter to come to the city of Ghent's 3D-CAVE. Participants will cycle through the prototype of the experimentally (manipulated) long street in the 3D-CAVE while they think-aloud about their environmental preferences related to (1) safety and (2) appeal for cycling.

**Results:** Current results from the study using manipulated photographs identify good upkeep and presence of playground and/or outdoor fitness equipment as the most important characteristics for park-based PA for at risk subgroups (lower PA levels, girls, older adolescents). Preliminary findings for the project using virtual environments will be available spring 2019 for ISBNPA presentation. The innovative 3D methodology was recently developed and participants will be recruited Dec. 2018.

**Conclusions:** Both research methodologies use innovative cost-effective experimental approaches to provide ready-made advice to local or regional policy makers, urban planners, and park and recreation practitioners for the development and/or renovation of active friendly environments and PA spaces.
15789

S2, S.2.15

Systems approaches to prevent and reduce obesity through multilevel multicomponent (MLMC) interventions across the globe

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Implementation and scalability (SIG)

Single component approaches to obesity prevention have limited impact. Multilevel multicomponent interventions are needed for impact. Three intervention programs in the US affiliated Pacific region, Baltimore Maryland and Denmark each used multilevel multicomponent approaches to prevent or reduce obesity, to improve eating habits and/or increase levels of physical activity. The programs implementation were guided by the Social Ecologic Model (SEM) and REAIM frameworks. Each of the three MLMC trials was successful in achieving some of its outcomes, but did not show impact in other areas. The three investigators will each present their recently completed MLMC obesity prevention trials, main strategies, primary findings and analytic approaches, and particularly where they were not successful. Then, using a systems perspective, they will describe their ongoing work to address the shortcomings of the previous implementation and analyses that will lead to a more scalable and sustained interventions.
Using a systems approach to improve a multilevel, multicomponent intervention for childhood obesity prevention in Baltimore City

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Purpose: Multilevel, multicomponent (MLMC) interventions represent a promising approach to addressing the obesity epidemic. Yet, little work has been done to refine, sustain and scale up complex completed MLMC interventions using data and lessons learned.

Methods: B’more Healthy Communities for Kids (BHCK) was a MLMC obesity prevention intervention that took place in 30 low-income neighborhoods of Baltimore City, and worked with 3 wholesalers, 50 corner stores, 25 carryout restaurants, 28 recreation centers/youth leaders, 3 social media platforms, and local policymakers. Since the completion of BHCK, we have developed additional strategies to address limitations and lessons learned of the original trial through systems science, technology development, and incorporating new intervention strategies.

Results: The BHCK trial increased wholesaler stocking and sales of promoted healthier foods, achieved improvements in corner store stocking, and improved caregiver and child food purchasing patterns and selected dietary behaviors. Yet, no impact was seen on small food retail sales, carryout stocking or sales, or in children's daily energy and fruit and vegetable intake. We have been addressing the limitations of BHCK by developing a web-based application for an online marketplace to increase access to healthier foods at wholesale prices to small food source owners, developing and testing intervention strategies to improve sleep duration and quality as a mediator of obesity in youth, working with local policymakers to design a staple foods ordinance for a healthier city food environment through micro-economic modeling, and developing a family-based approach to improve the home food, physical activity and sleep environments.

Conclusion. MLMC interventions, like BHCK, can be strengthened through activities that directly address shortcomings identified in the original trial. These should lead to an improved, scalable and sustainable intervention.
Systems approaches to prevent and reduce obesity through multilevel multicomponent (MLMC) interventions in the Children’s Healthy Living (CHL) Program

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Implementation and scalability (SIG)

Objective: Childhood obesity prevention requires community driven interventions addressing multiple levels of the Social Ecological Model (SEM). The Children's Healthy Living (CHL) trial successfully decreased child overweight and obesity, most of the behavioral outcomes did not show significant change. This presentation will explain methods we are using to better understand mechanisms of change found in the CHL trial.

Methods: The regional multilevel, community-based intervention consisted of 19 activities addressing physical activity, sedentary behavior, sleep, fruit and vegetable intake, sugar sweetened beverage intake, and water intake. An intervention template, based on the RE-AIM framework, was developed and intervention activity in the nine intervention communities was tracked over a 24 month period. Using qualitative data from monthly intervention reports, a protocol was developed to quantify the data to determine the process and dose of intervention implementation and considered a collective efficacy framework. Social network mapping examined key relationships.

Results: Implementation of the intervention activities varied among the nine communities (range 62 to 275). In the first year of the intervention the number of activities in the planning stage was greater than implemented activities, 499 and 256 respectively. Community network density increased over time. Schools, community-based groups, and large organizations were primary implementers. Partnering and advocating for environment change activities were implemented most often (39%) and 538 activities addressed all 6 behaviors.

Conclusion: The approach taken by the CHL program to incorporate RE-AIM concepts in a systematic way to report and quantify intervention activities shows a promising method to understand the implementation process of multilevel multisite interventions. Examination of community level changes and clustering of activities that yielded positive change are next analytic steps. Collective efficacy may capture some of the change that yielded positive outcomes.
Designing the Samson local community food scape program - a food systems approach to creating citizen engagement and sustainability of intervention

Mikkelsen B

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Purpose: MLMC intervention is a promising way to improve local community foodscapes. However, programs are often competing with other urgent urban and local programs such as smart city, food security programs, urban food strategies, etc. Furthermore, interventions are dependent on support from a broad range of community stakeholder to secure engagement and sustainability of the intervention. Little work has been done to develop and conceptualize ways to carry out the formative steps of MLMC's. The aim of the work is to describe the formative work of the Samson program.

Methods: Samson builds on insights from the SoL program - a multilevel intervention targeting food and nutrition behaviour among children 3-8 years with families and was implemented in two Danish communities. Interventions were developed in kindergartens, schools and supermarkets as well as in media sector. The Samson intervention was developed as a 2nd generation intervention and takes a "food systems" and participatory approach.

Results: The SoL project showed fair results on behavioral outcomes. In addition, it provided tools for how to engage institutions, groceries and media actors. Furthermore, the program was institutionalized in municipal health policy. A crucial factor was found to be the selection of settings and components for the intervention including how the most resourceful sites can be identified and engaged. The formative part of the Samson program sought to address these aspects by developing a participatory and spatially oriented approach. In each of the Samson cases community leaders were asked to make an inventory of food "places" with suggestions for how they could be developed in a healthier and more sustainable way. Five sites were chosen based on criteria of similarity, change potential, stakeholder support and resources available at each site. The evaluation protocol was developed based on principles of Realist Evaluation.

Conclusion: The results from initial steps showed that a pre-intervention formative process can be facilitated by delegating decisions to the local community. The social constitution of the community, the resources already present, the ambitions and aspirations of the local community residents and the stakeholder support for different intervention components and settings were found to be crucial.
“OK, but will it work in the real world?”: Designing, implementing, and evaluating school-based physical interventions at scale

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Implementation and scalability (SIG)

Purpose: This symposium will highlight the challenges and opportunities involved in delivering school-based physical activity interventions at scale. A particular focus of the symposium will be on the use of technology in dissemination.

Rationale: Millions of dollars in public funds have been invested in school-based physical activity intervention studies in countries worldwide. However, few studies were designed with scalability in mind and even fewer were effectively scaled up and sustained over the long term. For too long 'scale-up' studies have languished in the 'too hard basket'.

Objectives: In this interactive symposium we unpack pathways, processes and outcomes of scale-up in the school setting. To do so, we first set the stage for implementation of school based studies at scale and then animate scale-up with school-based physical activity intervention case studies from around the world. In doing so, we highlight for symposium attendees the essential elements of scale-up and discuss how technology may be used to facilitate dissemination.

Summary:
We first make the case for scale-up and the need for robust scale-up science. Using data from our international Delphi process, we propose common definitions, two conceptual frameworks and essential features that support scale-up of health promotion interventions in the school setting. From this common ground we introduce three unique studies that illustrate pearls, perils and the potential for scale up of physical activity interventions in the school setting. Notably, these three interventions are at different stages of scale-up, one with recently completed formative evaluation in Ireland, one that has just been released to schools across Victoria, Australia, and one that has been available since 2016 to schools across New South Wales, Australia.

Format:
Introduction (10 minutes): Co-Chairs Professors Heather McKay (University of British Columbia, Canada) and Patti-Jean Naylor (University of Victoria, Canada) will introduce the topic using evidence from their international Delphi study.

Presentation 1 (15 minutes): Professor Catherine Woods (University of Limerick, Ireland)

Presentation 2 (15 minutes): Professor Jo Salmon (Deakin University, Australia), including a demonstration of the Transform Us! website

Presentation 3 (15 minutes): Professor Chris Lonsdale (Australian Catholic University, Australia), including a demonstration of the iPLAY website

General Discussion (20 minutes): Discussant Associate Professor Thomas Skovgaard (Southern Denmark University)
Scalability within Intervention Development: Ireland’s post primary Active School Flag programme

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Purpose: Action 9 of Ireland's National Physical Activity Plan is to extend 'the Active School Flag' (ASF) to 500 schools between 2016 and 2020 (Get Ireland Active, 2016, p19). This action is being led by the Department of Education and Skills, in collaboration with the Department of Health and other multisectoral partnerships, who form the project steering group. The purpose of this presentation is to present the development of the post-primary arm of the ASF (PP-ASF), and its roadmap for scalability.

Methods: Formative research guided by public and patient involvement, meant consultation with pupils (n=62), parents (n=40), teachers (n=34) and principals (n=6) for the co-creation of the first iteration of the PP-ASF content, deliverables and underpinning theory. Subsequently, three case-study schools (one mixed, one all-girls and one mixed lower socio-economic status) took part in a feasibility and process evaluation trial. Research methods include year-long observations, interviews, questionnaires and a range of physical measures (accelerometers, grip strength, height and weight) collected at the beginning and end of the year.

Results: Results directed that the PP-ASF should be led by senior pupils with the assistance of teachers, as opposed to it being an entirely teacher-led intervention. This meant that the intervention model required formal timetabled hours during school time for the senior pupils to plan, implement and evaluate the PP-ASF. Pupils from each age group completed baseline measures (physical measures and comprehensive survey; n=203), and all pupils (n=3,147) completed a basic survey indicating their levels of physical activity opportunities.

Conclusion: Multisectoral partnerships are essential for design of interventions that are scalable. The PP-ASF can improve physical activity opportunities across the school, throughout the school day. Pupils involvement in the promotion of physical activity is beneficial for the pupils who lead the activities, the pupils who can take part in activities they prefer to do, and allows staff to supervise multiple activities run by the pupils. The research team are now examining pathways to dissemination, including the role that technology may play in scale-up.
Transform Us!: The journey from efficacy to scale-up and in-person to online

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15805: “OK, but will it work in the real world?”: Designing, implementing, and evaluating school-based physical interventions at scale (Convenor: Patti-Jean Naylor), Terrace 2A, June 5, 2019, 4:35 PM - 5:50 PM

Implementation and scalability (SIG)

Purpose: The implementation of efficacious strategies to increase children's activity and reduce prolonged sitting at scale is a major challenge in public health research, policy and practice. The Transform-Us! program incorporated novel pedagogical and environmental strategies to successfully target these health behaviours and children's health. Transform-Us! is currently being disseminated state-wide as a 'real-world' program embedded into education and health practice and policy. Key learnings and challenges faced in transitioning from face-to-face training and local dissemination, to large-scale online delivery will be presented.

Methods: Transform-Us! implementation involves online teacher professional development to deliver active lessons, active breaks, and active homework. Changes to the school environment include standing easels/desks, timers, access to novel sport/circus equipment in the classroom, and playground line markings. Planning for scale up involved two pilot dissemination trials (2015-17) to assess the feasibility of Transform-Us! online dissemination and teacher training approach. Stakeholder consultation has been ongoing since 2017. Outcomes have informed the intervention dissemination strategy and content of the online training to promote increased engagement from teachers. In partnership with key stakeholders, Transform-Us! 'at scale' commenced in 2018 and will continue to 2022. All Victorian primary schools (n=1,794) have access to the program.

Results: Considerations in translating the efficacious Transform-Us! program into a scalable program include: training delivery, material accessibility, equipment costs, program fidelity, and adherence. To maximise program reach, all supporting program materials, implementation resources and online training are hosted online via a program website. This includes data collection tools and a platform to maintain contact with schools. The website was launched in September 2018 with a link hosted by our partner organisations. Multiple dissemination routes via our partners are used to maximise program uptake and sustainability (e.g. through web links, email listserves, newsletters, teacher professional learning networks, and conferences and workshops). Evaluation is occurring at the partner/state, school and individual levels to determine the program's reach, effectiveness, adoption, implementation and maintenance.

Conclusions: Learnings from this implementation trial will provide valuable information regarding the challenges and successes of research to practice translation, and the role of technology to facilitate broad impact.
Implementation at-scale of the Internet-based Professional Learning to help teachers promote Activity in Youth (iPLAY) program

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15805: “OK, but will it work in the real world?”: Designing, implementing, and evaluating school-based physical interventions at scale (Convenor: Patti-Jean Naylor), Terrace 2A, June 5, 2019, 4:35 PM - 5:50 PM

Implementation and scalability (SIG)

Purpose: iPLAY is a comprehensive primary school-based physical activity intervention currently being delivered in New South Wales, Australia. In this presentation, we will:
1. outline how we worked with the stakeholders, such as the state’s Department of Education, to adapt an efficacious intervention (Cohen et al., 2015) for delivery at scale.
2. examine iPLAY’s dissemination across NSW.
3. provide results from a cluster RCT involving a representative subsample of schools.

Methods: iPLAY 'mentors', trained by the project team, facilitate program delivery in schools using content hosted on the project website. Teachers learn the curricular components of the program (i.e., quality PE and school sport, active homework, and classroom-based physical activity breaks, known as 'energiser breaks') through face-to-face and online learning. Up to three teachers in each school also complete blended learning to become iPLAY 'leaders' who are responsible for delivering the non-curricular components (i.e., active playgrounds, parent/caregiver engagement, community sport). We are evaluating iPLAY in two concurrent studies. A dissemination evaluation examines reach, adoption, and implementation fidelity of the intervention. A cluster RCT evaluates intervention effectiveness in Year 3 and 4 students. The primary outcome is change in cardiorespiratory fitness at 12 months (20m multistage fitness test).

Results: As of October 2018, 101 schools had begun the iPLAY program, involving 1,200 teachers and reaching more than 26,000 students. Overall adoption rates are promising, with 70% of teachers completing the online learning components. Adoption shows a bimodal distribution with the majority of teachers completing all aspects of online learning, but a substantial minority not engaging after the initial workshop. Implementation fidelity is strong. For example, 94% of teachers report implementing 'energiser breaks' at least once per day.

In the cluster RCT, data from 16 schools (N = 728 students) showed a significant increase in students' cardiorespiratory fitness at 12 months (adjusted mean difference = 2.4 laps [95% CI = 0.9,3.9]).

Conclusions: iPLAY is an effective intervention that can be delivered with promising adoption and strong fidelity in a large number of schools. The research team are working with stakeholders to increase reach and identify funding for widespread dissemination.
S2, S.2.17

Sustaining and scaling up evidence-based nutrition, physical activity and obesity-prevention strategies: local, regional and national perspectives

Harrington D, Thomas Skovgaard
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Implementation and scalability (SIG)

Rationale: Despite evidence on the effectiveness of nutrition, physical activity and obesity-prevention strategies emerging globally few evidence-based programs make it to scale.

Purpose: This symposium considers the extent of the evidence base for scaling effective community programs and the complexities of delivering these programs effectively and at scale. The aim is to present examples of research to scalable practice at three different stages. This will provide a structured opportunity to discuss the issues facing researchers when scaling up an evidence-based approach to nutrition and physical activity promotion and obesity-prevention.

The objectives of this innovative symposium are to:
1. Identify strategies that can be utilized at each program stage (planning, implementation, evaluation) to increase the potential for sustainability and scale up using real-world experiences from each presenter
2. Describe the benefits of a pragmatic trial and pragmatism within program delivery
3. Outline strategies to meaningfully include stakeholders in decisions on sustainability and scale up and the associated behaviors.

Summary: In the first presentation Davison will outline how scalability is included in the design of Communities for Healthy Living program. She will challenge us to think about what we need to do during program development to make it scalable. In presentation two Harrington will look at how evidence is being used in different communities in Cities Changing Diabetes and who the critical stakeholders are at this stage. Finally, in presentation three Hennessy will provide us with examples of how the ChildObesity180 program is scaling up evidence nationally in the US and her reflections on what has and has not worked.

Meeting theme: This symposium directly addresses the meeting theme of "healthy people, healthy planet sustainable and healthier lifestyles for all" as we consider how to make inclusive programs sustainable long-term while addressing local, regional and national inequalities.

Format: 75 minutes: 15 mins per presentation, 2 mins for changeover, 24 mins for general discussion.
Planning upfront for the sustainability and dissemination of a family-based childhood obesity intervention: The example of Communities for Healthy Living

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15716: Sustaining and scaling up evidence-based nutrition, physical activity and obesity-prevention strategies: local, regional and national perspectives (Convenor: Deirdre Harrington), Terrace 2B, June 5, 2019, 4:35 PM - 5:50 PM

Implementation and scalability (SIG)

Objectives: Drawing on implementation science and using the Communities for Healthy Living (CHL) as an example, this presentation will outline strategies utilized to plan upfront for program sustainability and scale up.

Methods: CHL is a family-centered childhood obesity prevention program designed for integration into Head Start (HS), a federal school readiness program in the United States (US) for low-income, preschool-aged children. Drawing on Empowerment Theory and the Family Ecological Model, CHL was developed in collaboration with low-income parents and HS staff using community-based participatory methods (CBPR) and pilot tested in Albany, NY (2009-2011). The efficacy of CHL is currently being tested in a pragmatic randomized controlled trial in 16 Head Start programs in the Greater Boston area, MA (2015-2020).

Results: Strategies to support CHL's sustainability and scale were integrated into its design, implementation, and evaluation. In accordance with the mission of HS, CHL's theory of change focuses on parent and organizational empowerment. Moreover, the program meets HS performance standards, leverages existing HS resources and services, and includes system-wide and individual intervention components. Implementation strategies position HS parents and staff as program co-leaders supported by coaches, with graduating parents subsequently serving as program leaders. To address site-specific needs and constraints, HS centers can adapt non-core elements of the program such as the timing of implementation and integration of CHL materials into practice. Planning for sustainability and scale up extends to CHL's evaluation. CHL is being tested in a real-world setting using a pragmatic trial with a stepped wedge design, and draws on existing data available for all HS children augmented with more detailed information on a subset of families. Overarching strategies to support CHL's sustainability and potential for scale-up include the development of an online training platform and creation of intervention, training, and technical assistance manuals.

Conclusion: Should CHL demonstrate efficacy, it is well positioned to be sustained and expanded nationally. Lessons learned to date include the need to integrate CHL implementation into job staff descriptions and establish proactive strategies to manage high staff turnover and changing staff roles.
15957

S2, S.2.17

Underpinning community programmes with evidence and stakeholder involvement to enhance scalability: Cities Changing Diabetes in Leicester City, UK

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1University of Leicester, Leicester, Great Britain, 2University Hospital Leicester NHS Trust, Leicester, Great Britain, 3Leicester Biomedical Research Centre, Leicester, Great Britain

15716: Sustaining and scaling up evidence-based nutrition, physical activity and obesity-prevention strategies: local, regional and national perspectives (Convenor: Deirdre Harrington), Terrace 2B, June 5, 2019, 4:35 PM - 5:50 PM

Implementation and scalability (SIG)

Purpose: Cities are a hotbed of health issues and inequalities. Global health problems such as childhood obesity and adult type 2 diabetes are more pronounced in cities and have local impact creating pressure on the local health system and health and social care services. Due to austerity measures (funding cuts), many community nutrition and physical activity programmes are developed and run in a pragmatic manner but often with limited underpinning evidence and stakeholder involvement. This presentation will outline how the global initiative Cities Changing Diabetes is working to ensure sustainability and scalability of community run programmes tackling obesity in a multi-ethnic city in the UK.

Methods: In 2017, Leicester City became the first UK city to join the Cities Changing Diabetes global initiative. Cross-sectoral stakeholder meetings held between October 2017 and May 2018 included representatives from local government, clinical and public health services, the four professional sports clubs, faith centres and large employers. These stakeholders drive the direction and priorities of the programme but they also identified that gaps in recourse, expertise and research hamper sustainability and scalability.

Results: Since May 2018 staff from Leicester Diabetes Centre (University Hospitals), the Centre for Black and Minority Health and the University of Leicester have been working towards the mission to "raise awareness, educate and train communities to deliver type 2 diabetes prevention and lifestyle education." We work with aforementioned stakeholders undertaking the following activities in the nutrition and physical activity arena that will impact sustainability and scalability of community programmes: data collection to test programme feasibility and effectiveness; co-writing research and community funding applications; providing expert opinion; maintaining a forum for linking disparate stakeholders and groups; upskilling of community staff; providing additional human capital; and adding value to stakeholder social media.

Conclusions: Cities Changing Diabetes in Leicester City aims to promote sustainable cross-sectoral working while also provide stakeholders with evidence and the skills to ensure programmes can be taken to scale and be sustained over time.
ChildObesity180: A collaborative model to blend scientific rigor with insights from the private sector and drive evidence-based strategies to national scale

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15716: Sustaining and scaling up evidence-based nutrition, physical activity and obesity-prevention strategies: local, regional and national perspectives (Convenor: Deirdre Harrington), Terrace 2B, June 5, 2019, 4:35 PM - 5:50 PM

Implementation and scalability (SIG)

Purpose: Despite extensive investments in research focused on discovering novel scientific insights, few evidence-based nutrition and physical activity strategies are disseminated and implemented at scale. Scaling such strategies at a national level requires alignment of a wide range of systems and stakeholders with top-down-bottom-up collaboration. This case study describes ChildObesity180's approach to integrate business acumen with scientific expertise to discover, innovate, pilot and scale effective solutions across the US through the lens of one of its four national initiatives.

Methods: Discover: With cross-sector national leadership and guidance, ChildObesity180 selected priority areas based on scientific considerations (e.g., strength of evidence base) and business-oriented factors (e.g., potential time to results). Subsequently creating the Active Schools Acceleration Project Initiative to promote quality school-based physical activity (PA). Innovate: Crowdsourcing strategies were used to identify innovative, school-based PA programs. Pilot: Micro-grants allowed schools to implement and evaluate three PA programs (before school, running and walking, classroom). Scale: Marketing tactics, a national campaign model, cross-sector partnerships and other business-centric tactics were used to scale the most promising program.

Results: Innovate: The crowdsourcing approach yielded 427 PA programs across all 50 US states. Three programs were selected based on readiness for scale, cost, availability of materials, and history of expansion. Pilot: >1200 schools applied for micro-grants; 1002 received grants to implement and evaluate one of three evidence-based PA programs. The running and walking program emerged as the most promising program to scale based on evidence, flexibility, accessibility, ease of implementation, appeal to children of all ages. Scale: The New Balance Foundation Billion Mile Race was launched, which challenges children to collectively walk, jog, run, or wheel 1 billion miles at school. Almost 9000 schools across the US have registered and have collectively logged approximately 90 million miles.

Conclusions: Blending scientific rigor with business innovation can impact children quickly and at national scale. Challenges of ChildObesity180's approach include tensions between academic rigor and speed-to-market, grassroots relationship-building and national scale, achieving broad population-level reach and prioritizing highest-risk children, and micro vs macro scale evaluation. Lessons learned may be instructive for organizations seeking to translate evidence to action at scale.
Increasing physical activity and reducing sedentary time in people living with mental illness in low-and middle-income settings

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15787

Disease prevention and management (SIG)

There is strong evidence that people living with mental illness have lower levels of physical activity and higher rates of sedentary behaviour than the general population. This contributes to higher rates of physical health comorbidity in this population. Meta-analyses have confirmed that physical activity and exercise interventions are effective in reducing psychiatric symptoms and improving cognition in patients with psychotic disorders and those with mild cognitive impairment. This symposium will feature three presentations focusing on what we know about physical activity and sedentary time in low- and middle- income countries (LMICs) where mental health services are limited. Davy Vancampfort (KU Leuven, Belgium) will review physical activity and sedentary behaviour survey data from people living with mental illness in 36 LMICs. Felipe Schuch (Universidade La Salle, Brazil) will focus on physical activity interventions as a means of preventing common mental disorders such as depression and anxiety in LMICs. Philip Ward (UNSW Sydney, Australia) will outline the results of a multinational validation study of a new questionnaire measure of physical activity and sedentary behaviour developed to assess those with elevated levels sedentary time, such as those living with mental illness. The results from LMICs will be compared with those obtained in high income settings. Discussion will focus on the opportunities and challenges to design, implement and evaluate feasible low-cost interventions to address these key modifiable risk factors in low-resource settings.
Measuring physical activity and sedentary behaviour in the developing world: Using the Simple Physical Activity Questionnaire (SIMPAQ) to estimate key modifiable risk factors in people with mental illness living in low- and middle-income countries (LMIC)

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Purpose: Physical activity and sedentary behaviour are key modifiable risk factors that contribute to increased morbidity and mortality in people living with mental illness. There are currently few self-report instruments specifically designed to assess these factors in populations with high levels of sedentary behaviour, such as people living with mental illness.

Aims: To develop a new, clinically acceptable self-report measure of physical activity for use sedentary populations, and to validate this against objective measures of physical activity using waist-worn accelerometers.

Method: SIMPAQ and accelerometry data were obtained from people diagnosed with mental disorders from over 40 sites in 23 countries. SIMPAQ was translated into 13 languages, and data were obtained from a range of LMIC settings, including Brazil, India, Iran, Nigeria and Pakistan.

Results: Data from people living in LMICs (n = 233) were compared with data from developed countries (n = 777). One-week test-retest reliability was similar in both settings. There were increased rates of low BMI (<18) in the LMIC versus higher income settings, and lower rates of desirable weight (32% versus 37%). Spearman correlations between questionnaire and objective measures of MVPA were similar in both settings, and equivalent to those observed in the general population using population surveillance measures such as the International Physical Activity Questionnaire.

Conclusions: SIMPAQ provides a feasible and acceptable method to measure physical activity and sedentary behaviour in LMIC settings. Further research is required to determine whether it is sensitive to change in relation to targeted interventions to increase physical activity and reduce sedentary time in this vulnerable population in LMIN settings.
S2, S.2.18

Physical activity and the prevention of depression and anxiety in low- and-income countries: Meta-analytic findings

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15787: Increasing physical activity and reducing sedentary time in people living with mental illness in low-and middle-income settings (Convenor: Philip Ward), Club A, June 5, 2019, 4:35 PM - 5:50 PM

Disease prevention and management (SIG)

Background: Common mental disorders, such as depression and anxiety, are highly prevalent and burdensome conditions. In addition, treatments opportunities in low- and middle income countries (LMIC) are not enough so preventing should be a priority.

Aims: To discuss, based on recent meta-analytic findings, the role of physical activity in reducing the risk of developing common mental disorders.

Methods: Two meta-analyses on looking for prospective studies (at least one year of follow-up) that calculated the odds ratio (OR) of incident depression or anxiety in people with higher PA levels against people with low PA. A random-effects meta-analysis was conducted, and heterogeneity was explored using subgroup and meta-regression analysis.

Results: A total of 49 unique prospective studies were at reduced odds of developing depression ((adjusted) AOR=0.83, 95%CI=0.79 to 0.88, p<0.001) and across 14 cohorts for anxiety, people with high PA (versus low PA) were at reduced odds of developing anxiety (Adjusted OR=0.74, 95%CI=0.62 to 0.88). Seven cohorts demonstrated that PA is associated to a decreased risk of incident depression (AOR=0.83, 95% CI = 0.73 to 0.95) and one cohort with a decreased risk of incident anxiety (AOR=0.31, 95% CI=0.10 to 0.96).

Conclusion: Evidence supports the notion that PA can confer protection against the emergence of common mental disorders. This effect is also seen in LMIC countries. Strategies promoting PA should by a priority to reduce the burden of common mental disorders in LMIC.
S2, S.2.18

Physical activity and sedentary behavior in people living with mental health disorders in low- and middle-income countries – a state-of-the-art global perspective

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Disease prevention and management (SIG)

Purpose: There is a paucity of multi-national research investigating associations between physical activity, sedentary behavior and mental health among people from low- and middle-income countries. The purpose is to explore associations between physical activity and sedentary behavior levels and a wide range of are socio-demographic, health-related and environmental factors in people with mental health problems in low- and middle-income countries, and this across the lifespan.

Methods: Cross-sectional data from (1) the World Health Surveys, (2) World Health Organization's Study on Global Ageing and Adult Health, and (3) Global School-Based Student Health Surveys will be presented examining these key modifiable risk factors. Moderators were examined by multivariable linear and logistic regression analyses.

Results: Data from 36 low- and middle-income countries involving more than 175,000 participants were analysed. Higher socio-economic status was an important sociodemographic correlate of lower physical activity and higher sedentary levels. Mobility limitations and disability, sleep problems, pain/discomfort, and cognitive problems were important individual-level correlates whilst a lack of social cohesion in the society and living in an urban center were important environmental correlates. Finally, we observed clustering of unhealthy lifestyle habits, with less physical activity and more sedentary behavior being associated with unhealthy dietary habits in people with mental health problems. Data were similar for adolescents, adults, and middle- and old age participants.

Conclusions: Multi-national data from low- and middle-income countries, representing more than half of the world population, offer potentially valuable insights for several hypotheses concerning factors that may influence the relationship between physical activity, sedentary behavior and mental health among people living with low- and middle-income countries. Further longitudinal studies should be undertaken to confirm these cross-sectional observations.
Purpose: In community-based participatory research (CBPR) projects, the community participates fully in all aspects of the research process. This symposium addresses how CBPR may advance health promotion: how can we optimally collaborate with community members in CBPR? What are advantages and challenges? How can we obtain valuable scientific output from CBPR? How can we evaluate effectiveness and process of CBPR?

Rationale: Many previous interventions aimed at promoting a healthy lifestyle showed limited effectiveness, especially on the long-term and among disadvantaged populations. Strikingly, those most in need are the most difficult to reach e.g. people with a low socioeconomic status or from ethnic minority groups. One explanation for low participation and effectiveness is that the target group is seldom involved in the development of interventions. This may be essential to match interventions to their needs and interests, which may be key to increasing effectiveness and sustainability. Another explanation is that most interventions focused on linear cause-and-effect relationships, not considering the complexity in the multilevel factors involved and its multiplex relationships in the specific community.

Objectives: Our symposium will present and discuss several CBPR projects aiming to promote healthy sleep, physical activity, sedentary and dietary behavior among disadvantaged communities. Specific objectives are:

- Presenting examples of CBPR research projects on healthy lifestyle;
- Discuss the advantages and challenges of CBPR;
- Discuss optimal evaluation of CBPR projects.

Summary: Introduction of the rationale and relevance of using community participation in health behavior interventions by Dr. Teatske Altenburg.

Presentation 1: Using complex system methodologies in CBPR interventions targeting childhood overweight by Prof. Dr. Steven Allender.

Presentation 2: Developing, implementing and evaluating a participatory intervention, based on the Intervention Mapping Protocol, to improve sleep behavior among Flemish adolescents by Anneke Vandendriessche, MSc.

Presentation 3: Combining youth participatory action research and intervention mapping to develop, implement and evaluate interventions that stimulate a healthy lifestyle among children from a disadvantaged neighbourhood by Manou Anselma, MSc.

Discussion by Prof. Dr. Mai Chin A Paw.

Format: Dr. Altenburg will provide a 5-min introduction to the topic. This will be followed by three 10-minute presentations (followed by 5 minutes discussion each), representing three different CBPR projects. Prof. Dr. Chin A Paw will critically reflect on the use of CBPR in health promoting research and facilitate an interactive discussion with the audience (25 minutes). The symposium will be closed by formulating lessons learned and practical recommendations for applying CBPR.
Using complex system methodologies in CBPR interventions targeting childhood overweight

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Introduction: The Global Obesity Centre (GLOBE), a World Health Organization Collaborating Centre for Obesity Prevention based in Victoria, Australia, has been involved in multiple community based interventions over the past 15 years. These interventions have taken a community based participatory approach and have demonstrated some success in improving physical activity and healthy diet. In this presentation we will introduce some of this history and discuss critical elements of this approach.

Methods: Community based trials emerged from the ANGELO process of prioritization and grew to involve the use of Modified Problem and Solution Trees and more recently methods adapted from community based system dynamics. GLOBE developed software, called STICKE, which provides the means for communities to collect, share and track their efforts to improve childhood obesity. The relative strengths and weaknesses of each approach and the reason for a move to apply methods from systems science are discussed.

Results: This presentation will describe successful behavioral changes observed over a decade of community based intervention and provide insight into the number, spread and reach of interventions and their effectiveness in current trials to improve physical activity and nutrition. The place and use of systems thinking in community based intervention are discussed.

Conclusion:
Objective: Adolescent sleep deprivation is becoming increasingly recognized as a significant health concern. The optimal amount of sleep in adolescence is approximately 9-10 hours per night, however, 53% has a sleep duration of less than eight hours. Only few interventions have already targeted adolescents’ sleep patterns. When developing an intervention, it is advisable to follow a system-based approach and to involve the target group to improve the research quality. Therefore, the aim of this study was to evaluate the effect and process of an intervention to improve sleep behavior among 13-15-year-old adolescents that combined a participatory approach with the Intervention Mapping Protocol. 

Methods: A cluster-randomized controlled trial was used, using a pre-, post-test design including an intervention group (3 secondary schools) and a control group (6 secondary schools). In each intervention school an action group was installed, including adolescents and an academic facilitator, who have had weekly meetings during the school year 2017-18. In those meetings, the group went through the Intervention Mapping Protocol to develop the intervention. This school year, each action group will further refine and implement their intervention. Before implementation, a pre-test will be performed (November 2018) in which all adolescents complete a questionnaire on sleep behavior and determinants, and wear a Fitbit to objectively measure sleep behavior. The post-test (May 2019) will include the same measures. Focus groups will be conducted with both the action groups as well the other adolescents who have only received the intervention. Qualitative data will be analyzed using NVivo 12. Multilevel repeated measures analyses will be conducted in R.

Results: We will present the first results of the effect evaluation on the objectively measured sleep duration. We will also present the process evaluation results to understand how adolescents have perceived the developmental process and/or the intervention itself.

Conclusions: This unique approach of combining a participatory approach with the Intervention Mapping Protocol will increase the chance on effectiveness and sustainability and will significantly improve our understanding of success and failure factors of interventions to improve sleep behavior in this group.
Kids in Action! Combining youth participatory action research and intervention mapping to develop, implement and evaluate of interventions that stimulate a healthy lifestyle among children from a disadvantaged neighborhood.

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Background: Current interventions targeting children's healthy lifestyle are generally developed and implemented top-down, with limited involvement of children. By closely collaborating with children, as experts of their own lives, interventions may become more relevant, attractive and thus effective. Additionally, children are empowered to improve their own health behaviors. Therefore, this study aims to develop, implement and evaluate intervention strategies together with children from a low socio-economic neighborhood as co-researchers, targeting their physical activity and dietary behaviors.

Methods: This youth-led participatory action research (YPAR) incorporated the Intervention Mapping (IM) approach, to identify evidence-based strategies in a structural stepwise process. At four schools in a low socio-economic neighborhood, six to eight child-researchers (9-12 years old) met (bi)weekly in participatory group meetings, facilitated by an academic researcher. In these meetings the groups identified potential determinants for physical activity and dietary behaviors, and subsequently developed and implemented context-specific intervention strategies. Child-researchers were encouraged to collaborate with relevant stakeholders, e.g. school staff and parents, to ensure sustainable embedding of the interventions. The effects of these interventions on children's health behaviors are evaluated in a controlled trial.

Results: Potential determinants were among others finances, distance to activities and perceiving the neighborhood as unsafe. This study led to several interventions co-created with children, such as cooking workshops, free extracurricular sports activities, a sports event and the implementation of a water policy at a school. Academic researchers conducted a process and effect evaluation with input from children. Throughout the course of the meetings, children became more confident in sharing their opinion. They felt they had a say in changes occurring in the neighborhood or at school, and noticed that the changes adhered to children's wishes. Children enjoyed organizing activities for their peers and were proud of their achievements. Further results of the process and effect evaluation will be presented at the symposium.

Conclusions: This study demonstrated that involving children as co-researchers in a combined YPAR and IM study is feasible and yields important insights in child-perceived determinants of a healthy lifestyle. Additionally, children appreciate having a voice in interventions targeting their lifestyle.
What defines a day? Exploring data collection and processing decisions and implications for 24-hour measurement of sleep, sedentary behavior, and physical activity

Takemoto M, David Berrigan

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Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: The goal of this symposium is to explore current 24-hour accelerometry data collection and processing decisions and discuss how data processing decisions may affect study outcomes and associations with health. We will present research involving children, adults and older adults and discuss options on how best to classify sleep, sedentary behavior (SB), and physical activity (PA) in these populations across the 24-hour day. For example, traditional methods have created the 24-hour day based on a midnight-to-midnight timing; however, if the outcome of interest is sleep, this method divides the outcome of interest across two "days". Further, discussion will include the importance of considering the research question, the study population and design, and the resources available when making data processing decisions.

Rationale: Researchers have expanded their focus from assessing one behavior with accelerometers to assessing all behaviors across the 24-hour day. Despite the increase in 24-hour accelerometer assessment, there is currently no consensus on the best approach to collect or process 24-hour data for the estimation of sleep, SB, and PA.

Objectives:
1. To explore current approaches to collecting and processing 24-hour data.
2. To illustrate the impact of different data processing decisions through examples from research with children, shift workers, and older women.
3. To discuss implications for the estimation of behavior profiles, examining relationships between behaviors, and future 24-hour day research.

Summary: The session will include an introduction to 24-hour data collection and processing decisions used to create estimates of sleep, SB, and PA followed by three individual presentations and a general discussion.

Format:
1. Introduction - Overview of the data processing decisions for 24-hour data analyses (10 minutes).
   Speaker: Dr. Takemoto
2. Presenter 1: Dr. Meredith-Jones - Issues and practicalities of sleep assessment using large accelerometry data sets in children. (12 minutes + 3 minutes for questions)
3. Presenter 2: Dr. Mackay - Intraindividual variability of day length among working adults: implications for 24-h measurement of behavior. (12 minutes + 3 minutes for questions)
4. Presenter 3: Dr. Full - Estimating Time Spent in Sedentary Behavior and Sleep in Older Adults: How do we determine where the detrimental associations end and the benefits begin? (12 minutes + 3 minutes for questions)
5. Discussion - Dr. Berrigan (20 minutes)
Issues and practicalities of sleep assessment using large accelerometry data sets in children

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15856: What defines a day? Exploring data collection and processing decisions and implications for 24-hour measurement of sleep, sedentary behavior, and physical activity (Convenor: Michelle Takemoto), Club C, 4:35 PM - 5:50 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Although accelerometers are increasingly being used to assess sleep and activity over 24 hours, many questions remain. We undertook two studies to determine how different sleep/wake algorithms and accelerometer wear location affect sleep estimates compared to polysomnography (PSG), and whether different screening decisions used to identify sleep affected estimates of sedentary time and physical activity.

Methods: In study 1, we tested three existing actigraphic sleep/wake algorithms (count-scaled, Sadeh and Tudor-Locke) against simultaneous polysomnography (PSG) in 34 children aged 5-8 years at two body sites (waist and non-dominant wrist). The sensitivity (% sleep agreement), specificity (% wake agreement), and overall agreement (%) between each algorithm and the PSG data were examined. In study 2, we compared the effect of six different sleep screening decisions on measures of activity and sleep by accelerometry (ActiGraph GT3X) over 7 days in 291 children aged 4-8.9 years. Mixed models with random effects and post hoc testing were conducted to compare mean values between scoring methods.

Results: For study 1, overall agreement was similarly high between waist and wrist worn accelerometers using the count-scaled algorithm compared to PSG (87.9% vs 89.9), with sleep estimates varying by less than 30 min. The Sadeh algorithm appears to perform well at the waist, but not at the wrist, with sleep estimates varying by more than 40 mins for total sleep time and wake after sleep onset. For study 2, choice of sleep screening decision substantially affected estimates of non-wear time (ranged from 33-193 mins), wear time (736-1337 mins), counts per minute (384-658) and sedentary behaviour (556 to 1145 mins/day). By contrast, estimates of light activity and moderate-to-vigorous activity (MVPA) were similar across methods, varying by less than 9 mins/day.

Conclusion: The count-scaled algorithm appears flexible to differences in accelerometer wear location when estimating measures of sleep, whereas the Sadeh algorithm should only be used when accelerometers are worn at the waist. Different scoring methods to remove sleep from 24-hour accelerometry data do not affect measures of MVPA, whereas estimates of sedentary time depend considerably on which technique is used.
Intraindividual variability of day length among working adults: implications for 24-h measurement of behaviour

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Purpose: As studies begin to incorporate 24-hour measurement of sleep, SB and PA, new issues for data processing arise, including what defines a 'day'. 24-h data can be used to determine the optimal composition of sleep, SB, and PA for health; however, this relies on accurate segmentation of waking and sleep hours. Traditional approaches that define a 24-hour day (i.e., midnight-to-midnight) may not be appropriate for the ~15-20% of the adult working population who work shift patterns. This study examines the intraindividual variability of day length among working adults and whether various definitions of a 'day' result in differences in 24-h accelerometer-derived behaviour compositions.

Methods: 101 adult employees in the New Zealand aviation industry (59.4% Male; 39.6% aged 35 to 49 years; 83.2% European) wore Axivity AX3 accelerometers on the thigh and lower back for seven days (168 hours) and completed a sleep log diary. Four different data processing rules to define a day were used to analyse the same dataset: (1) start wear time (24h); (2) midnight-to-midnight (24h); (3) wake-to-wake (variable h); and (4) bed-to-bed (variable h). Intraindividual variation in day length was determined as the individual coefficient of variation (CV). Daily estimates of sleep, PA, SB were derived from accelerometer data and converted to percentage of the 'day'.

Results: Mean day length for all rules were 24h (range 12h to 37h). Intraindividual variation (CV) in wake-to-wake and bed-to-bed day lengths ranged from 0% to 50%. Daily estimates of sleep and SB were different between midnight-to-midnight and bed-to-bed rules (p < .05). There were no differences between rules for weekly estimates of sleep (p = .06), SB (p = .05), or PA (p = .35). The median number of complete days varied from 5 days (wake-to-wake and bed-to-bed), 6 days (midnight-to-midnight), and 7 days (start wear time).

Conclusions: Decisions on what constitutes a 'day' are necessary when processing 24-h accelerometer data and may depend on the population being studied. While mean weekly estimates of sleep, SB, and PA may not differ between rules, investigation of work/non-work days or intervention effects may drive processing decisions.
Estimating time spent in sedentary behavior and sleep in older adults: How do we determine where the detrimental associations end and the benefits begin?

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Purpose: Emerging research supports sleep duration, physical activity (PA), and sedentary behavior (SB) as independent risk factors for cardiometabolic risk in older adults. As the popularity of 24-hour accelerometer measurement increases, it is important to consider data processing decisions that impact the estimation of sleep, PA, and SB. The purpose of this presentation is to discuss the processing of 24-hour data collected in older adult populations, with a specific focus on processing decisions used to discriminate between SB and sleep. Implications unique to the older adult population will be explored in relation to cardiometabolic health outcomes.

Methods: Older women participating in the Women’s Health Initiative OPACH Study (N=3329; mean age=78.5±6) wore ActiGraph GT3X+ accelerometers 24 hours/day for up to 7 days and completed a daily sleep log. After data collection was complete, OPACH investigators considered several data processing methods to classify 24 hour behaviors and derive estimates of sleep duration, SB, and PA. In this analysis, we compared the two different methods used to derive SB estimates based on how the sleep period was identified: 1) using self-reported in-bed and out-of-bed time from the sleep log and 2) visual identification of nightly sleep period by a trained coder. Pearson correlations and paired t-tests were run to compare different SB estimates. Adjusted linear regression models were constructed to examine associations of SB estimates to cardiometabolic outcomes including insulin, HOMA-IR, and waist circumference.

Results: The self-reported sleep period method produced longer SB estimates on average by 20.13 minutes (p value: <0.001), but both estimates were highly correlated (r=0.86 p value:<0.001). Both estimates of SB were significantly associated with higher values of insulin, HOMA-IR, and waist circumference (all p values <0.01).

Conclusion: In our population of older women, estimates of SB derived using two different processing methods were similarly associated with cardiometabolic health outcomes. The different estimates of SB may create prevalence bias for population surveillance, but may not create biased associations with cardiometabolic health outcomes. We will address the potential implications of using different methods to estimate SB in the context of epidemiologic studies, evaluating interventions, and study resource burden.
S2, S.2.21

The physical environment, physical activity and quality of life in older adults

Dyck D, Ester Cerin

"Ghent University, Ghent, Belgium"

Purpose: The purpose of this symposium is to provide an overview of study results that link the neighborhood built environment with mental and physical health-related quality of life in older adults. Furthermore, the role of physical activity in this association will be examined. Results of three similar studies in very diverse regions (Hong Kong, Ghent [Belgium], Curitiba [Brazil] and Temuco [Chile]) will be presented.

Rationale: Worldwide, populations are ageing and this leads to an increase in age-related chronic diseases like type two diabetes, cardiovascular diseases and specific types of cancer. From a health perspective it is crucial to keep older adults active and healthy for as long as possible. The built environment can play an important role in determining physical activity and quality of life, but empirical evidence in older adults is currently lacking.

Objectives:
- To give an overview of the international evidence on the role of the built environment to explain quality of life in older adults in three culturally and geographically diverse regions
- To emphasize the role of the neighborhood physical environment to stimulate active and healthy ageing
- To discuss the implications of these international studies for interventions and policies

Summary: The symposium chair will briefly introduce the symposium and explain the importance of examining the role of the built environment in explaining quality of life in older adults. Anthony Barnett will present findings of a study in Hong Kong, examining the mediating effects of physical activity on the relationship between neighborhood built environment and quality of life in older adults. Jelle Van Cauwenberg will focus on the association of the perceived built environment with physical and mental health-related quality of life, taking into account the moderating effect of neighborhood-level socio-economic status and the mediating effects of physical activity and social contact. Finally, Nicolas Aguilar-Farias will present the findings of the 'Latin American Cities for Healthy Aging' project. In that project, the role of the built environment on physical activity and quality of life in older adults is studied in Temuco, Chile and Curitiba, Brazil. Ester Cerin will lead the general discussion and will specifically focus on the international importance of the built environment in the context of healthy ageing, and on how the current findings can be translated into interventions and policy efforts.

Format:
Chair: Delfien Van Dyck
Presenters: Anthony Barnett, Jelle Van Cauwenberg, Nicolas Aguilar-Farias
Discussant: Ester Cerin
Mediating effects of PA on associations of the neighbourhood built environment with depression and quality of life in older adults residing in a prototypical high-density, high-rise city

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Purpose: Based on evidence of associations of the neighbourhood built environment with PA, presence of depressive symptoms (DS) and quality of life (QoL), we examined mediating effects of types of PA on associations of the neighbourhood built environment with QoL and DS in Hong Kong older adults. Methods: 909 Hong Kong Chinese older adults, aged 65+ years and living in pre-selected communities stratified by walkability and socio-economic status, participated in this cross-sectional, observational study. Exposure variables were objectively-quantified neighbourhood attributes previously shown to be related to DS or domains of QoL in this cohort. PA was assessed using validated Chinese versions of international questionnaires. Outcome measures were environmental (E-QoL), psychological, physical and social QoL (S-QoL) and DS. Generalized additive mixed models were used to examine associations of neighbourhood attributes with DS and QoL and the mediating role of various types of PA. Results: DS was related to connectivity (OR\(q_0=1.039\), p=.002), prevalence of public transport stops (OR\(q_0=1.056\), p=.012) and pedestrian infrastructure (OR\(q_0=1.025\), p=.008), with frequency of within-neighbourhood walking for transport suppressing the positive associations of connectivity (OR\(q_0=1.046\), p=.001); and pedestrian infrastructure (OR\(q_0=1.029\), p=.004). Weekly frequency of non-walking PA mediated associations of street intersection density (total: \(b_0=-0.731\), p<.001; direct: \(b_0=-0.696\), p<.001), entertainment density (total: F(3.652, 3.652)=3.71, p=.004; direct: F(3.527, 2.527) = 3.19, p=.010) and litter/decay (total: \(b_0=-0.035\), p=.038; direct: \(b_0=-0.040\), p=.028) with E-QoL, and associations of street intersection density (total: \(b_0=-0.396\), p=.026; direct: \(b_0=-0.337\), p=.056), entertainment density (total: \(b_0 =-0.042\), p=.002; direct: \(b_0=-0.021\), p=.134) and trees in parks (total: \(b_0 = 0.132\), p=.046; direct: \(b_0 = 0.149\), p=.023) with S-QoL.

Conclusions: Physical activity is a weak mediator of associations between environmental attributes and both DS and QoL in Hong Kong older adults. Different types of PA seem to mediate the associations with the two outcomes. Other potential mechanisms need to be considered.
The relationships between neighbourhood physical environmental perceptions and physical and mental health-related quality of life among Belgian older adults

Cauwenberg J, C De Win, M Petrovic, D Van Dyck, L Mertens, I De Bourdeaudhuij, B Deforche
1Ghent University, Ghent, Belgium, 2Research Foundation Flanders (FWO), Brussels, Belgium, 3Vrije Universiteit Brussel, Brussels, Belgium, 4Ghent University, Ghent, Belgium / Research Foundation Flanders (FWO), Brussels, Belgium

Objective: Neighbourhood physical environmental perceptions have been linked to older adults' physical activity levels. However, knowledge about the relationship between neighbourhood perceptions and older adults' quality of life is limited. The aim of this study was to examine the relationships between neighbourhood physical environmental perceptions and physical and mental health-related quality of life among older adults. In addition, we investigated whether these relationships were moderated by neighbourhood socio-economic status (SES) and mediated by physical activity and social contacts.

Methods: This cross-sectional study is part of the Belgian Environment and Physical Activity Study in Seniors (BEPAS-Seniors). Stratified cluster sampling was used to recruit 508 non-institutionalized Belgian older adults (= 65 years). An interview-administered questionnaire was used to collect information on socio-demographics, environmental perceptions (the Neighbourhood Environment Walkability Scale), physical activity (IPAQ), social contacts and health-related quality of life (RAND SF-36). Neighbourhood SES was obtained from the Belgian National Institute of Statistics. Linear regression analyses with interaction terms were applied.

Results: Aesthetics, road safety and crime safety were significantly positively related to both physical and mental health-related quality of life. Diversity of facilities was significantly positively related to physical health-related quality of life. Accessibility of facilities was also significantly positively related to physical health-related quality of life, but only in low-income neighbourhoods. The mediation analyses showed only limited mediation through physical activity and social contacts.

Conclusions: Our findings suggest that neighbourhoods with high aesthetic qualities that offer a diversity of facilities and that are crime and traffic safe may increase older adults' health-related quality of life. Good access to facilities appeared to be particularly relevant for residents of low SES neighbourhoods. Physical activity levels only partly explained these relationships. Future longitudinal research is necessary to unravel the causal pathways between neighbourhood environmental perceptions and older adults' quality of life.
15858

S2, S.2.21

Latin American cities for healthy aging: findings from an international collaboration project between Chile and Brazil.

Aguilar-Farias N, P Martino-Fuentealba, D Chandia-Poblete, M do Nascimento, TG dos Santos Coco, R Reis, AA Hino

1Dept. Physical Education, Sports and Recreation. Universidad de La Frontera, Temuco, Chile, 2UFRO Activate Research Group, Temuco, Chile, 3Graduate Program in Health Technology, Pontificia Universidade Catolica do Parana, Curitiba, Brazil, 4Grupo de Pesquisa em Atividade Fisica e Qualidade de Vida (GPAQ), Curitiba, Brazil, 5Prevention Research Center, Brown School, Washington University in Saint Louis, St Louis, USA, 6Graduate Program in Urban Management, Pontificia Universidade Catolica do Parana, Curitiba, Brazil, 7Dept. Physical Education, Sports and Recreation. Universidad de La Frontera, Temuco, Chile | UFRO Activate Research Group, Temuco, Chile

15737: The physical environment, physical activity and quality of life in older adults (Convenor: Delfien Van Dyck), Club D, June 5, 2019, 4:35 PM - 5:50 PM

Ageing (SIG)

Purpose: This is the first collaborative study conducted in Latin America to better understand factors associated with physical activity (PA) and quality of life in older adults. The aim of this study was to examine associations between neighbourhood environmental characteristics and health-related quality of life (HRQoL) in older adults from Temuco, Chile and Curitiba, Brazil. We will also examine the role of device measured physical activity in these associations.

Methods: The present study included community-dwelling older adults from Chile (Temuco) and Brazil (Curitiba). Stratified cluster sampling based on neighbourhood walkability and socioeconomic status was used in both study sites. Questionnaire were used to obtain sociodemographic details, environmental perceptions (NEWS), physical activity (IPAQ), social support and HRQoL (WHOQoL). Participants wore an ActiGraph GT3X+ (physical behaviours) and a GPS QStarz during 7 consecutive days. Multivariate analysis will be conducted to explore associations and interactions between variables.

Results: To date more than 600 participants had been evaluated in both countries. Preliminary findings have shown that 20.5% of Chilean and 28.0% of Brazilian participants met the PA recommendations based on self-report. Physical inactivity has been related with low level of education in both countries and female gender in Brazil. Complete results will be presented in the conference as recruitment is undergoing.

Conclusions: The project will answer important research questions to test the role of the built environment on physical activity and HRQoL in older adults of the region. Also, the protocol used in this study will allow comparison across countries, not only from South America, but also with current and past studies from Europe and Asia.
Activity behaviours, motor competence, and health in the early years – where are we and where do we go from here?

Costa S, Cain Clark
1Loughborough University, Leicestershire, Great Britain

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: To present novel perspectives of the knowns and unknowns of activity behaviours, motor competence, and health in clinical and healthy populations during the early years (0-5 years).

Rationale: How clinical populations (e.g., cancer patients/survivors) compare to otherwise healthy young children (aged 0-5 years) in terms of physical activity (PA) and sedentary behaviour (SB) levels, motor development and competence, and how these relate to health outcomes (e.g., recovery after treatment, quality of life) is unclear, yet of paramount importance. Notwithstanding, the assessment of PA/SB and, in particular, motor competence in young children is important, yet methodological and technological problems may cloud our ability to adequately assess such constructs. Recently emerged analytical strategies have great potential to improve our knowledge in these areas, but their application has been limited.

Objectives:
1) To summarise the evidence on clinical population (young paediatric cancer patients/survivors) comparisons to their otherwise healthy counterparts in PA/SB levels, motor competence/development, and how these relate to health outcomes;
2) To present a novel analytical approach to motor competence, PA/SB, and health outcomes in young children;
3) To present evidence of application and constraints of our ability to assess motor competence/development in young children;
4) To discuss the current state and knowledge gaps regarding PA/SB, motor competence, and health outcomes in healthy and clinical populations during the early years.

Summary: The session will integrate health, activity behaviours, and motor competence in a triadic relationship, with specific application to the early years period, including clinical populations. The novel perspectives will be used to help inform motor competence testing norms and inform clinical and educational judgement.

Format: The Chair will introduce the rationale for the symposium, followed by three interconnected presentations from Drs Costa, Clark, and Ward. Dr Costa will present current evidence on preschool-aged cancer patients/survivors PA/SB, motor development, and related health outcomes; Dr Clark, the role that novel analytics could have on key-stakeholder decision making in the adoption of behaviour change and expected outcomes across general and special populations; Dr Ward, how and why our current protocols for the assessment of motor competence may not provide the answer we are looking for, towards an improved framework for assessment. There will be five-minute discussant-moderated periods between presenters and delegates following each presentation, and a fifteen-minute overall discussion at the end.
Activity behaviours, motor development, and health in paediatric cancer patients and survivors – a literature review

Costa S

Loughborough University, Leicestershire, Great Britain

Cancer prevention and management (SIG)

Purpose: The early years, when children typically acquire fundamental movement skills, are the childhood period with most incidence of cancer. Paediatric cancer patients spend large amounts of time in clinical settings, and the environmental and physical constraints resulting from their health condition likely impairs their motor development, as well as activity behaviours (physical activity and sedentary behaviour), and their health during and post-treatment. This review aims to summarise the existing evidence on the activity behaviours and motor development, and the relationship of both with health outcomes, in paediatric cancer patients and survivors.

Methods: MEDLINE and Web of Science will be searched, using a search strategy including key themes relevant to this review (i.e. physical activity, sedentary behaviour, motor development/competence, cancer, children), without date or language restrictions. We will include observational and experimental studies, which target children aged <6 years, with a cancer diagnostic (pre-, during, and post-treatment).

Results: We will tabulate and summarise results narratively, and may conduct meta-analysis if ≥5 studies report comparable data. Results will be presented separately for activity behaviours and motor development, comparing cancer patients/survivors' levels with their otherwise-healthy counterparts (if available). Additionally, the relationship of these with health outcomes (including treatment outcomes) will also be presented, separately for observational and experimental studies.

Conclusion: The results of this review will be relevant to researchers, practitioners, and policy-makers, in order to help young paediatric cancer patients and survivors to have adequate physical activity levels and motor development. This, in turn, may lead to improved treatment outcomes, and health outcomes after cancer treatment.
Motor competence and the isotemporal substitution of physical activity, sedentary time and sleep among young children

Clark C
Coventry University, Coventry, Great Britain

Purpose: Daily activity data are axiomatically compositional. Accordingly, they occupy a specific geometry with unique properties that is different to standard Euclidean space. This study aimed to estimate the commonly theorized difference in motor competence associated with isotemporal reallocation between daily activity and sedentary behaviours, and to compare the findings from compositional isotemporal substitution to those obtained from traditional isotemporal substitution.

Methods: We estimated the differences in motor competence associated with reallocating fixed durations of time (isotemporal substitution) between accelerometer-measured daily activity behaviours (sleep, sedentary time and light and moderate-to-vigorous physical activity (MVPA)) among 300 children aged 3-5 years from across the UK. We generated estimates from compositional isotemporal substitution models and traditional non-compositional isotemporal substitution models.

Results
Both compositional and traditional models estimated a positive (unfavourable) difference in motor competence when time was reallocated from MVPA to any other behaviour. Compositional models found the differences in estimated motor competence and health outcomes were not symmetrical when an activity was being displaced; were not linearly related to the durations of time reallocated and varied according to the starting composition.

Conclusion: The compositional isotemporal model caters for the constrained and relative nature of activity and sedentary behaviour data and enables all daily behaviours to be included in a single statistical model. This analytical technique may facilitate decision making and in the adoption of behaviour change and expected outcomes across general and special populations.
Can proficiency and deficiency be accurately identified during real-time motor competence assessments?

Ward B
1University of Western Australia, Perth, Australia

Purpose
Motor competence assessors in education environments rely upon real-time assessment due to the time and resource efficiency the technique offers. It has recently been suggested that the recognition of proficiency criteria during real-time process-oriented MC assessment may be problematic. Studies into the reliability of process-oriented MC assessment commonly neglect to consider the accuracy of identifying individual skill components. Given that a key strength of process-oriented MC assessment techniques is the identification of skill deficiencies based on proficiency criteria scores, the current work aimed to further understand assessors' ability to recognise proficiency and deficiency criteria during real-time MC assessment and the impact of assessor experience on assessment accuracy.

Methods
10 primary teachers, and 7 paediatric professionals assessed 10 performances of four MC assessments using process-oriented MC assessment techniques.

Results
Moderate accuracy in identifying proficiency criteria was reported in both assessor groups. In contrast, reliability of performance scoring was high in both groups. Some proficiency criteria were more difficult to assess than others, with reported accuracy as low as 36%.

Conclusion
The study reinforces the difficulty of observing proficiency criteria during real-time MC assessment regardless of assessor experience, potentially hindering clinical and key stakeholder judgment. Results from this study also suggest that performance level reliability may overstate assessor's ability to accurately score proficiency criteria, which is an important consideration for test administrators. Emerging technologies may provide solutions to the barriers to reliable and cost-effective MC assessment in educational and clinical environments, therefore, development and implementation should be a research priority.
Public discourse and policy debates: fiscal measures to reduce sugar consumption and the role of the media

Penney T, Shona Hilton

1University of Cambridge, Cambridge, Great Britain

Policies and environments (SIG)

Purpose: Fiscal policies are being implemented worldwide to tackle excess sugar consumption and reduce risk of disease. This symposium will explore how the media can be used by different groups to influence the discourse that shapes public support for policy and policy-makers, and how these discourses shift and evolve during moments of intense policy deliberation.

Rationale: Reducing excess sugar consumption is a global public health goal. Fiscal policies to support this aim have been implemented in several countries, however many remain opposed to their use. Public support is an important contributor to political action, and media plays a critical role in shaping public views. This symposium aims to present recent evidence in this area.

Objectives: By the end of the session, participants will have a better understanding of:

- The role of media in framing the debate for fiscal policies to reduce sugar consumption
- Evidence of the media strategies employed by proponents and opponents of sugary drinks taxes leading up to the passage of the tax in Mexico
- Evidence of the use of the media by both proponents and opponents of the soft drinks industry levy in the United Kingdom
- Evidence of the shifting soft drinks industry discourse after the announcement of the UK soft drinks industry levy

Summary

A range of fiscal measures have been implemented across the globe, and several have received significant media coverage before and after implementation. One of the earliest cases of sugary drinks taxes – that of Mexico, demonstrates the role media might play in advocating for taxation. While in the UK, analysis of media shows that public health advocates engaged in debates with producers and marketers of unhealthy commodities with consistency in argumentation. These studies are complemented by other UK analysis that demonstrates that discourse from the soft drinks industry was found to shift considerably, and present inconsistent stances, between announcement and implementation.

Format

- 0-10 mins. Introduction; Tarra Penney
- 25-40 mins. Paper 2: “Did proponents and opponents of the UK soft drinks industry levy use the news media to influence the policy debate? a qualitative discourse analysis”; Christina Buckton, Scotland
- 55-75 mins: Open discussion; Shona Hilton, Scotland
Advocating for sugar-sweetened beverage taxation: a case study of Mexico (Recorded Presentation)

Donaldson E

1Johns Hopkins Bloomberg School of Public Health (time of study), Maryland, United States

15785: Public discourse and policy debates: fiscal policies to reduce sugar consumption and the role of the media (Convenor: Tarra Penney), Club H, June 5, 2019, 4:35 PM - 5:50 PM

Background: The obesity and diabetes epidemics in Mexico are significant public health problems that impose a substantial health and economic burden on the country. Given the link between sugar-sweetened beverage (SSB) consumption and obesity and related disease, a tax on these beverages emerged as a key target for policy intervention among health advocates. In October 2013, the Mexican legislature passed a specific excise tax of 1 peso ($ 0.08 U.S. dollars [USD]) per liter of SSBs, including sodas, energy drinks, bottled teas and coffees, and fruit drinks.

Methods: A case study was conducted to explore the strategies of SSB tax proponents and opponents leading up to the passage of the 2013 tax in Mexico. Data for this case study were collected in January 2015 at the national level using a qualitative approach based on key informant interviews (n=20) and a document review (n=10). Key informants were identified through purposive sampling. Interviews were conducted in English with translation provided as needed. Documents were selected to complement the interview data. Data analysis was conducted using a thematic approach. A formal external review committee with expertise in government policy processes and advocacy reviewed an initial draft of the case study and provided critical feedback.

Results: The advocacy strategy centered on two activities in particular - paid and earned media campaigns and formal lobbying - both of which leveraged scientific evidence and a rigorous understanding of the political context. The findings of this case study suggest that strong advocacy work, scientific evidence, and knowledge of the political context can be important facilitators to policy change that promotes obesity prevention and control.

Conclusions: As one of the first countries to pass a tax on SSBs, Mexico's experience provides key lessons for advocates interested in pursuing policy change in cities, states, and countries around the world. The passage of the tax on SSBs was achieved through strategic and targeted advocacy, primarily focused on elevating the visibility of the issue and communicating a sense of urgency with policymakers and the public.
15822

S2, S.2.23

Did proponents and opponents of the UK soft drinks industry levy use the news media to influence the policy debate? a qualitative discourse analysis

Buckton C, C Patterson, SV Katikireddi, F Lloyd-Williams, L Hyseni, A Elliott-Green, S Capewell, S Hilton

1 University of Glasgow, Glasgow, Great Britain, 2 University of Liverpool, Liverpool, Great Britain

Policies and environments (SIG)

Objective: There is growing body of evidence that indicates so-called unhealthy commodity industries (UCIs) such as alcohol and tobacco use similar tactics to resist upstream regulation and maximise profits. The media then offers UCIs a potentially important channel for direct lobbying of the public and policy-makers. In March 2016, the UK Government announced a soft drinks industry levy (SDIL) as part of its strategy to combat obesity and non-communicable diseases associated with excessive sugar consumption. The aim of this study was to use discourse analysis to examine how SDIL proponents and opponents sought to influence the public and policy-makers through the news media, during a time of intense policy deliberation.

Methods: We conducted a content analysis of news articles discussing the SDIL published in 11 UK newspapers between 1 April 2015 and 30 November 2016, identified through the Nexis database. Stakeholder citations were identified and imported into NVivo for qualitative coding according to a thematic typology developed and tested in a previous analysis of alcohol and tobacco industry tactics. Discourse analysis was used to uncover the argumentation used by opponents and proponents of the SDIL.

Results: In the final sample of 491 newspaper articles, a range of 287 stakeholders were presented as citing 1761 arguments; 65% for and 35% against the SDIL. We identified three scenarios of argumentation: 1) The soft drinks industry as a public health stakeholder; 2) the SDIL as a small but important step in tackling obesity; and 3) the SDIL as a 'win-win' scenario. Our findings support the concept of a common 'playbook' of arguments used by opponents of the policy. Conversely, SDIL proponents demonstrated three sources of inconsistency: 1) change in ideological stance; 2) pursuit of academic rigour; and 3) inconsistent arguments.

Conclusions: Public health policy advocates engaged in media debates are faced with the direct lobbying tactics of producers and marketers of unhealthy commodities. These advocates may benefit from increasing awareness of typical UCI tactics, presenting clear and consistent objectives, and supporting arguments with quality evidence.
Industry reactions to the UK soft drinks industry levy: unpacking the evolving discourse from announcement to implementation

Penney T, J Adams, M White

University of Cambridge, Cambridge, Great Britain

Background: Within the context of a global movement toward taxes on sugary drinks, the UK Soft Drinks Industry Levy (SDIL) is unique, a two-tiered levy to encourage industry to reformulate soft drinks. Industry reformulation decisions will directly influence the health impacts of the levy, however how these reactions are covered in the media will also shape a wider public discourse on sugar and health. This work will examine the evolution of industry reactions to the levy from announcement to implementation, via articles published in news media and trade press.

Methods: We searched the Factiva database of UK news media and trade press. A search strategy was used to identify articles related to sugar or soft drinks and related to the levy covering March 16th 2016 to March 31st 2018. Articles were screened using predefined criteria. Analyses included: (a) description of included articles by industry actor and (b) a longitudinal, case-based, thematic analysis of each industry actor.

Results: Nine soft drinks industry actors provided reactions that began with a discourse of disagreement with the aims of the SDIL immediately after its announcement with themes including 'no evidence that sugar taxes reduce obesity' and 'this will destroy industry and kill jobs'; with contradictory themes such as 'most products are not impacted' and 'we support government actions on obesity'. Throughout the consultation phase and during the Brexit vote and snap election further themes emerged including 'threats of legal action' that were not always consistent across industry actor but dominated until Royal Assent. Throughout the parliamentary process the discourse shifted toward acceptance of the levy and undertaking efforts to adapt including 'diversification and innovative marketing efforts' and various 'cost management actions to offset the levy'. As the implementation of the levy approached, acceptance was reinforced by additional themes that sought to ensure perceived profitability with 'claims of strong sales and profits'.

Conclusion: The shifting discourse suggests that industry actors are continually navigating issues of public, government and commercial interests, which result in conflicting narratives. Further work is needed to explore the discourses surrounding other related actors such as government, civil society and academics.
THURSDAY JUNE 6 2019

SYMPOSIA SESSION 3,
To legislate or not to legislate? Engaging the food industry to reformulate food and meals

Webster J, Joao Breda
1The George Institute for Global Health, University of New South Wales, Sydney, Australia

Policies and environments (SIG)

Diet-related diseases are one of the main contributors to the increasing burden of chronic diseases around the world. In most countries, the prevalence of obesity, diabetes, and hypertension is increasing with poor diets a key driver. The World Health Organization and many other national and international organisations have highlighted the importance of tackling this problem through interventions to improve the food supply, including by reducing levels of salt, fat and sugar in foods. As the majority of salt, fat and sugar in diets comes from processed foods and meals, the most effective approach to do this is through the food industry. There are a number of different policy instruments to influence the food industry to improve food composition. These range from front of pack nutrition labelling schemes, to use of fiscal policies such as sugar taxes and targets/standards to establish agreed levels for different nutrients in specific food categories. In relation to the latter, in 2015, 61 countries had programs to engage the food industry as part of national salt reduction initiatives. The World Cancer Research Fund recently updated its database of policies to improve healthy diets. It contains 28 examples of countries with front of pack nutrition labelling schemes, 35 countries with health-related taxes, 24 countries with voluntary and 17 countries with mandatory reformulation programs. Approaches to engaging the food industry vary from public private partnerships to make general commitments to action, to legislated standards for food composition.

Our symposia will focus on these different approaches to food industry engagement on food reformulation. Presentations will include a comprehensive review of national sugar reduction initiatives, an in-depth process evaluation of voluntary and regulatory approaches to engage the food industry in reformulation in the low- and middle-income Pacific Island Countries and an examination of the impact of the New Zealand government's voluntary Health Star Rating front of pack nutrition label on food reformulation. Together these presentations will provide an insight into challenges and opportunities of different approaches.

Some of the main policy questions that we will explore through the subsequent discussions are:

- To what extent can voluntary approaches be effective or do we need legislation?
- What are the barriers to translating effective interventions from high-income countries to low- and middle-income countries?
- Are efforts to reformulate processed foods and meals detracting from the important objective of shifting diets away from these foods towards a larger proportion of fresh foods?
Global review of sugar reformulation activities

Farrand C

1 World Health Organization Collaborating Centre on Population Salt Reduction, Sydney, Australia

Purpose: To do a global review of national efforts to engage the food industry to reformulate foods to contain less sugar and identify common elements in their approaches.

Methods: A rapid review of published literature, Google Scholar and grey literature identified national sugar reduction programmes, globally, and specific strategies on reformulation activities were extracted. This included specific food / drinks categories, targets set, mechanisms for monitoring and evidence of changes of sugar levels in foods.

Results: Out of 79 countries with national sugar reduction strategies, 21 reported work with the food industry to reformulate food to contain less sugar. All reformulation initiatives identified were voluntary. Four countries have set percentage reduction targets for the food supply, 13 countries have set sugar targets for specific foods (and 1 planned), and 9 have set sugar targets for beverages (and 1 planned). Common foods targeted included breakfast cereal, yoghurt, biscuits and snacks, and sugar sweetened beverages. Four countries (France, Italy, Switzerland and UK) have reported an impact. Reductions in the sugar content of different foods ranged from 3% in Switzerland to 10% in Italy, following the sugar reformulation strategies. In France this has translated into a 0.4g reduction in sugar intake from 2008-2012. There was limited data on evidence of impact for other countries.

Conclusions: While countries are increasingly adopting sugar reduction interventions many countries have yet to initiate work with the food industry to reduce sugar content in food. The review identified setting of targets across specific food categories (breakfast cereal, yoghurt, snacks, and sweetened beverages) with varying targets. However range of food categories, and ambitious targets were limited, as was information related to monitoring systems towards meeting the targets. Identification of common approaches, such as food categories, and sugar targets for reformulation can provide a base from which other countries within similar contexts can develop their own sugar reduction strategies within a broader nutrition strategy. Evidence of health impacts from sugar reformulation is currently in its infancy, due to the recent introduction of reformulation initiatives in most countries, and requires further monitoring and evaluation.
Process evaluations of Samoa’s and Fiji’s salt reduction strategy: can successful food reformulation interventions from high-income countries be replicated in low- and middle-income countries?

Trieu K, J Webster

1The George Institute for Global Health, The University of New South Wales, 2042, Australia, 2Sydney School of Public Health, Faculty of Medicine, The University of Sydney, 2050, Australia, 3The George Institute for Global Health, The University of New South Wales, 2042, Australia | Sydney School of Public Health, Faculty of Medicine, The University of Sydney, 2050, Australia

Policies and environments (SIG)

Objective: To understand whether successful food reformulation interventions used in high-income countries can be transferred to low- and middle-income (LMIC) Pacific Island Countries through investigating the extent of implementation and the contextual influences affecting implementation and outcomes.

Methods: A mixed methods approach was used to assess the dose, adoption, fidelity and contextual barriers and facilitators of interventions to engage the food industry in lowering salt in foods. Data were collated from routinely-collected administrative data, nationally-representative post-intervention surveys and stakeholder interviews. Thematic analysis of qualitative interview responses were triangulated with the quantitative data.

Results: Overall, the dose, adoption and fidelity of interventions to engage the food industry to support salt reduction was low in both Samoa and Fiji. In Samoa, 17% of food outlets in Apia agreed to display educational material about salt reduction and remove salt shakers from tables in support of World Salt Awareness Week. Reformulation initiatives were not implemented as planned due to concerns about unfairly affecting local food companies' compared to global manufacturers, who were harder to contact and engage in voluntary reformulation. In addition, legislative backing to substantiate the Ministry of Health's requests for food companies to lower salt in foods was absent due to the delay in the establishment of the Food Act. In Fiji, although voluntary salt content targets were established for foods, there was no active mechanism put in place to monitor food companies' compliance with targets. This was due to a lack of technical resources (funding, expertise and equipment) to measure the salt content in foods. In both countries, stakeholders suggested government legislation of salt content in foods was needed to create a level playing field for food manufacturers and ensure food industries prioritize salt reduction.

Conclusions: Reducing salt in processed and prepared foods is crucial as it is a major and growing contributor of excess salt intake in LMICs like Samoa and Fiji. This process evaluation provides insights about the contextual challenges of engaging food industries to voluntarily lower salt in foods in Samoa and Fiji, and the necessary adaptations of reformulation interventions to fit the local context.
Effects of the voluntary Health Star Rating nutrition labelling system on food reformulation in New Zealand

Eyles H, C Ni Mhurchu, R Chen, Y Jiang, L Young
1 National Institute for Health Innovation, The University of Auckland, Auckland, New Zealand

Objective: Interpretive front-of-pack (FoP) nutrition labels can encourage healthier reformulation of packaged foods. The Health Star Rating (HSR) FoP nutrition label was introduced as a voluntary initiative in New Zealand (NZ) in 2014. Packaged products can display between ½ and 5 stars based on contents of positive and negative nutrients, with 5 stars being the healthiest. Our aim was to determine the impact of the voluntary HSR system on food reformulation in NZ.

Methods: Annual surveys of packaged foods and beverages were completed in four major supermarkets before (2014) and after (2015 to 2018) HSR implementation. Supermarket data were linked with the Nielsen Homescan™ Panel (2014-2017) for weighted analysis by purchase volumes. Outcomes were: uptake of HSR overall and by food group, star ratings of products displaying a HSR label, average nutrient composition of products displaying HSR compared with non-HSR, and the composition of same products displaying HSR in 2018 compared with 2014 (prior to HSR).

Results: In 2018, four years after the introduction of HSR, 21% of eligible products displayed HSR labels (2,997/14,318). The highest uptake was for packaged fruit and vegetables, cereal and cereal products, and non-alcoholic beverages. The majority of products displaying the HSR (77%) had ratings between 3.0 and 5.0 stars. The average energy density, saturated fat, and sodium content of unlabelled products increased significantly over the four years (no change in average sugar content), and in 2017 HSR labelled products had an overall healthier (sales weighted) nutrient composition than their non-labelled counterparts. For products available in both 2014 and 2018, there was a 2% reduction (-12.5mg/100g) in sodium for HSR compared to non-HSR products. However, this change was not significant when weighted by household purchases (2014-2017).

Conclusions: Voluntary uptake of the HSR system in NZ is slow, and display of HSR labels appears biased towards already healthier products. There is some evidence of healthier product reformulation of HSR compared with non-HSR labelled products, but it is minimal and not reflected in healthier food purchases. Making the HSR system mandatory could be necessary to ensure equitable implementation and greater reformulation efforts.
Challenges and opportunities for promoting physical activity in out-of-school time programs

Beets M, Tony Okely
1University of South Carolina, Columbia, SC, USA

Purpose/Rationale: Out-of-school time (OST) programs, defined broadly as programs that operate before/after school, on the weekends or during summer/holidays breaks, represent unique settings to offer youth opportunities to engage in physical activity. Interest in delivering interventions to increase physical activity in OST programs has grown considerably within the last 10 years and across numerous countries, with many of the studies originating from the United Kingdom, Australia, and the United States. Intervening within OST programs, however, presents interventionists with unique challenges that require careful attention to ensure intervention effectiveness. These include a high degree of staff turnover, irregular attendance of children, competing/conflicting organizational priorities, and enrollment fees/cost of attendance for parents/children.

Objectives: The goal of this symposium is to present evidence from three large-scale interventions targeting two complimentary OST program settings, summer day camps, and afterschool programs. The objectives are to describe the: 1) similarities and differences when intervening across different OST program settings; 2) intervention design features geared toward different settings and populations; 3) impacts of the interventions on participation and youth physical activity levels; 4) challenges associated with intervening in these settings; and 5) suggested future directions.

Summary: Leaders in OST program interventions will present findings from three large-scale studies. Presenter 1, Dr. Russ Jago, will present findings from Action 3:30 afterschool intervention, a feasibility trial evaluation of an after-school intervention in UK primary schools. The presentation will include feasibility results and costs. The presentation will also include a summary of the implications of the study program for promoting physical activity afterschool in the UK. Presenter 2, Dr. Keith Brazendale, will present findings from Turn up the HEAT, a 4-year intervention to promote physical activity in summer day camps serving low-income youth. Presenter 3, Dr. Thomas Robinson, will present results from Team GOALS, a 3-year, community-based after school team sports intervention for low-income Mexican-American children with overweight or obesity.

The Discussant, Dr. Tony Okely, will provide his thoughts regarding the immediate and future opportunities and challenges when intervening on the OST program setting and apply these to OST programs in Australia.

Format: The Chair, Dr. Michael Beets, will introduce the speakers and provide a brief 5-minute overview of the symposium. The three presenters will each be provided 15-minutes to present the findings from their studies. The Discussant will close with a brief 10-minute presentation. During the remaining 15-minutes, the Discussant will moderate questions from the audience.
S3, S.3.26

**Action 3:30: A cluster randomised feasibility study of a revised teaching assistant-led extracurricular physical activity intervention for 8-10 year olds**

**Jago R, B Tibbitts, A Porter, E Sanderson, EL Bird, JE Powell, C Metcalfe, SJ Sebire**

1Centre for Exercise, Nutrition & Health Sciences, School for Policy Studies, University of Bristol, Bristol, Great Britain, 2Bristol Randomised Trials Collaboration, University of Bristol, Bristol, Great Britain, 3Centre for Public Health & Wellbeing, University of the West of England, Bristol, Great Britain

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15659: Challenges and opportunities for promoting physical activity in out-of-school time programs (Convenor: Michael Beets), South Hall 2B, June 6, 2019, 8:30 AM - 9:45 AM

**Other**

**Purpose:** To examine the feasibility, evidence of promise and cost of Action 3:30, a revised after-school physical activity intervention in children.

**Methods:** A cluster randomised feasibility study, including process and economic evaluations. Year 4 and 5 children (8 to 10 years old) were recruited from twelve primary schools in Southwest England. Two teaching assistants (TAs) from each intervention school attended a 25-hour (five day) training course focused on how to deliver an after-school PA programme. As Action 3:30 is grounded in Self-Determination theory, the training focussed on promoting children's autonomy, belonging and competence. TAs received resources to aid delivery. TAs delivered a 60-minute after-school physical activity programme twice a week for 15 weeks (30 sessions).

**Results:** Twelve primary schools were recruited; six intervention (n=170 pupils) and six control (n=165 pupils). 41% of eligible pupils participated, 49% of which were girls. The sample included participants with a range of baseline physical activity levels. Two schools allocated to the intervention arm withdrew from the study before the start of the intervention. The TA training was well attended and positively received. Attendance in the Action 3:30 after-school programme was good; 70% of pupils attended at least 50% of the 30 sessions. Mean weekday MVPA did not differ between arms at T1 (-0.5, 95% CI = -4.57, 3.57). The process evaluation revealed Action 3:30 was received positively by pupils, TAs and key contacts in intervention schools. Pupils enjoyed Action 3:30 and both TAs and pupils perceived the teaching style to be autonomy-supportive. The economic evaluation showed that Action 3:30 is inexpensive; the estimated cost of the programme after one year was £1.64 per pupil per session.

**Conclusions:** Action 3:30 is a low-cost feasible after-school programme, which engages a range of pupils and offers continuous professional development to TAs. However, Action 3:30 does not show evidence of promise to increase levels of MVPA. Training existing school staff is a viable means of providing physical activity programs after-school and may be a more effective use of limited funds than using external providers.
Turn Up the HEAT (Healthy Eating and Physical Activity) in Summer Day Camps: Physical Activity Outcomes from a 4-year randomized controlled trial

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Objectives: To evaluate a multi-component, capacity-building intervention to increase moderate-to-vigorous physical activity (MVPA) of children attending summer day camps (SDCs).

Methods: Twenty SDCs serving 3,312 children (7.9 yrs., 46.2% girls, 66.1% non-Hispanic Black) participated in this 4-year quasi-experimental controlled trial. Children's accelerometer derived MVPA was collected at baseline (July 2015) and follow-up (July 2016, 2017, 2018). Following baseline assessment, SDCs were assigned to the immediate (N=10) or delayed (N=10) group. Immediate SDCs received intervention for 2 consecutive years (Year 2 and 3) and delayed SDCs received the intervention for 1 year (Year 3). Year 4 was a maintenance phase with no intervention. During intervention years SDCs received the STEPs (Strategies To Enhance Practice) intervention, a capacity-building approach grounded in the Theory of Expanded, Extended and Enhanced Opportunities (TEO), where program leaders received training to expand (introduction of PA breaks and active field trips), extend (scheduling a minimum of 3 hours/d for PA opportunities) and enhance (increase amount of MVPA children accumulate during schedule PA using the LET US Play principles) PA opportunities. Multilevel mixed effects regression models estimated changes in MVPA. Implementation of TEO was evaluated using direct observation.

Results: At baseline, immediate boys and girls attained 87.5 and 77.5 MVPA minutes/day, respectively, while delayed boys and girls attained 104.6 and 86.5 minutes/day, respectively. Boys and girls in the immediate group showed small increases in MVPA after 2 years of intervention (+4.9 minutes/day and +4.6 minutes/day). However, after the 1-year maintenance phase, MVPA returned to baseline. After one year of intervention, boys and girls in the delayed group decreased MVPA (-14.0 minutes/day and -9.0 minutes/day). After the 1-year maintenance phase, boys decreased MVPA by -2.0 minutes/day, girls increased MVPA by +4.8 minutes/day. Observational data indicated SDCs extended PA opportunities and sustained this during maintenance phases. However, SDCs varied in implementation of expanding and enhancing PA opportunities during intervention and maintenance phases.

Conclusions: The intervention was not successful at increasing children's MVPA. Nonetheless, children attending SDCs accumulated substantial amounts of MVPA, suggesting SDCs without a formal intervention, may be a setting where children can naturally obtain a considerable amount of MVPA.
Team GOALS: A 3-year, community-based, after school team sports intervention for 7-11 year-old low-income Mexican-American children with overweight and obesity

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Objective: To describe the rationale, theory, design, implementation, results, and lessons learned from Team GOALS, a 3-year, community-based, after school team sports intervention designed to meet the needs of 7-11 year old, low-income, Mexican-American children with overweight and obesity.

Methods: Team GOALS was specifically designed, based on theory and past research, to increase a growth mindset and intrinsic motivation for voluntary participation in physical activity, including a focus on team sports. Coach training incorporated feedback using a novel Coaching Behavior Observation Tool (CBOT) with audio and videotaping of sessions. Coaching behaviors and children's team sports participation and physical activity were measured by direct observation, children's activity was measured with accelerometry, and parents and children completed physical/physiological assessments and surveys. Team GOALS was tested, in a randomized controlled trial, as part of a large-scale multi-level, multi-component, home-, community-, and primary-care-based intervention to reduce obesity (Stanford GOALS).

Results: 241 families were randomized with 1-, 2- and 3-year follow-up rates of 98.8%, 96.7%, and 94.2%. Children were 7-11 years old at enrollment and 10-14 years old at completion of the study. Availability for and/or interest in participating in an after school program were not required for enrollment. Mean participation over the entire 3 years of enrollment was 22% of all offered days (about 47 days per year) with 42% of children attending = 1 day per week. However, participating =1 day per week trended from about 60% in the first months after enrollment to less than 20% after 3 years. Curriculum design and coach training resulted in consistently >50% of total session time spent in moderate-to-vigorous physical activity (MVPA).

Conclusions: Grounded in theory and past research, Team GOALS successfully provided substantial participation and MVPA for a high-risk, socio-economically challenged, community sample of overweight and obese children. Few past studies have assessed effects over 3 years. Team GOALS was designed to promote voluntary participation over the entire 3 years. Key barriers to participation changed as children aged. The results identify principles and methods that may enhance short-term and long-term participation and MVPA as part of an after school program.
Research opportunities for implementation of diet and physical activity behavioral interventions

Wolfenden L, Paul Estabrooks
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Purpose: This symposium seeks to identify opportunities for advancing implementation science research to move diet and physical activity interventions into practice within non-health care settings. The symposium will include the perspectives of funders and implementation researchers and will feature a case study of an innovative method of optimizing implementation interventions to meet end-user needs.

Rationale: As a research community, we have studied, evaluated, and produced efficacious interventions, yet more progress is needed in implementation science so we make a global impact on chronic diseases that could be prevented with healthier diets and more physical activity. Despite the presence of such efficacious programs, policies and practices, research evidence internationally indicates that such programs are not routinely implemented in practice. Without effective implementation in end-user settings, the benefits of such research investment in improving community health cannot be realized.

Objectives: To: i) describe trends in implementation research funding of diet, physical activity and obesity by the National Institutes of Health (NIH) and National Cancer Institute (NCI); 2) provide a summary of intervention research targeting implementation of diet and physical activity programs in non-health care settings; and 3) describe a case study of the optimization of an evidence-based public health program in schools to meet the needs of end-users.

Summary: First, the US NIH, NCI, will present trends in Implementation Science research funding in diet, physical activity and obesity, and share opportunities for innovation and transdisciplinary perspectives across context (Dr April Oh). Second, we will present an overview of four systematic reviews (three published by Cochrane) aimed at synthesizing effective strategies for implementing evidence-based diet and physical activity programs, policies and practices in childcare services, schools, sporting clubs and workplace (Dr Serene Yoong). Lastly, we will describe a case study of optimizing a physical activity implementation intervention in schools (Dr Nicole Nathan). The symposium will include a discussant who will reflect on the presentations and facilitate a panel and audience discussion about the gaps in the current evidence-base and what research questions and methods are needed to advance implementation science in diet, physical activity and obesity research (Professor Paul Estabrooks).

Format: This symposium will include a chair, three presentations and a discussant. The introduction by the chair will be 10 minutes and help frame the presentations in the context of current available evidence (A/Prof Luke Wolfenden), the three presentations (15 minutes) and the discussant will facilitate an interactive discussion (15 minutes).
Perspectives on research priorities and funding for implementation science in diet, physical activity and obesity

Oh A, G Neta

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Purpose: Implementation of cancer prevention and control interventions, including promotion of a healthy diet, physical activity and reduction of obesity, is among the research priorities at the National Cancer Institute (NCI), National Institutes of Health (NIH). Identifying strategies to reduce obesity and promote physical activity and diet will require multi-level approaches with recognition of context for these interventions, pragmatic designs, and transdisciplinarity. In this presentation, we will briefly describe implementation science, and observations in currently funded implementation science in diet, physical activity and obesity. The presentation will also share current opportunities for innovation and transdisciplinary perspectives, opportunities and tips for grants funding in implementation science at NCI, and training opportunities to build capacity in the field.

Methods: Description of the currently funded research at NCI were obtained through qualitative methods, using iSearch, an NIH Office of Portfolio Analysis platform. NCI-funded grants awarded through the Dissemination and Implementation Research in Health program announcements were selected if they included diet, physical activity, or obesity as a health intervention of focus. Abstracts and specific aims for the applications were reviewed and coded.

Results: Within the total currently funded applications (n=68), 16% of the applications included diet, physical activity or obesity. Major themes of funded research include a focus on multiple health behaviors and overall "wellness", use of technology as a tool for delivery of implementation strategies, and community engagement/stakeholder engagement strategies deployed. Areas for growth include integration of the clinical and community contexts, examination of policy and work in more diverse populations. The presentation will also offer observed trends, pitfalls and opportunities for research directions to advance new applications in this field.

Conclusions: Identification of observed gaps and trends in implementation science research funding is part of a larger dialogue towards agenda setting for the field. Rich opportunities are available for advancing implementation science in diet, physical activity and obesity research to ultimately reduce the burden of related chronic diseases, including cancer.
An overview of intervention research to increase implementation of nutrition, physical activity and obesity-related programs/policies in non-health care settings: opportunities for future research

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Implementation and scalability (SIG)

Purpose: To provide an overview of findings from four evidence syntheses of intervention research to identify strategies to improve implementation of nutrition, physical activity and obesity-related programs/policies in non-health care settings. This presentation will describe the quantity and quality of studies undertaken in these settings and highlight opportunities for future implementation research.

Methods: This is an umbrella review, summarizing findings from four systematic reviews (three published by Cochrane) undertaken by the research team. All reviews aimed to identify effective strategies to improve implementation of evidence-based nutrition, physical activity and obesity related programs/policies in four settings: i) childcare services; ii) schools; iii) sporting clubs; and iv) workplaces. All reviews have been published and/or are currently being updated. The reviews had similar inclusion criteria, and included only controlled trials (randomised and non-randomised) that had a primary aim of improving the implementation of nutrition, physical activity and obesity-related programs/policies in the target settings. The screening of articles and data extraction was undertaken by two reviewers, with discrepancies resolved by a third reviewer. A narrative synthesis of the four reviews will be undertaken focusing on overall findings of each review as well as the quantity and quality of the research evidence. Building on the findings from the reviews, we will facilitate a discussion with a broader group of researchers to identify priorities for implementation research in non-health care settings.

Results: Overall, the largest number of included trials were conducted in schools (n=27), followed by childcare services (n=10), workplaces (n=6) and sporting clubs (n=2). The majority of intervention research trials were randomised controlled trials. A wide range of implementation strategies with varying levels of effectiveness was found in each review. The overall quality of the evidence within each review was rated as low for all/most outcomes, with high risk of bias. Opportunities to advance the evidence-base will be described.

Conclusions: This presentation provides an overview of the existing intervention research examining the effectiveness of implementation strategies in non-health care settings. This provides an avenue to reflect on the needs of implementation research to further advance the field and improve community health.
Optimising a school-based physical activity implementation intervention for scale up

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Purpose: School physical activity policies have been mandated by many jurisdictions internationally, however implementation of such policies is poor. Without population wide implementation, the potential benefits of school policies will not be realised. The aim of this presentation is to describe how an efficacious intervention that increased schools' compliance with a mandatory physical activity policy was optimised for scale-up to reach over 100 schools.

Methods: Optimisation is an emerging field within implementation science involving an iterative, data-driven process to improve the impact of an intervention. The optimisation process involved a series of randomised controlled trials (RCT), undertaken between 2016-2018, with the aim of developing the most effective and scalable implementation strategy, that could be delivered by a service delivery organisation. Intervention effectiveness was measured via school's compliance with the mandatory policy and children's physical activity levels measured via accelerometer.

Results: Following extensive formative research which included: i) literature reviews; ii) interviews with teachers; and iii) observations of teachers' delivery of physical activity, the identified barriers/facilitators to policy implementation were mapped to the Behaviour Change Wheel (BCW) and the Theoretical Domains Framework (TDF). Potential behaviour change techniques and implementation strategies were then identified and presented to an advisory group to assess against the APEASE criteria. Implementation strategies included: executive support, training in-school champions, provision of tools and resources, implementation prompts, reminders and feedback. The findings from each RCT as well as the methods used to modify the implementation strategies for each subsequent trial in terms of behaviour change technique, dose or modality will be presented.

Conclusions: This is the first study to optimise an implementation intervention to increase schools' compliance with a mandatory physical activity policy. Given the dearth of research, the findings will be important in informing future implementation efforts in this setting. Furthermore, the methodology used may inform the design of other health promotion programs in schools or other settings more broadly.
Defining “Success” in Digital Health Behaviour Solutions: Academic vs Industry Perspectives

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E- & mHealth (SIG)

Debate Symposium

Purpose: The purpose of this debate symposium is to (a) use a case study to illustrate common challenges experienced between scientific and commercial interests, and (b) provide a point-counterpoint debate reflecting the perspectives of academic versus industry when defining "success" for digital health behaviour solutions.

Rationale: Despite interest and promise surrounding the field of digital health, a major challenge exists: academics do not typically consider commercialization as an important endpoint, and industry approaches often do not consider the evidence base and scientific evaluation as important outcomes. To bridge this gap, academic researchers have begun to partner with industry collaborators, and many industry experts have recognized the value of behavioural science and evidence-based principles. However, there remain "bumps along the road" in establishing fruitful, equitable partnerships that preserve the principles of the science while maintaining commercial viability. This debate symposium will begin with a brief case study (Dr. Marta Marques) highlighting some of the challenges faced by NoHoW consortium researchers developing a digital solution for supporting long-term weight maintenance. The case study will include examples of cultural differences in what constitutes "sufficient evidence", the pace and timeline of work, difficulties in developing engaging digital solutions (design vs content), preservation of core intervention content and mechanisms when transforming to digital delivery, and balancing scientific goals with commercial interests. Following this case study, the symposium will continue with a point-counterpoint debate emphasizing the unique perspectives of academic and industry partners when defining success for digital health behaviour solutions. Dr. Melanie Hingle will represent the academic perspective, emphasizing the importance of rigorous methodology and remaining true to evidence-based principles. Dr. Heather Patrick will represent the industry perspective, addressing the challenges of translating established intervention approaches into digital solutions and positioning these solutions for commercialization. The session will conclude with a panel discussion (moderated by Dr. António Palmeira and Dr. Camille Short) that strives to reach a middle ground and offer behavioural researchers concrete, actionable steps for establishing productive partnerships that bring evidence-based principles to digital solutions with a clear path to commercialization.

Objectives:
1. To present a case-study illustrating common challenges for developing scientifically sound, commercially viable digital health behaviour solutions.
2. To engage in a point-counterpoint debate reflecting differing perspectives of academic versus industry partners for defining success.
3. To discuss actionable steps for researchers to take to establish quality partnerships with industry, while addressing both scientific and commercial interests.
S3, S.3.28

From design to commercialization strategy: NoHoW as a case study

Marques M, AL Palmeira, J Stubbs, B Heitman

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Purpose: As funding agencies have come to recognize the importance of commercialization for supporting sustainable digital health behaviour change solutions, academic researchers have begun to actively seek opportunities for collaboration with industry experts in design and commercialization. Although such collaborations offer much potential, researchers are often ill-equipped to work through some of the demands, challenges, and differing perspectives that emerge regarding what constitutes a "successful" digital health behavioural change program. The purpose of this talk is to provide a brief case study of how researchers engaged in the NoHoW consortium - a large European project developing a digital solution for supporting long-term weight maintenance - have navigated some of these challenges.

Methods:
Not applicable for debate symposium.

Results: This case study will address some of the key challenges in developing an evidence-based digital health behaviour solution for commercialization. Topics to be discussed will include the tensions that emerge between design vs. content, features vs. evidence-base, and iterative vs. traditional trial methods. The case study will also highlight differences in pace of work, varying degrees of comfort with best-quality vs. best-available evidence, and interest in preserving core intervention content and underlying mechanisms while designing for commercial interests and scalability. Another challenge to academic-industry partnerships arises around intellectual property. Academics are trained to support open science and freely share materials and content that may benefit the broader research community and public health writ large. In the context of commercialization strategy, openly sharing the "secret sauce" of a digital health behaviour solution may impede potential for patenting and marketplace competitive advantage.

Conclusions: Challenges remain for academics engaged in collaborations for developing scalable digital health behaviour solutions with high potential for commercialization. Although researchers in the NoHoW consortium have been able to address some of the tensions between scientific and commercial interests, it has not been without frustration. These and other challenges have the potential to have considerable negative impact on the success of large transdisciplinary research projects and ultimately may impact the commercialization potential of such collaborations.
S3, S.3.28

Why scientific rigor is necessary for the success of digital health interventions

Hingle M, H Patrick, M Marques, AL Palmeira

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15743: Defining “Success” in Digital Health Behavior Solutions: Academic vs Industry Perspectives (Convenor: Camille E Short), Terrace 2A, June 6, 2019, 8:30 AM - 9:45 AM

E- & mHealth (SIG)

Purpose:
While many commercially-available digital health products enjoy broad reach and popularity, their potential health impact remains as limited as their evidence base. Further, a majority of commercial digital health products have not been formally tested in randomized controlled trials, thus limiting the potential data consumers and health professionals can use when seeking products to support targeted behaviour change and clinical outcomes. Industry-academic partnerships offer opportunities to redefine industry’s "success" in terms of behavioural science - i.e., systematically assessing potential efficacy and effectiveness and, through these efforts, formally signalling readiness to progress to the next phase of research and/or implementation. Scientists who wish to partner with developers of commercial digital health solutions should be aware of the challenges inherent in the application of scientific principles and methods to commercialization strategy. The purpose of this perspective is to emphasize these challenges and offer some ways by which progress can be made.

Methods: Not applicable for debate symposium.

Results:
Scientists bring rigor and reproducibility to digital health research and development, including robust and unbiased experimental design, methodology, interpretation, and reporting of results. Maintaining rigor and demonstrating reproducibility allows developers to identify critical intervention elements and retain these elements when efficacious products and strategies are translated into scalable, digital health programs. Many scientifically rigorous methodologies - e.g., pragmatic trials, multiphase optimization strategy - are also responsive to real world development constraints. However, the pace of industry continues to be too fast for such rigor. Further, academics still experience resistance to greater rigor by industry partners who are uncomfortable with comparing an emerging product (or popular established product) to a standard care or other comparable solution known to positively affect meaningful outcomes.

Conclusions
Academic-industry partnerships offer commercial digital health products greater grounding in evidence-based approaches to behaviour change. Such partnerships can encourage more rigorous evaluation of digital health solutions, ensuring that interventions delivered via digital technology are producing clinically meaningful outcomes for users. For this to happen, industry partners must be willing to make adjustments to product timelines and subject their commercial products to scientific scrutiny.
Why commercialization is necessary for the success of digital health interventions

Patrick H, M Hingle, M Marques, AL Palmeira

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15743: Defining “Success” in Digital Health Behavior Solutions: Academic vs Industry Perspectives (Convenor: Camille E Short), Terrace 2A, June 6, 2019, 8:30 AM - 9:45 AM

E- & mHealth (SIG)

Purpose: A major limitation of digital health solutions developed in the context of academic environments is that most have not adequately considered consumer expectations or incorporated an a priori commercialization strategy. As a result, many evidence-based digital health solutions fall short of their full potential with regard to reach and effectiveness and far too many stall out after the end of a funding cycle. One possible solution is for industry to more actively partner with academic scientists to ensure that evidence-based approaches are brought to scale in appealing ways through strategic commercialization.

Methods: Not applicable for debate symposium.

Results: Within digital health industry, there is increasing pressure to leverage evidence-based approaches to behaviour change and clinical outcomes for marketplace advantage. A challenge often facing industry is how best to utilize interventions that have been developed and tested by academics using traditional modes of delivery (e.g., in-person, human-delivered). Additionally, these interventions typically have been developed for delivery over a much longer time course than the typical digital consumer is likely to engage. Academic teams also do not regularly include designers whose expertise ensures products deliver a high-quality user experience and commercialization potential. This critical omission results in a lackluster experience and low engagement. Finally, the time course for identifying and evaluating necessary modifications to existing interventions is often misaligned with commercialization needs.

Conclusions: Academic-industry partnerships offer an opportunity to develop digital solutions informed by evidence-based principles, and designed to achieve meaningful changes in behavioural and clinical outcomes. However, achieving "success" at scale relies heavily on a robust commercialization strategy, and an engaging user experience. For academic-industry partnerships to function (and ultimately thrive) a truly transdisciplinary approach must be undertaken. These transdisciplinary teams should bring together not only behavioural scientists and engineers but also designers and business strategy experts. Successful partnerships - i.e., producing efficacious digital health interventions that can be translated into something appealing and useful in the consumer digital health landscape - require academic partners to be willing to become more nimble with timelines and more flexible in the application of scientific rigor in the context of commercialization goals.
Integrating Multiple Stakeholder Perspectives to Build Partnerships that Shape Effective Nutrition and Physical Activity Interventions

Harden S, Adrian Bauman

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Purpose: To share best practices and lessons learned conducting participatory nutrition and physical activity research within a variety of pragmatic settings.

Rationale: In order to scale and sustain evidence-based interventions, partnerships with individuals from the settings that will ultimately deliver the intervention are necessary. Much of what is understood about participatory research involves the participant, patients, or end-users engaged in the intervention. Less is understood about unique partnerships with stakeholders from pragmatic settings (e.g., corporate staff, community volunteers, lay health educators) that contribute to intervention implementation, but are not a target of the intervention itself. This leaves a gap in understanding best practices with a range of pragmatic settings. For example, how many times the partnership meets, which representatives are in the partnership (how do you recruit them), and how do we understand their needs and balance that with the scientific literature? Furthermore, more information is needed on how to empirically test the impact of the partnership.

Objectives: Detail methods and outcomes of participatory approaches with multiple stakeholder levels, and discuss how these partnerships impact the degree to which an intervention or outcome may be sustained beyond the lifespan of the research project.

Summary: Dr. Samantha Harden (USA) will provide an overview of dissemination and implementation science as it relates to engaging in participatory research methods, with a focus on how contextual factors may determine processes and outcomes. Dr. Scherezade K. Mama (USA) will share initial work in establishing an academic-community partnership for promoting physical activity and reducing cancer health disparities among rural cancer survivors. Dr. Carmen Byker Shanks (USA) will detail her research to measure and implement contextually relevant practices, programs, and policies that promote nutritious food environments. Dr. Courtney Parks (USA) will discuss the importance of participatory methods in the development, design, and interpretation of evaluating organizational impacts on health as well as how to build capacity for implementing evidence-based approaches in diverse organizations. Particular attention will be paid to highlighting context relevant factors and how audience members may translate these findings to their work. Dr. Adrian Bauman (AUS) will provide interpretations and applications from a translational perspective and will describe how these findings and best practices may be applied in diverse international settings.

Format: The chair will provide a 5-minute overview, followed by three presentations (8 minutes each) with 15-minute guided discussion. Each discussion will outline main issues and variations in terminology, approaches, and outcomes.
Partnering to prevent and control cancer: An academic-community partnership to reduce cancer health disparities in rural communities

Mama S

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Purpose: Rural cancer survivors (CS) are less likely to do physical activity (PA) than those residing in urban areas, emphasizing the need for contextually tailored interventions designed to meet rural CS unique needs. The Partnering to Prevent and Control Cancer (PPCC) study used a community-engaged approach to understand and address PA disparities in rural CS in central Pennsylvania, specifically how to engage organizations in the PPCC and how those organizations can reach rural CS.

Methods: Community organizations were invited to join an academic-community partnership via an initial introductory letter, followed by a phone call, and an email. The partnership assisted with recruiting individual CS to the study via active (e.g., announcements at community events) and passive (e.g., mailings to cancer registries, community organizations) recruitment strategies.

Results: Sixty-eight community organizations were initially contacted to join the PPCC partnership, 28 expressed interest, and 15 returned signed letters of commitment. The partnership includes churches (n=4), cancer support groups (n=3), and other community organizations (e.g., YMCA, county/regional health organization; n=8). PPCC member organizations were provided recruitment materials by research teams members. They were able to choose and tailor the materials for their audience. Through the partnership, 266 CS enrolled in the study (n=35 via active and 231 via passive recruitment methods), representing 18 counties and 84 cities in central Pennsylvania, USA.

Conclusions: Although formative work in rural populations and CS exists, the persistent lack of effective and sustainable programs suggests that more work is needed to understand the needs and priorities of rural CS, specifically. Findings from this study contribute to our understanding of how to engage rural CS in research, effective recruitment strategies in this underserved and hard to reach population, and the underlying factors contributing to PA adoption and maintenance in rural CS. The PPCC partnership and findings from this study will guide adaptation of evidence-based PA interventions for rural CS and implementation within rural communities.
The UnProcessed Pantry Project: A novel approach to improving dietary quality for low-income adults served by rural food pantries

Harden S, C Byker Shanks

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Purpose: UP3: The UnProcessed Pantry Project uses an academic-community partnership that was built upon six years of preliminary work. The purpose of the partnership was to build an adoptable and generalizable intervention that increases dietary quality and decreases health disparities among rural, low-income populations served by food pantries. This is particularly relevant as ultra-processed foods (i.e., shelf-stable, energy-dense foods high in added sugar, fat, salt, and additives) comprise more than half of the American diet, and intake is even higher among low-income populations in rural communities. Intake of ultra-processed foods is linked to increased health risk for overweight and obesity, inflammation, some cancers, hypertension, dyslipidemia, diabetes, and metabolic syndrome. These health risks disproportionately affect low-income populations in rural communities.

Methods: Through an ongoing community advisory board, food pantry directors and staff and local health care providers provided input on recruitment strategies, intervention development and implementation, and data collection and interpretation. The resulting intervention was based upon three social-ecological levels in the food pantry interventions to improve dietary quality: the food supply stream (community), food environment (environment), and food pantry user (individual). The specific levels were identified within the partnership because they interact and reinforce the dietary choices and health outcomes of food pantry clients.

Results: UP3 aimed to decrease the amount of ultra-processed foods in the food supply available in the food pantry, improve the food environment within the food pantry to nudge less processed food choices, and recruit 40 participants across two food pantry sites to participate in a dietary intervention. Strategies of this successful partnership will be discussed in tandem with initial findings from UP3, including the logistics of the community advisory board, incorporating practice-based observations with evidence-based public health, the importance of multiple stakeholders and sites, and valuable approaches to communicating science.

Conclusions: Community-based approaches to research are necessary in rural communities to cultivate effective and sustainable interventions that target multiple socio-ecological levels to decrease nutrition-related health disparities for a healthy people and healthy planet.
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Implementation and scalability (SIG)

Purpose: To describe three studies that involve community partnerships, each with a unique balance of scientific rigor, community needs, and capacity building. These science-practice partnerships included developing a statewide food system shared measurement effort, evaluation of a national healthy food incentive program, and a national volunteer organization's efforts to build capacity to address food insecurity in cancer prevention and control work.

Methods: The statewide food system shared measurement project included two years of needs assessments and consensus building among diverse partners to identify core areas of interest for assessment and implementation of community surveys using common metrics on healthy food access. The survey was administered in five communities (3 urban, 2 rural) and a statewide panel which yielded an aggregate sample of 1,754 respondents. The evaluation of a national healthy food incentive program included a set of key informant interview (N=22) to inform federal policy in a rapid timeframe. The national volunteer organization's efforts to build capacity to address food insecurity in cancer prevention and control work involved a series of meetings with leadership and key informant interviews with multiple levels (e.g., field staff, regional leads, partners).

Results: Key findings from across the three projects will be discussed within the context of balancing scientific rigor and contributing to advancing the evidence-base while incorporating the community needs and making an impact on the local level. When working across various sectors and different types of partnerships it is beneficial to consider both practice-based knowledge and scientific evidence when making decisions about best practices to implement and measurement tools to assess impact and process. Scientific findings are a valuable tool for community partners to communicate needs and impact with partners and funders, but results should be framed in easy to digest formats that highlight the most important findings and implications for a broad audience. Finally, developing frameworks to institutionalize changes made as a result of partnerships is needed for sustained impact.

Conclusions: As multi-sector partnerships become increasingly important to solve complex issues around behavioral nutrition and physical activity, understanding best practices for creating synergy among diverse stakeholders is imperative.
Translating lifestyle interventions for cancer patients into clinical practice

Beeken R, Cristina Caperchione


Cancer prevention and management (SIG)

Purpose:
Lifestyle interventions (e.g. nutrition and exercise programs) are well-recognized treatment strategies for cancer patients and cancer survivors. However, these interventions are typically tested in controlled research settings and translation to daily practice remains challenging. To support the inclusion of lifestyle interventions as part of standard/usual cancer care, there is a need to focus on identifying facilitators of translation, strategies for implementation, and techniques to support and maintain behaviour change.

Rationale:
Participating in exercise, limiting sedentary behaviour, and consuming a healthy diet mitigate cancer-related and treatment-induced adverse effects and lead to improvements in overall quality of life. However, only a small proportion of cancer patients and survivors adhere to current lifestyle recommendations. Methods to bridge the gap between evidence-based guidelines and daily clinical practice are needed. This symposium will discuss strategies for translating lifestyle interventions into daily clinical practice.

Objectives:
We aim to identify methods and factors that facilitate translation of lifestyle recommendations and interventions into daily clinical practice during and after active treatment. Therefore, we aim to discuss;
Timing and methods for promoting adherence to lifestyle and body weight recommendations
The implementation of a clinical pathway to increase exercise levels and to improve consuming a healthy diet.
Exploring the role and application of behaviour change theory and behaviour change techniques in the development of translatable complex interventions to support positive lifestyle change in the community

Summary: This symposium is a collaboration of cancer researchers across five different countries, including England, the Netherlands, Belgium, Ireland and Australia. The chair will start with a short introduction of the topic “Translating lifestyle interventions for cancer patients into clinical practice”. Next, three short papers will be presented on methods and factors to bridge the gap between study-based interventions and daily clinical practice. This will be followed by a facilitated audience discussion on barriers and possible solutions to the translation of cancer interventions into practice. Finally, the discussant will end with a summary of the presentations and discussions.

Format: Three presentation and a facilitated general discussion of 15 minutes.
Optimal Timing and method for promoting adherence to lifestyle recommendations in postmenopausal breast cancer survivors – the OPTIMUM study


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15773: Translating lifestyle interventions for cancer patients into clinical practice (Convenor: Rebecca Beeken), Club A, June 6, 2019, 8:30 AM - 9:45 AM

**Cancer prevention and management (SIG)**

**Background:**
Adherence to lifestyle and body weight recommendations can improve health outcomes among postmenopausal breast cancer (PMBC) survivors. However, the majority does not adhere to these recommendations. There is a lack of insight on when and how sustained adherence should be promoted. Therefore, the OPTIMUM-study aims to gain insight into the optimal timing and method for promoting sustained adherence to lifestyle and body weight recommendations in PMBC survivors.

**Methods:**
The OPTIMUM-study is guided by a protocol for systematic development of health promotion programs, and has a mixed-methods design: it comprises a longitudinal observational survey among 1087 PMBC survivors with measurements at 1 and 2 years after diagnosis, and interviews and focus groups to further explore survey results. Survey outcomes include: adherence to recommendations, readiness for change, need for support, and their determinants. Eligible participants (i.e., individuals diagnosed with BC ~1 year ago, aged 60 years or older) will be sampled from the southern area of the Netherlands Cancer Registry. The PROFILES registry will be used for data collection management.

**Findings:**
Findings will include scientific evidence on when and how to promote sustained adherence in which PMBC survivors; translation of evidence into clinical oncology guidelines (through the Netherlands Comprehensive Cancer Organisation); and a plan for adoption, implementation, sustainability, and evaluation of these guidelines.

**Discussion:**
The OPTIMUM-study leads to scientific knowledge addressing a major research gap, and to products that can be embedded in clinical practice to promote sustained adherence to lifestyle and body weight recommendations in PMBC survivors.
Implementation of a lifestyle-based clinical pathway in daily clinical practice in men undergoing androgen deprivation therapy for prostate cancer

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Cancer prevention and management (SIG)

Introduction and objectives: Androgen deprivation therapy (ADT) is one of the cornerstones in the treatment of locally advanced and metastatic prostate cancer (PCa). Evidence-based guidelines (e.g., exercise, nutrition, etc.) have been drawn up to reduce the impact of ADT-induced side effects, but a European study showed that these guidelines are not sufficiently applied in practice. The aim was to assess the effect of a clinical pathway, incorporated in clinical practice, to increase the implementation of evidence-based strategies to manage ADT-induced side effects.

Materials and methods: PCa patients receiving ADT for >6 months were referred to the pathway (i.e., as standard practice), through a central coordinator. The pathway consisted of a medical screening (i.e., bone and cardiometabolic screening) and a rehabilitation program with a supervised exercise program (3 months) and referrals to a dietician and a psychologist. Anthropometric parameters and physical performance were measured at baseline and after 3 months. Primary endpoint was physical performance evaluated with the 400m walk test. A meaningful clinically important difference of the 400m walk test was defined as 17 seconds improvement and p<.05 was considered statistically significant.

Results: Between January 2015 and June 2018, 200 patients were referred to the pathway, of which 177 patients were enrolled (median age 69, IQR 63-74). The majority of the patients (86%) had a good functional status (Karnofsky Performance =90) at baseline. The indication for ADT was curative in combination with local therapy for locally advanced PCa in 67% and palliative for (non)metastatic PCa in 33% of patients. In total, 124 followed the complete pathway. The medical screening indicated a lower bone mineral density in 51% of the patients (40% osteopenia and 11% osteoporosis) and 25% had metabolic syndrome. After initial referral, 53% choose to receive diet advice and 43% psycho-education. A clinically meaningful performance improvement was observed in patients following the exercise program (277s to 257s; p<0.001).

Conclusion: Physical performance improved after following a lifestyle-based clinical pathway for prostate cancer patients in daily practice.
S3, S.3.30

A physical activity behaviour change intervention for survivors of cancer

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Cancer prevention and management (SIG)

Introduction: Few effective interventions have been identified that support the long-term maintenance of exercise behaviour by survivors of cancer. The aim of this study was to determine the long-term effects of the MedEX IMPACT (IMprove Physical Activity after Cancer Treatment) trial, a patient centred, evidenced-based and theoretically informed PA behaviour change intervention, on cancer survivors' long-term levels of physical activity (PA), cardiorespiratory fitness (CRF) and quality of life (QoL). The intervention was delivered through a community-based exercise rehabilitation programme for survivors of cancer called 'MedEx Move On' (MMO).

Methods: Adults with an established diagnosis of cancer, who had completed their adjunctive therapy, were referred to 'MMO'. Participants within the control group (CG) attended two 60-minute supervised exercise classes each week for 12 weeks. In addition to this, participants in the intervention group (IG) also received: i) a home exercise programme, ii) 4 PA information sessions and iii) a 1:1 exercise consultation. PA levels, CRF and QoL were measured using 7-day accelerometry, the 6-minute time trial and the Functional Assessment of Cancer Therapy (FACT) questionnaire, respectively, at baseline, programme completion (week 12) and 3 month follow-up. Analyses of variance and co-variance (ANOVA, MANCOVA) were conducted to test for differences.

Results: One-hundred and ninety-one survivors of cancer were recruited (CG, n= 87; IG, n=104; mean age 56 ±smn; 10 yrs, 73% female). Cancer diagnoses were breast (60%), colorectal (16%), prostate (13%) and other (11%). On average, participants attended 66% of the supervised exercise classes (CG= 67±smn;22%; IG=65±smn;27%). 51% of participants completed the trial. There was a substantial main effect for time for CRF and daily step count, with both groups showing significant increases across the three time points (p<.01, eta squared=.635 ,.194). No statistically significant differences for the outcome measures were identified between the CG and IG (p=.141).

Conclusion: Participation in a 12-week community-based exercise rehabilitation programme has a positive long-term effect on cancer survivors' CRF and daily step count. The inclusion of additional behaviour change strategies to the supervised exercise classes did not augment the benefits achieved.

Acknowledgement: This research is funded by the Irish Cancer Society.
Move to Learn: Does physical activity cause improvements in cognitive development and academic achievement in preschool and school-aged children?

Cliff D, Valerie Carson

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Purpose: This symposium provides new evidence on causal associations between physical activity and cognitive development and academic achievement in preschool and school-aged children.

Rationale: Globally, levels of physical inactivity among children are high, and the early development of lifestyle-related conditions, such as obesity, are concerning. Schools and preschools are common settings targeted by interventions for physical activity promotion. However, the primary goal of such institutions is children's cognitive and educational development, rather than health promotion, and this can influence their engagement with and maintenance of strategies to promote physical activity. If educational outcomes and physical activity promotion could be achieved concurrently, or if physical activity participation improved cognitive development or subsequent academic outcomes, educators and school leaders might be more motivated to implement strategies to support physical activity. However, causal evidence of the effects of physical activity on preschool or school-aged children's cognitive development, such as higher-order cognitive functions, or academic achievement, is scarce.

Objectives: This symposium aims to give insight on the causal associations between physical activity and cognitive development and academic achievement in preschool and school-aged children. Specific objectives are to investigate the following:

- Do cognitively engaging physical activities cause improvements in executive functions in preschool children?
- Are the effects of cognitively engaging physical activities on executive functions in preschool children greater than the effects of equivalent cognitively engaging sedentary activities?
- Can physical activity-based learning experiences cause improvements in executive functions or academic achievement in school-aged children?

Summary - Introduction: Dr. Dylan Cliff

Presentation 1 –; Dr. Dylan Cliff: Does cognitively-engaging physical activity improve executive functions and frontal lobe brain activity in preschool children? A pilot group randomised trial.

Presentation 2 –; Dr. Mirko Schmidt: The effects of a six-week combined physical-cognitive intervention on kindergarten children's executive functions.

Presentation 3 –; Dr. Myrto Mavilidi: Thinking while Moving in English: Integrating physical activity during English lessons on academic and cognitive outcomes.

Format: Dr. Cliff will chair the symposium and provide an introduction (5min) to the topic. This will be followed by three presentations (15min each) of new research. A/Prof. Valerie Carson will follow the presentations and act as discussant for the symposium (10min), facilitating discussion (15min). Based on the presentations and following discussion, the symposium will be closed by highlighting the implications for practice and formulating recommendations for future research. Discussant: Valerie Carson.

Cliff D, X Wei, A Giobbi, D Verstappen, P Paiman, M Schmidt, K Tonge, SJ Johnstone, SJ Howard

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PURPOSE: Observational evidence in young children suggests that physical activity may be beneficially associated with cognitive development. This pilot study aimed to investigate if participation in cognitively-engaging physical activities caused improvements in higher-order executive functions and frontal lobe brain activity in preschool children.

METHODS: A pilot group randomised trial was conducted among 60 children (mean age = 4.6 ± 0.3 years) from four preschools in Wollongong, NSW, Australia. Preschools were randomised to intervention or control groups. Control children participated in two 30min group intervention sessions at their preschool each week for six weeks. Activities were designed to promote children's engagement in physical activity (target of ~50% of session in moderate- to vigorous-intensity physical activity (MVPA)) and to incrementally challenge their executive functions. Assessments were completed at pre- and post-test by blinded assessors. Executive functions, including phonological and visual-spatial working memory, inhibition and shifting, were assessed using the validated Early Years Toolbox. Frontal lobe brain activity was assessed using a portable electroencephalogram (EEG) headset during: i) rest and ii) executive function tasks. Physical activity during each intervention session was assessed using accelerometry (ActiGraph). Intervention effects were tested using linear mixed models adjusted for clustering, and Cohen's d effect sizes.

RESULTS: Intervention children received the desired dose of the intervention (attendance = 11.2 ± 1.7 out of 12 sessions), including 44.3% of each 30min biweekly session in MVPA. However, there were no significant intervention effects on executive functions or EEG (p > 0.05). Effect sizes were typically small and the direction of the intervention effect was inconsistent (e.g., Cohen's d: Inhibition = 0.12 and EEG during phonological working memory = 0.18 in favour of intervention group; Shifting = 0.39 in favour of control group).

CONCLUSION: Although this study demonstrated that it was feasible and acceptable to deliver cognitively-engaging group physical activity sessions to young children at preschools, intervention effects were small. Alternative strategies, such as a modified intervention dose (e.g., more frequent sessions of shorter duration, over a longer intervention period), or alternative activities may be needed to achieve improvements in executive function from physical activity participation in preschool children.
The effects of a six-week combined physical-cognitive intervention on kindergarten children’s executive functions

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1University of Bern, Bern, Switzerland; 2University of Newcastle, Newcastle, NSW, Australia

15806: Move to Learn: Does physical activity cause improvements in cognitive development and academic achievement in preschool and school-aged children? (Convenor: Dylan Cliff), Club B, June 6, 2019, 8:30 AM - 9:45 AM

Implementation and scalability (SIG)

Objective:
The purpose of the present study was to test the effectiveness of a six-week combined physical-cognitive intervention, and to compare it to both a sedentary cognitive intervention and a waitlist control group.

Methods:
Using a between-subjects experimental design, 189 children aged between four and six years (mean age = 5.34, SD = 0.59) were recruited from 14 kindergarten classes, and randomly assigned to one of three experimental conditions: (a) combined physical and cognitive training (n = 75), (b) sedentary cognitive training (n = 52) or (c) waitlist control group (n = 62). Before and after the interventions, all three core executive functions of updating, inhibition and shifting were measured. Physical activity was objectively measured using accelerometers during one intervention session. Analyses of covariance (using pre-test values as covariate) were used to compare executive function performance between groups.

Results:
Results revealed that children from the combined physical-cognitive and the sedentary cognitive intervention improved their updating performance compared to the children of the control group, F(3, 185) = 3.18, p = .044, ?2p = .033. Post-hoc comparisons showed that the children from the physical-cognitive, p = .044, d = 0.25, and the cognitive training, p = .022, d = 0.18, improved more than those from the control group. The updating performance between the physical-cognitive and the cognitive condition did not differ, p = .613. Inhibition, F(3, 185) = 0.21, p = .815, ?2p = .002, and shifting, F(3, 185) = 0.05, p = .951, ?2p = .001, remained unaffected by both interventions. With respect to children's daily physical activity, only the combined physical-cognitive intervention could significantly increase the amount of step counts, F(2, 170) = 126.66, p < .0005, hp2 = .598, with post hoc comparisons revealing the physical-cognitive condition being more physically exerting than the cognitive, p < .0005, d = 2.62, and the control condition, p < .0005; d = 2.18. The cognitive and the control group did not differ, p > .999, d = 0.19.

Conclusions:
The results underline the feasibility of combined physical-cognitive interventions to enhance children's daily physical activity and their cognitive performance at school.
Thinking while Moving in English: Integrating physical activity during English lessons on academic and cognitive outcomes

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Implementation and scalability (SIG)

Objective:
Many Australian schools are failing to provide children with sufficient activity at school due to a crowded school curriculum. The purpose of this study was to evaluate the impact of the "Thinking While Moving in English" (TWM-E) intervention program that incorporated physical activity during English lessons on primary students' learning and cognitive control.

Methods:
Participants (N = 283 Grade 3-4 students, age = 9-11 years) were randomly assigned to a control (n=162) or an experimental group (n = 121). The control condition followed the normal curriculum whereas the TMW-E group consisted of active English lessons (for example, running, skipping on a hopscotch while learning spelling). The active English lessons occurred over 3 x 40 min sessions per week, for four weeks and were delivered by teachers who had previously received 1-day professional learning development on how to implement movement-based activities.

Assessments occurred before the beginning (baseline) and directly at the end of the intervention: The Eriksen Flanker test and 'n' back task were used to assess students' inhibition and working memory. Children's learning performance on spelling and grammar and punctuation was measured using the standardized test Progressive Achievement Test (PAT). Repeated measures analysis of variance (ANOVA) was used to evaluate the intervention effect on the dependent variables.

Results:
No significant group-by-time effects were found on the cognitive outcomes (inhibition: F(1, 251) < 1, p = 0.514; working memory: F(1, 250) < 1, p = 0.534]. In addition, the group-by-time interaction for spelling was not significant (F(1, 228) < 1, p = 0.362). However, a group-by-time effect was found for grammar and punctuation, in favour of the TWM-E group (F(1, 228) = 19.51, p = 0.001, d = 0.42; Baseline: M control = 21.60 (6.33), M TWM-E = 18.32 (8.61); Post-test: M control = 21.52 (6.90), M TWM-E = 21.43 (7.25)).

Conclusions:
The TWM-E program that integrated physical activity within learning was able to enhance children's spelling and grammar but not their cognitive control. Importantly, integrating physical activity with learning does not compromise academic time, which is a barrier commonly reported by teachers.
School-based interventions to promote cycling as a mode of commuting

Chillón P, Palma Chillón

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Purpose: The session will focus on school-based interventions to promote cycling as a usual mode of commuting. Although cycling to school and other destinations is a daily source for increasing physical activity levels, rates of cycling are generally low in the whole population, especially in urban environments. Educational interventions focused on promoting urban cycling skills among young people are lacking. Furthermore, the school seems to be an appropriate setting for implementing these interventions and a future approach might consider the urban cycling skills within the compulsory school curricula.

Rationale: Promoting healthy and sustainable lifestyles, especially active transport will highly contribute to "Healthy People. Healthy Planet", the theme of the ISBNPA 2019 meeting. Furthermore, relevant worldwide organizations such as the OECD (Organization for Economic Cooperation and Development) and the WHO (World Health Organization) share a similar approach. The Global action plan on physical activity and health 2018-2030 launched by the WHO has been titled "More active people for a healthier world", prioritizing studies focused on increasing the people’s physical activity and improving the air quality in the environment. Cycling to school, work or other destinations is an opportunity to increase physical activity levels in the population and, moreover, contribute to phase out motorized transportation improving the air quality for a sustainable environment and society.

Objectives: 1) To provide an overview of three school-based interventions to promote cycling as a mode of commuting in three different contexts; 2) To reflect about the effectiveness of the interventions; 3) To propose ideas for implementing these interventions in the school curricula.

Summary: The presentations provide three different experiences for a common topic: school-based interventions to promote cycling. The common topic of the presentations will guarantee a clear focus on the discussion part with the attendants through reflecting on the previous objectives.

Format: The structure of the session is:
1. Chair. Prof. Palma Chillón. Presentation-Introduction (10 minutes)
2. Presentation 1. Prof. Greet Cardon (10 minutes)
3. Presentation 2. Prof. Manuel Herrador-Colmenero (10 minutes)
4. Presentation 3. Prof. Enrique García-Bengoechea (10 minutes)
5. Discussant. Prof. Palma Chillón (10 minutes). Summary of the previous presentations.
6. Discussion with attendants (20 minutes). Discuss the objectives 2 and 3 fostering interaction with the attendants (questions will be ready in case it is necessary to dinamize the discussion)
7. Final CyclingTrivial game (5 minutes).
Safer cycling in schoolchildren: effects of cycling skill and hazard perception training

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Purpose: Safety issues are found to be the most important determinants of children's cycling in traffic. We aimed to study the effects of two interventional programs to make child cyclists safer: 1) a cycle training course to improve cycling skills and 2) a brief hazard perception training to improve situation awareness and hazard perception for potential dangerous situations.

Methods: Two cluster-randomized controlled designs in elementary school settings were used. 1) A cycle training (four sessions of 45 min) took place on the playgrounds of two intervention schools. It focused on mastering 12 basic skills that children should manage to cycle in traffic (e.g. one-handed steering while signaling). Cycling skills were assessed, using a practical cycling test. Additionally a short parental questionnaire on cycling behavior was administered. Assessments took place at baseline, within 1 week after the last cycle training session and at 5-months follow-up (n= 117; age 9,3 ±sd:0,5; 54% boys). 2) A hazard perception training, consisting of the presentation of video clips (each approximately 30 s) from the perspective of a bicyclist (videoed with GoPro) encountering various (potentially) dangerous traffic situations, took place during two classroom sessions. Situation awareness and hazard perception (e.g. response rate, reaction times) were measured at baseline and one day and three weeks after the intervention, using eye tracking technology (n= 124; age 9,5 ±sd:0,3; 53% boys).

Results: 1) The cycle training course was effective in improving children's cycling skills and the improvements were maintained five months later. No effects were found on reported cycling to school rates. 2) Trained child bicyclists were found to detect more hazards and reacted quicker. The training did not result in 'seeing' the hazard sooner.

Conclusions: The results demonstrated that a few sessions on cycling skills and a brief intervention for training hazard perception skills were able to improve children's cycling skills and their situation awareness and hazard perception for potential dangerous situations consequently. Both programs complement each other and implementation is warranted. Since the cycle training course did not increase children's cycling to school, the promotion of levels of cycling to school requires an additional approach.
Feasibility of a cycle training course in physical education lessons for Spanish adolescents: the PACO Project

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15953: School-based interventions to promote cycling as a mode of commuting (Convenor: Palma Chillón), Club C, June 6, 2019, 8:30 AM - 9:45 AM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Active commuting to school (ACS) interventions are required to promote active lifestyles in adolescents. Its inclusion in the school curricula (via Physical Education -PE-) maybe a promising strategy. This study aimed to report the feasibility of a cycle training course performed during PE lessons for adolescents.

Method: A school-class of 32 students aged 15y from Granada (Spain) were invited to participate. Students were asked to complete both demographic and mode of commuting questionnaires. The intervention lasted 1 month, including 4 sessions (1 session/week): 1) "theoretical" about cycling use (1 hour), 2) "closed circuit" to train the cycle skills in the school (2 hour), 3) "urban circuit" to train cycle skills in the street (2 hour), and 4) "bike's party" where students become teachers of younger students showing their learning (1 hour). The cycling skills were assessed in sessions 2 and 3 using direct observation. The perceived satisfaction and utility of each session were assessed throughout a questionnaire. Students and the PE teacher opinions were assessed through a discussion group and an interview.

Results: Fifteen students from the school-class signed the informed consent and completed both questionnaires (age=14.4±smn;0.6; male=53.3%). A 33.3% of the participants reported ACS; 46.7% lived closer than 6km and 40.0% owned a bike. The students liked the intervention (mostly the third session). Students and the teacher expressed to have more practical sessions to feel safer, improving the cycling skills. The assessment of the cycling skills was less feasible in session 3 due to the high amount of tasks for the teacher during the session time. The perceived satisfaction and utility of the sessions scored highly.

Conclusions: To perform a cycle training course during PE lessons is feasible. The learned lessons were: 1) to require 1 bike/2 students in the sessions 2 and 3, 2) to provide 2 teachers/10 students in session 3, 3) to assess the cycling skills at the end of the sessions, and 4) to increase the session time. This novel proposal of PE lessons to promote ACS has been perceived as enjoyable and useful for the adolescents.
S3, S.3.32

Effects of cycle skills training on cycling-related knowledge, self-efficacy, and behaviour in children and adolescent girls

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15953: School-based interventions to promote cycling as a mode of commuting (Convenor: Palma Chillón), Club C, June 6, 2019, 8:30 AM - 9:45 AM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Cycle skills training (CST) is considered a promising strategy to increase rates of active travel to school and physical activity in children and adolescents. This study examined the effects of short duration (1-10 weeks) CST with or without on-road training on cycling-related knowledge, self-efficacy and behaviour in children and adolescent girls.

Methods: Children (n=429; 11.0±smn;0.9 years; 52.1% boys; 3 schools) and adolescent girls (n=117; 13.9±smn;0.7 years; 2 schools) participated in either playground-based CST (Traffic-Free CST; n=207) or playground-based plus on-road CST (Traffic-Free+OnRoad CST; n=339) in Dunedin, New Zealand in 2015-2016. Participants completed pre-training, post-training, and follow-up (6-9 months after CST) self-report assessments of cycling-related knowledge, self-efficacy, and behaviour and practical skills assessments.

Results: The training provided improved cycling-related knowledge and self-efficacy both in children and adolescent girls. While knowledge was not maintained at follow-up, self-efficacy continued to increase 6-9 months after training. Cycling habits and preferences did not change significantly after CST with the exception of increased rates of cycling to school after Traffic-Free+OnRoad CST (10.6% to 12.5%) in children. In addition, in this group, initial differences in self-efficacy and behaviour (frequency of riding a bicycle) favouring boys tended to disappear at follow-up.

Conclusions: Overall, increases in self-efficacy were not matched with changes in cycling habits during the period considered, particularly in adolescent girls. Therefore, additional strategies and environmental supports are necessary to capitalize on increased confidence and encourage cycling to school among children and adolescent girls. Besides increasing confidence to ride a bicycle, CST could be an effective strategy to reduce gender differences in self-efficacy and frequency of cycling favouring boys over girls.
Eating behaviours: navigating the transition from childhood to young adulthood

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Purpose: This symposium will examine eating behaviours during the transition from childhood to young adulthood across Australian, Norwegian and Belgian populations. This transition period is under-researched, thus this symposium will be an important platform for understanding, improving and evaluating change in eating behaviours during this life stage.

Rationale: Young adulthood is characterised as a period of multiple transitions, which can negatively impact on dietary choices. Poor diets in this age group track into later life, increasing risk of obesity, chronic disease and poor social functioning, impacting not only on their own health but also the health of their future children. Improving diets in this age group is thus a priority for reducing the social and economic burden of ill health.

Objective 1: To evaluate how a multicomponent school-based intervention influences fruit and vegetable intake in Norwegian school children, and if this intake is sustained into young adulthood. This presentation will provide novel understanding of how school-based interventions in childhood affect diets in young adulthood during this transition period, thereby informing the design of future research and policies.

Objective 2: To explore the complexity of eating decisions in young Australian adults using a discrete choice experiment. This methodology has been primarily used in health economics and is a novel application in nutrition research. By using a decision-making methodology for ranking barriers to healthy eating, this presentation will provide an example of alternative approaches to examining health behaviours in this age group.

Objective 3: To study the impact of novel messaging and labelling on behaviour change in Belgian university students. This presentation will provide evidence for the effectiveness of point-of-purchase-messaging and product labelling for behaviour change in the young adult population.

Summary: This symposium will provide an overview of change in eating behaviours from childhood to young adulthood and novel methodologies for understanding and improving eating behaviours in young adults. Each of the three presentations will provide a unique contribution and will link together to better understand how to develop more effective healthy eating strategies in this at risk age group.

Format: This symposium will be 75 mins:
Dr Kirsten Verkooijen (Chair): 7 mins introduction
PhD students Bente Ovrebo & Ingrid Marie Hovdenak (Presenters 1): 15 mins presentation; Handover: 1 min
Dr Katherine Livingstone (Presenter 2): 15 mins presentation; Handover: 1 min
Dr Tom Deliens (Presenter 3): 15 mins presentation; Handover: 1 min
Dr Sofia Strommer (Discussant): 20 mins discussion
Effects of a childhood school-based multicomponent intervention on fruit and vegetable intake in young adults.

Øvrebø B, IM Hovdenak, T Stea, E Bere, KI Klepp

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Purpose: The objective of this study was to evaluate the fruit and vegetable (F&V) intake among young adults following a multicomponent school-based intervention aimed to increase F&V intake in childhood.

Methods: A cluster randomized school-based intervention (Fruit and Vegetable Make the Marks Study) was initiated in 2001 in Norway with 38 schools. Eighteen schools were randomized to a ten-month educational program and the remaining were included as control schools (n=20). A subsample of the participants were given free fruit at school for one school year. Participants completed questionnaires in 2001 (baseline, mean age 11.8 years), 2002 (at intervention end), 2003, 2005, 2009 and throughout 2016. Intake of F&V was measured by a 24-hour dietary recall (portions/day). The following outcomes were evaluated using mixed models: the educational program (educational program vs control), free fruit (free fruit vs control) and a possible synergetic effect between the educational program and free fruit (educational program & free fruit vs free fruit only).

Results: Of the baseline sample (n=1950), 982 (50.4%) adults (mean age 26.5 years) completed the 14-year follow-up survey. There was no effect of the childhood education program on F&V intake in adulthood. Receiving free fruit did not yield overall differences in F&V intake in adulthood. However significant interactions revealed a higher fruit intake among females in the free fruit group compared to the control group (mean difference (MD)= 0.38 portions/day; p=0.023). Furthermore, when females were stratified by education, lower educated females had higher F&V intake compared to the control group (MD= 0.73 portions/day; p=0.043). No significant synergetic effect was found between the educational program and free fruit provision.

Conclusions: The results indicated that a multicomponent school-based intervention initiated in childhood, did not affect overall adult F&V intake. However, providing children with one year of free fruit at school had a sustained positive effect on fruit consumption among females with low education. These findings suggest that structural interventions providing free fruit may have long-term effects into young adulthood.
Exploring eating decisions in young Australian adults: a discrete choice experiment

Livingstone K, K Lamb, T Worsley, SA McNaughton

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Purpose: This study aimed to understand the relative ranking of barriers to healthy meal choices in young adults (18-30 years) using a discrete choice experiment (DCE) and to explore whether education level modifies these associations. Our understanding of barriers to healthy eating decisions is limited by a reliance on methodologies that do not account for the complexity of food choice behaviours. DCEs are a novel and quantitative means of analysing behaviours in a decision-making context. To date no DCE has examined eating decisions in young adults.

Methods: A total of 92 adults (23.9 (SD 3.36) years; 61% female) completed the online DCE. Participants were presented with 12 choice tasks about a typical weekday meal and were asked to choose between four meal options. Each meal reflected a combination of five meal attributes (preparation time, cost, taste, nutrition content and familiarity) and three attribute levels. Data were analysed using conditional logit models. Preference coefficients were used to estimate a relative importance score. To examine interactions between attribute preference and education level, interaction terms were included in the model. All analyses were conducted in Stata v15.

Results: Participants evaluated very good taste higher than sufficient taste (coef 0.38, SE 0.08; P<0.001). Participants preferred a preparation times of 30 minutes less than a preparation time of 5 minutes (-0.33, 0.08; P<0.001) and a very familiar meal more than a not very familiar meal (0.37, 0.08; P<0.001). Optimal nutrition content was preferred more than low nutrition content (1.11, 0.09; P<0.001). Participants preferred spending $15 per person less than spending $5 per person for a meal (-0.51, 0.08; P<0.001). When ranked by relative importance score, nutrition content was the most important consideration, followed by cost, taste, familiarity and time. Higher educated participants preferred optimal nutrition content (0.82, 0.18; P<0.001) and very good taste (0.70, 0.19; P<0.001) compared with lower educated participants.

Conclusions: Nutrition content was the most important consideration for meal decisions in young adults, which has implications for the design of future behaviour change interventions to improve dietary behaviours in this age group. Interventions that reflect the barriers for different socio-demographic groups are warranted.
Nudging students towards higher fruit consumption: an on-campus restaurant experiment

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Vrije Universiteit Brussel, Brussels, Belgium

Purpose: This study examined the effects of labelling and point-of-purchase messaging, inspired by the recently renewed Flemish Food Triangle, on fruit sales in a Belgian on-campus university restaurant.

Methods: A mixed method real-life experimental design was used. During a first week baseline fruit sales were registered. Then, over a period of four consecutive weeks, one intervention was added weekly, namely, the placement of Food Triangle posters inside and outside the restaurant, large "green heart" icons placed above the fruit stands, a message to swap more unhealthy desserts to fruit, and a norm message showing how many percent of current customers already chose fruit for dessert. In the following week, short interviews were conducted among a subsample of students to obtain additional information about the visibility, influence and effectiveness, and perception of the interventions. Seven weeks later, follow-up measurements were performed to evaluate longer-term effectiveness. Meanwhile, all interventions remained in place.

Results: Around 600 students were exposed daily to the interventions. In the short term, male students' fruit purchase increased during the Food Triangle intervention (+2.8%), the Food Triangle + green heart intervention (+4.1%) and the Food Triangle + green heart + swapping message intervention (+3.6%) compared to baseline (43.9%). Among female students, there were no differences compared to baseline (47.3%). Adding the norm message resulted in a decrease for both male and female students towards baseline sales values. No positive cumulative effects were found between the different interventions. At 7 weeks follow-up, increased fruit sales of +9.9% in males and +8.3% in females were observed. The short interviews revealed that the majority (65.4%) of students noticed at least one of the interventions, among which the Food Triangle intervention was the most noticed (by 53.4% of students). Only 3.1% of students indicated to have adjusted their dessert choice, while 71.0% believed such interventions were good initiatives to help people make healthier choices.

Conclusions: The proposed nudges (except for the norm message) were effective in increasing short-term fruit sales in male but not in female students. In the long-term, even greater effects were found for both male and female students.
Electronic ecological momentary assessment to measure correlates of physical activity and sedentary behaviour

DeSmet A, Ralph Maddison
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Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Health promotion intervention design heavily relies on changing predictors of health behaviours that were assessed in cross-sectional, retrospective surveys. These surveys, however, face problems of memory bias and not fitting health behaviour that is time-and context specific, by which they do not provide tools when and where the user needs it most. Ecological Momentary Assessment (EMA) is a method to investigate behaviour at or near the moment it occurs, to capture data with a higher ecological validity and less memory bias compared to retrospective measurements, and higher accuracy for behaviours that are very context-specific and time-varying. Information collected by EMA can inform health interventions to take place when the person needs them the most (e.g. Just-in-Time Adaptive Interventions). Interventions for physical activity (PA) and sedentary behaviour (SB) are usually provided by the specific domain in which these activities occur, e.g. leisure time, occupational domain, during transport or while performing domestic tasks. This makes it highly relevant to have time-specific and contextual information in the measurement of these behaviours and their correlates. This symposium will present results from electronic/mobile EMA studies that have investigated correlates of physical activity and sedentary behaviour in youngsters and adults. It aims to inspire researchers and practitioners to the potential of using EMA in PA/SB studies and in the design of context- and time specific PA/SB interventions.

The symposium will consist of three presentations:
1. "Real-life correlates of physical activity: An ecological momentary assessment study examining the association between affect and subsequent physical activity." - Dr. Christina Niermann, Department of Sports Science, University of Konstanz, Germany.
2. "Social environment and affective correlates of sedentary behavior among adolescents using EMA and accelerometers". - Prof. Amanda Staiano, Pennington Biomedical Research Center, Louisiana, United States
3. "Affect and minor physical complaints as correlates of sedentary behavior among adults using Ecological Momentary Assessment and Fitbit trackers". - Dr. Ann DeSmet, Department of Movement and Sport Sciences, Ghent University, Belgium; Research Foundation Flanders, Belgium

The first presentation investigates the role of affect preceding PA, while the second presentation assesses affect after PA/SB. The third presentation assesses mental state correlates (affect), but also physical state correlates that may be associated with SB.

The discussant will wrap up the main findings across the presentations, will highlight similarities and potential divergences, and will invite the audience to interact on a critical reflection of EMA-based findings and their potential to inform future interventions.
Real-life correlates of physical activity: An ecological momentary assessment study examining the association between affect and subsequent physical activity

Niermann C
University of Konstanz, Konstanz, Germany

Purpose: Traditionally, motivational and volitional determinants have been used to explain and predict health behaviors such as physical activity. Recently, the role of affect in influencing and regulating health behaviors received more attention. Affects as internal cues may automatically activate unconscious processes of behavior regulation. Affective states underlie dynamic fluctuations across days and even within-days. Studies using single, retrospective self-reported ratings of affect did not address this issue because of limitations such as recall bias. Ecological momentary assessment (EMA) enables us to assess affective states within persons during a week in participants' natural environment and to combine this with real-time measurement of physical activity using accelerometers. The aim of our study was to examine the within association between affect and subsequent physical activity in daily life using an EMA design.

Methods: The EMA study was conducted with 89 persons (33.7% male, 25 to 65 years, M=45.2, SD=8.1). Affect was assessed in the afternoon on 5 weekdays using smartphones. Physical activity was measured objectively using accelerometers and subjectively using smartphones in the evening. The outcomes were objectively and subjectively measured moderate-to-vigorous physical activity (MVPA) performed after work. Multilevel regression models were used to analyze the association between affect and after work MVPA.

Results: Positive affect was positively related to objectively measured and self-reported after work MVPA: the greater the positive affect the more time persons subsequently spent on MVPA. An inverse relationship was found for negative affect: the greater the negative affect the less time persons spent on subsequent MVPA.

Conclusions: The results of this study confirm previous results and indicate that affect plays an important role for the regulation of physical activity behavior in daily life. Using EMA designs enables researchers to examine time- and context specific correlates of physical activity and other health behaviors such as sedentary behavior or dietary intake. It is possible to address within person dynamics of health behaviors and correlates and to examine their real time interrelations in natural settings. These insights are crucial for a better understanding of health behaviors and barriers for behavior change in daily life.
Purpose: To examine the associations of home environment (indoor vs. outdoor) on sedentary behavior (SB) and subsequent affective response in adolescents. Methods: Adolescents 10-16 years of age were asked to respond to 22 ecological momentary assessment (EMA) prompts delivered outside of school time via a mobile application on their phone, while wearing a hip-worn accelerometer for seven continuous days. At each prompt, adolescents reported their general location with multiple response options (e.g. home-indoor or home-outdoors) and completed the Positive and Negative Affect Scale for Children. Amount of SB during the 30 minutes prior to each prompt was identified using established cut-points. A multiple level mixed-effects mixed model was used to assess home indoor/outdoor status on SB minutes and positive affective response, including two levels to evaluate random and fixed effects. The first level of the model assessed the random covariates related to SB including location, day of the week, time of day, month of wear, and negative affect, while the second level of the model adjusted for additional fixed covariates to examine the association of adjusted SB with positive affect. Results: In total, 342 adolescents completed baseline measures, and 293 (85%) indicated spending some time at home indoors and at home outdoors. On average, adolescents were 12.5 ± smn; 1.9 years of age and had a body mass index percentile of 71.8 ± smn; 29.5. Over half (54%) were female, and 42% were non-white. Adolescents spent on average 1 ± smn; 2.3 minute in MVPA and 21.3 ± smn; 6.8 minutes in SB in the 30 minutes prior to the prompts. In the multi-level models, being indoors at home was associated with higher SB compared to being outdoors at home (p=0.001). Adjusted SB was not related to positive affect, while age was inversely related to positive affect (p<0.001). Conclusion: Adolescents engaged in substantial SB at home but less SB when they were outdoors as opposed to indoors. Spending more time sedentary did not confer rewards of positive affect. EMA paired with accelerometry can reveal context-specific and time-varying associations among environment, activity levels, and affect, which can inform context- and time-tailored interventions.
Affect and minor physical complaints as correlates of sedentary behavior among adults using Ecological Momentary Assessment and Fitbit trackers

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1Ghent University, Ghent, Belgium, 2Glasgow Caledonian University, Glasgow, Scotland, 3Deakin University, Melbourne, Australia

15902: Electronic Ecological Momentary Assessment to measure correlates of physical activity and sedentary behaviour (Convenor: Ann DeSmet), Club E, June 6, 2019, 8:30 AM - 9:45 AM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective
Ecological momentary assessment (EMA) allows to assess the role of time- and context specific correlates of behaviour. Little research has been conducted on EMA in relation to adult SB. The aim of this study was to examine the associations of minor physical complaints and affect with SB in adults. There is a well-established link between PA and affect, we hypothesize to find similar results for SB. We furthermore expect to find a positive association between SB and physical complaints, where having more physical complaints may be associated with more SB.

Methods
A random sample of working-age adults (age 22-55y) was drawn from the civil registry in Ghent, Belgium. Ethical approval was obtained for the study. One hundred adults started the study (2 dropouts). EMA was completed 3 times /day (time-based random sampling, morning/afternoon/evening) during 14 days. Activity data were collected using Fitbit Charge 2 during the same period and were available for 89 participants. Affect was measured on a 5-point Likert PANAS scale (4 positive; 4 negative). Physical complaints included 5 common problems: pain, fatigue, dizziness, stiffness, itching (7-point scale). Multi-level analyses were performed in MLWin. Preliminary analyses were conducted at a daily level. Results on within-day variations and subsequent SB will be available at the time of the conference.

Results
The analysed sample included 89 participants (M age=37.1 ± sdm; 9.2, % female). Average time spent on SB was 618.9 ± sdm; 75.9 minutes. Minor physical complaints surprisingly showed an inverse relationship with sedentary behavior: less physical complaints (pain, itch) during the day were associated with more SB during that day. There was also an inverse relationship with positive affect (higher positive affect was associated with less SB), but there was no association with negative affect.

Conclusions
The results confirm relations between affect and (in-)activity, as previously documented for physical activity, but also shows sedentary behaviour may be influenced by minor physical complaints during the day. Analyses on within-day variations planned for the conference, can suggest the direction of this association which cannot yet be determined from the preliminary analyses.
15793

S3, S.3.35

Food retail environments - entry points for approaches to improve dietary behaviours

JBeulens, Christina Vogel

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Policies and environments (SIG)

Purpose: To share and discuss implementation strategies and the effectiveness of approaches to improve dietary behaviours, with a specific focus on the supermarket setting.

Rationale: Interventions in the food-retail environment present a promising avenue to improve diet. Supermarkets in particular are the setting for the majority of food purchases, and over the last few years many interventions have been implemented in this setting across the world. But do such interventions actually work? And what approaches work best? In what sub-groups? And how can they best be implemented? To guide further progressions in this relatively new field, such questions need to be addressed and properly discussed.

Objectives:
- To introduce the supermarket setting as a promising setting to change dietary behaviours;
- To present the effectiveness of a one year multi-component intervention on sales of healthier and less healthy food;
- To provide a systematic overview of facilitating and/or constraining factors encountered by health-promoting interventions in the food-retail environment;
- To provide a systematic overview of the evidence for the effectiveness of nudging in promoting healthy dietary choices within food purchasing environments and to identify potential effect-modifiers, including age, sex and SEP.

Summary: The symposium will be introduced by stipulating the growing interest in the role of the supermarket environment on changing dietary behaviours. Ambitious plans of a new supermarket intervention will be outlined. Next, three presenters will zoom into the effectiveness of a supermarket intervention in specific and on the available evidence in general. Barriers and enablers to implement interventions in the food retail environment are presented. A discussant will put the contributions into perspective and kicks off a wider discussion with the audience and presenters.

Format:

00-10 min: Introduction by chair (J. Beulens, The Netherlands)

10-25 min: Outcomes of a 12-month supermarket RCT to promote healthy eating (J. Marshall, Australia)

25-40 min: The duality of interests: a review of facilitators and constraints for the implementation of health-promoting interventions in the food-retail environment. (C. Middel, The Netherlands)

40-55 min: Nudging to promote healthy dietary choices in food purchasing environments and preferences of target groups (M. Harbers, The Netherlands)

55-75 min: Discussion (Discussant: C. Vogel, United Kingdom)
Outcomes of a 12 month supermarket RCT to promote healthy eating

Marshall J, A Brown, G Sacks, L Orellana, A Cameron

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Purpose
Supermarkets are the setting for the majority of food purchases. Marketing techniques that modify the choice architecture in supermarkets can be important for promoting healthy eating at a population level. The purpose of this study was to test the effect of a one year multi-component intervention on sales of healthier (core) and less healthy (discretionary) food.

Methods
Eat Well @IGA was a 12 month, NHMRC-funded randomized controlled trial conducted between May 2017 and May 2018 (with a 12 month baseline period) in 5 intervention and 6 control supermarkets in regional Victoria, Australia. Interventions included shelf tags (highlighting all products with a 4.5/5 health star rating), trolley/basket and floor signs, shelf wobblers, local area promotion (flyers), social media, a public launch and in-store banners and posters. The primary outcome of impact on sales of core and discretionary food was analysed using time series analysis over two years based on store sales data provided by the retailer. Secondary analysis looked at changes across product categories, nutrients including key risk nutrients (energy, saturated fat, sugar, sodium), and sales of products with a 4.5/5 health star rating. Store profit was also analysed. To account for the impact of key promotions on sales, products on end-of-aisle displays were measured weekly in all stores.

Results
The impact on sales of core and discretionary food, key categories, risk nutrients and total store profit will be presented (data cleaning currently underway), accounting for the impact of end of aisle displays. The fidelity of the intervention and responses by competitors in close proximity will be considered when interpreting sales data in each store.

Conclusions
Eat Well @IGA represents a unique partnership between industry, academia, local government and NGO partners. Given the exceptional reach of supermarkets, such interventions are a particularly promising intervention approach to encourage population level healthy eating.
The duality of interests: a review of facilitators and constraints for the implementation of health-promoting interventions in the food-retail environment.

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Implementation and scalability (SIG)

Purpose

Interventions in the food-retail environment present a promising avenue to improve diet, as they are a major point-of-choice for consumers. Several health-promoting interventions in the food-retail environment have been designed, but suboptimal implementation and execution can limit their impact. In the literature, reflections on facilitators and constraints for the intervention process are often limited, and a central overview is lacking. This study aims to provide an overview of the literature on facilitating and/or constraining factors encountered by health-promoting interventions in the food-retail environment.

Methods

The study employed a systematic review of the scientific literature. A total of 43 publications were included and subjected to a thematic analysis to identify recurring themes. This analysis was guided by the Consolidated Framework for Implementation Research, which distinguishes five domains which influence the implementation process: the outer setting, inner setting, intervention, individuals, and process.

Results

A central issue in the identified facilitating and constraining factors was the duality of interests between retailers and interventionists: that of commercial interests versus health interests. In the outer setting, a common cause of tension between these interests was a perceived lack of consumer demand (and thus profitability) for healthy foods, whereas strong community relations might facilitate implementation. In the inner setting, common causes of tension were food waste and retailers' contractual agreements with suppliers. Regarding the intervention, designs that fit within retailers' existing practices, were flexible to adapt, were trusted to improve health, or provided advantages to the retailer (e.g. public image, network building), were noted to facilitate implementation. In terms of process, designing the intervention in close collaboration with retailers facilitated a fit with existing practices, and thus implementation.

Conclusion

The results illustrate various leverage points to align the interests of retailers and interventionists and facilitate implementation. E.g. interventionists can incorporate activities to stimulate demand for healthy products, and engage retailers early in the design process. Causes of tension can be circumvented or resolved, e.g. by promoting products with longer shelf life to avoid waste. Awareness of these opportunities and threats during the design process might enhance implementation.
Nudging to promote healthy dietary choices in food purchasing environments and preferences of target groups

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15793: Food retail environments - entry points for approaches to improve dietary behaviours
(Convenor: Joline Beulens), Club H, June 6, 2019, 8:30 AM - 9:45 AM

Policies and environments (SIG)

Purpose
Nudging may be a promising strategy for improving dietary behaviours among individuals with low socioeconomic position (SEP). Our first aim is to systematically review the evidence for the effectiveness of nudging in promoting healthy dietary choices within food purchasing environments and to identify potential effect-modifiers, including age, sex and SEP. Our second aim is to qualitatively identify the needs and preferences of low-SEP individuals with regard to nudges in food purchasing environments.

Methods
For our first aim, we have conducted systematic searches in PubMed, Embase, and PsycINFO. Studies were included when they examined the effects of nudging on dietary choices, purchases, or intake; were situated in food purchasing environments; and focused on adult populations. Data were extracted using a pre-defined data-extraction form, and quality was assessed in duplicate using the Quality Assessment Tool for Qualitative Studies. For our second aim, we have conducted interviews among low-SEP individuals. During these interviews we explored their everyday lives in order to generate insights into the individual and environmental factors that hinder or facilitate a healthy diet. Subsequently, we explored the conditions under which nudges may be helpful in making healthy dietary choices.

Results
From 9,149 identified articles, 81 met the inclusion criteria. Preliminary analyses indicate that nudges generally are effective in stimulating healthy food purchases and dietary intake. There is some indication that the effects of nudges are moderated by population characteristics, although this issue warrants further investigation. As for the qualitative study, data-collection is still ongoing. However, exploration of the available literature showed that key determinants of food choice in low-SEP populations include taste, habits, friends and family as role models, and perceived price of foods. Also, low-SEP individuals generally perceive nudges to have limited effectiveness.

Conclusion
Nudges may be effective in stimulating healthy food purchasing, for which the effectiveness may be moderated by population characteristics. Given the large heterogeneity in study quality, future high-quality studies are warranted. As for the qualitative study, interviews with the target population will offer valuable insights into the conditions under which nudging may be perceived to be helpful by low-SEP individuals.
THURSDAY JUNE 6 2019
KEYNOTE SESSION 3,
PLENARY

How systems approaches can transform nutrition and physical activity.

Lee B

Johns Hopkins University, United States

Keynote (Chair: Amy Yaroch), Congress Hall, June 6, 2019, 9:50 AM - 10:30 AM

Nutrition and physical activity are not single-cause, single effect issues. There isn’t a single magical diet, magical food item, magical exercise device, magical exercise program, or magical potion that will solve the current physical inactivity, non-communicable disease, and obesity epidemics. Instead, these epidemics are systems issues and are the result of broken biological, behavioral, social, environmental, and economic systems that all affect each other. For example, a person’s likelihood of participating in physical activity may depend on how much sleep that person gets, what competing priorities there may be, what that person’s work or school schedule is like, whether that person’s peers convince him or her to get physical activity, whether there are available physical education classes or programs, whether the local areas are safe and walkable and have parks, recreation centers, and playing fields, and whether that person can afford sports programs and equipment. A person’s food choice may depend on what types of food are available around them, how much time they have, how much the food costs and what they can afford, and what their peers are eating. Moreover, these are systems issues. Solving physical inactivity and nutrition problems are crucial as this can positively affect many different systems, having far-reaching mental and physical health, social, economics, and other benefits. Unaided, humans may have a hard time understanding these complex systems. Therefore, in order to better understand and develop and implement the right solutions, there is a need for more systems approaches. Systems approaches include new methods such as systems mapping and computational modeling that also leverage and utilize new developments such as mobile technologies, Big Data, and artificial intelligence. We will walk through examples of such systems approaches and methods. Systems approaches are not only the future of nutrition and physical activity but also should be the present.
THURSDAY JUNE 6 2019
POSTER SESSION 2
Motivated and Confident But Not Skilled: Students’ Wellness Goal Setting and Action Planning

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Goal setting and action planning are thought to be important to successful wellness behavior change. To assess wellness goal setting skill, in a relatively educated and motivated sample, we asked college students (n = 140) enrolled in an Introduction to Nutrition course to complete a goal-setting and action planning activity.

Methods: Using Deci’s et.al. Self-Determination Theory Health-Care Questionnaire, we assessed the same students’ autonomous motivation (average 5.8 + 1.4; range 1-7) and confidence (average 5.2 + 1.5; range 1-7) for being able to change and maintain a healthful behavior. To estimate students’ wellness goal-setting and planning skills, we adapted a goal-scoring rubric created and tested by Lockspeiser et.al.. Two researchers independently scored each student's goal setting and planning activity; then conferred until agreement was reached on each student's rubric scores.

Results: Possible scores for goal setting ranged from 0-4 and averaged as follows: Specific: 1.8 + 1.2; Measurable: 2.2 + 1.2; Feasible: 2.3 + 1.2; Stated reason (for achieving the goal): 1.4 + 0.8; Obstacles considered 1.8 + 1.0. Rubric scores were generally at the midpoint or below. These results suggest that students in this sample were relatively motivated and confident about making healthful behavior changes, but had limited skill for goal-setting and planning.

Conclusions: Further research is needed to determine whether limited skill for goal setting and planning affects other populations and what types of education or support from health professionals improves wellness goals, plans, and, ultimately, behavior change success rates.
Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Abstract
Objectives. While people of all ages are gaining weight, the largest growth in the overweight category is in ages 18-29. Most of the previous studies focused on identifying factors that were associated with, instead of predicting, weight gain. The innovation of the current study is to examine the predictors of weight gain among college freshmen over a 3-month period.
Method. Participants were freshman students attending a private college at Northeast of United States. Total of 131 students responded the online pre-survey. Of these 131 students, 92 students responded to the post-test survey 3 months later (M=18.60, SD=1.13). A total of 35 items in the pre-survey was developed to measure knowledge, attitudes, intention, self-efficacy, and practices of physical activity and diet. Anthropometric and demographic data, including age, gender, height, and body weight, were also measured. In the post-survey, thirteen Liker scale questions examined students' perception of barriers to practice physical activity and healthy diet during the last 3 months.
Results. The results showed that 30.43% (n=28) have gained weight, and 49.28% (n=45) have maintained their weight, and 20.29% (n=19) have lost weight. Results of a one-way ANOVA showed that the only factor predicted weight change was Physical Activity Attitude, F(2, 86) = 2.97, p=.055, with the group who gained weight had a lower physical activity attitude than those who lost weight, with M= 5.14, SD= 1.61, M= 6.17, SD= 0.99, respectively. In addition, students who gained weight perceived significantly more barriers than those who did not change weight on the following variables: lack of motivation to exercise (M= 3.15, SD= 1.42, M= 2.00, SD= 1.20, respectively), perception of lack of healthy food options on campus (M= 3.25, SD=1.29, M=2.08, SD=1.20, respectively), no time to eat healthy (M=2.50, SD=1.36, M=1.69, SD=1.05, respectively), and bad weather to exercise (M= 2.40, SD= 1.50, M=1.50, SD= 0.91, respectively).
Conclusions. Living in the same campus, college students perceived environmental barriers differently, which is associated with body weight gain. Colleges should guide students to overcome barriers to practice healthy behaviors, as well as make the campus environment more suitable for healthy behaviors.
Examining total and domain-specific sedentary behaviour in adults; a socio-ecological approach

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Sedentary behaviour and in particular prolonged sedentary behaviour is a growing public health concern. The aim of this study was to examine intrapersonal, interpersonal and environmental correlates of domain-specific and total sitting time in an Irish adult cohort.

Methods: Cross-sectional analysis of the second wave (2016) of the nationally representative Healthy Ireland Survey. Multivariate regression analyses were used to examine the association between socio-demographic variables, self-reported lifestyle factors, workplace activity, physical and mental health status, and neighbourhood environment and time spent sitting engaged in screen-time, while driving/relaxing/eating, occupational sitting and total sitting time.

Results: The adults' (n=7,305; 3,227 males; 51.2 ±smn; 17.8 years) overall median of sitting time per day was 360 minutes (6 hours) (IQR 240-480). Sitting in the workplace was the strongest predictor of increased domain-specific and total sitting time. Male gender, low education attainment, a possible mental health problem, low physical activity and smoking were associated with increased screen-time sitting. High education attainment, physical illness, a possible mental health problem, high alcohol consumption and negative perception of neighbourhood environment were associated with higher driving/relaxing/eating sitting times. Male gender, high education attainment, high socio-economic classification and urban dwelling were associated with increased occupational sitting time. Male gender, higher education attainment, higher socio-economic classification, low physical activity levels, and an urban dwelling was positively associated with increased total sitting time.

Conclusion: Our findings provide further evidence on factors that appear to predict sedentariness in multiple domains. Interventions should target domain-specific sitting, in particular workplace sitting.
Evaluating the impact of the AEQUIPA prevention research network: introduction of a mixed method approach to assess and predict long-term impact

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Other

Objectives

There is a growing demand that investment in health research should lead to improvements in policy, practice, resource allocation and ultimately in the health of society as a whole. However, the impact of research is complex, non-linear and unpredictable. There is a tendency to count what is easy to measure rather than what counts in terms of significant permanent change. Using AEQUIPA (Physical Activity and Health Equity: Primary Prevention for Healthy Ageing) research network data, impact measures are developed and applied to assess and monitor the development of sustainable structures that could lead to social impacts.

Methods

Based on the SIAMPI approach (Social Impact Assessment Methods through the study of Productive Interactions between science and society), quantitative and direct interaction data were combined to evaluate and track network development. An information documentation system and an evaluation framework were developed and tested. First data of the AEQUIPA prevention research network (2015-2018) were collected via communication data, project reports, event reports and publications. Social network analyses and visone were used to perform descriptive analyses and visualizations.

Results

The following indicators could be identified as short-, medium- and long-term indicators to be followed up over the following three years (metric indicators: publications, guidelines, workshops, media presentations). Relational data on interactions such as the number, frequency and type of interaction of people (project members, praxis partners, lay persons) participating in different network training events and workshops, their relationships, co-author and citation networks were analyzed. The data show that actors within the network have a relatively high degree of connectedness (proximity of the network). After three years, specific in- degrees and out-degrees of actors are visible that point to different roles of project members in the internal and external communication and knowledge flow within AEQUIPA and with external partners.

Conclusions

The data show first developments of structures within AEQUIPA and with stakeholders and practice partners, which provide a first insight into the reach of the network. The combination of qualitative and network data is a promising approach to social impact evaluation that will be further tested and verified.
South Asian Mothers and Children Being Active (SAMBA): A Qualitative Investigation of Barriers and Enablers to Physical Activity Participation

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective:
Culturally and linguistically diverse migrant women from South Asia are at increased risk of cardiovascular disease, diabetes and abdominal adiposity, and are vulnerable to social exclusion. Physical activity offers an effective preventive health strategy and can foster feelings of social inclusion, however, this population is insufficiently active to realise these benefits. The aim of this study was to identify barriers and enablers of physical activity among South Asian women living in Perth, Australia. The findings will inform the development of a collaboratively-designed, culturally-relevant intervention to encourage physical activity co-participation among South Asian mothers and their children.

Methods:
Three focus groups (N = 14) were conducted with women from India, Sri Lanka, Bangladesh, and Pakistan. The discussions were recorded and transcribed verbatim. Data were analysed by thematic analysis using NVivo Pro (version 12). An inductive approach to analysis was adopted, informed by Michie and colleagues' COM-B model. The central tenant of the model is that behaviour is a product of motivation, capability and opportunity. Behavioural interventions should focus on addressing identified shortfalls within these domains. To facilitate a behavioural diagnosis, data was coded and organised into pre-determined themes representing physical activity-related capability, opportunity, and motivation.

Results:
The most prevalent behavioural barriers were lack of time due to work and family-related commitments, and tiredness. A culture of self-consciousness among South Asian women was described as impeding participation. Unique physical limitations also hindered participation (e.g. large child-bearing pelvises that make running difficult). For some, religious constraints presented barriers to participation (e.g., dance was described as unacceptable by some Muslim women), and dictated the need for female-only venues. Programs that provided opportunities for social interaction were described as desirable. Participating with children was particularly appealing as it facilitated 'family time,' was consistent with the women's prioritisation of 'family needs' over personal needs, and negated the need to make child care arrangements.

Conclusions:
Specific behaviour-change techniques will be selected based on this behavioural diagnosis (e.g., reducing negative emotions such as self-consciousness). The collaborative approach will afford the development of a tailored intervention that will encourage South Asian mothers to become active with their children.
A systematic literature review of choice architecture interventions to increase physical activity and decrease sedentary behavior

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective
Choice architecture (CA) is considered a promising approach to change health behaviors; however, its effectiveness in increasing physical activity and reducing sedentary behavior, especially in the long term, remains unclear. This systematic literature review aimed to provide an overview of the short- and long-term effectiveness of CA interventions that promote physical activity or reduce sedentary behavior.

Methods
CA interventions were defined as interventions that aim to change behavior by altering the presentation of a choice in the information, physical or social micro-environment in which people make decisions. Following PRISMA guidelines, PubMed, Embase, PsycInfo and the Cochrane Library were searched for articles published up to February 2018. Additionally, backward and forward reference searches were conducted. Studies were eligible for inclusion if they (quasi)experimentally tested the effect of CA on either intention, behavior (physical activity or sedentary behavior) or health outcomes among an adult population. We excluded studies that did not meet our CA definition or combined CA with other behavior change techniques. After eligibility screening, articles were assessed for methodological quality (QualSyst tool), data was extracted and findings were narratively synthesized by type of choice architecture and type of outcome measure.

Preliminary results
Of the 4888 unique records identified, 37 studies (36 on physical activity, 2 on sedentary behavior) met our inclusion criteria. In the short term, about two thirds of the studies showed a significant increase in physical activity and the two studies on sedentary behavior both showed a significant reduction in sedentary behavior. With regard to intentions and health outcomes, results were mixed. Only five studies, all on physical activity, investigated long term effects (=12 months), of which two reported a significant increase in physical activity. Most studies applied CA in the information environment (n=25) or physical environment (n=17); only four studies applied CA in the social environment.

Conclusions
Although the overall results vary substantially, the findings suggest that most CA interventions effectively promote physical activity and reduce sedentary behavior. More research is needed to assess the underlying mechanisms of CA and its effectiveness in the long term and in the social environment, especially for sedentary behavior.
The effects of an exercise intervention on daily time-use composition and fitness, adiposity and cardiometabolic outcomes: A novel analysis of compositional data

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: A day has 24 hours; therefore changing time in physical activity (PA) must be accompanied by compensatory changes in the remaining time-use domains. Using novel statistical methods, we examined how time-use composition changed when time in PA was increased, and if change in time-use composition mediated change in health.

Methods
Participants: Previously inactive adults (n=106) aged 43±11 years, randomly allocated to Control (n=34) or 6-week Moderate (150 min/week) (n=36) or Intense (300 min/week) (n=36) exercise intervention groups.
Measures (baseline and post-intervention): 24-h time use (min/day), derived from the Multimedia Activity Recall for Children and Adults. Fitness: Estimated VO2max from submaximal ergometer tests. Adiposity: measured zBMI and waist circumference. Cardiometabolic: blood pressure (SBP and DBP), and fasting blood glucose and cholesterol from finger-prick blood samples.
Analysis: Compositional MANOVA compared between-group change in 24-h time-use composition; with bootstrapped 95% CI of log-ratio differences identifying which time-use components were driving between-group differences. Time-flow analytics described direct temporal exchanges. ANOVA compared between-group changes in outcomes. Mediation analysis determined if change in time-use composition (compositional isotemporal substitutions) mediated change in outcomes.

Results
Change in time-use composition was significantly different between all groups (Control:Moderate p=0.003, Control:Intense p=<0.001, Moderate:Intense p=0.02). PA increased more, and screen and sleep decreased more in intervention groups (averaged over moderate and intense), compared with control. Time-flow analytics for intervention participants revealed a direct net flow of 34 min/day into PA from chores, transport, self-care, sleep and social time. While 53 min/day flowed out of screen time, these minutes were not directly swapped for PA.
Age- and sex- adjusted change was significantly different between Control and Intense groups for waist circumference (p=0.03, ES=0.62) and fitness (p=0.001, ES=0.78), but not for zBMI or cardiometabolic outcomes. The difference in change in fitness (but not waist circumference) between Control and Intense groups was mediated by change in time-use composition. Replacing 30 min of screen time with PA mediated an increase in fitness of +0.14SD.

Conclusions: Increased PA was offset by less screen, social and sleep time, however the compensatory time-flow adjustments were complex. Compensatory time adjustments should be considered when planning and delivering activity interventions.
16869

P2, P2.9

Qualitative Analysis of COACH: A Community-Based Behavioral Intervention to Reduce Obesity Health Disparities within a Marginalized Community

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Objective: To conduct a qualitative evaluation of a behavioral intervention to prevent and treat childhood obesity for minority children. Our goal was to evaluate the intervention's personalized approach to supporting personal agency, which we define as overcoming structural barriers in a family's ecological context to engage in healthy behaviors.

Methods: COACH was a randomized controlled trial of 117 Latino parent-child (ages 3-5) pairs in Nashville, TN that resulted in improved child BMI in intervention vs. control families at 1-year follow-up. All parents (intervention and control) were invited to a focus group after the intervention. Focus groups were conducted in Spanish at community centers. Discussions were audiotaped, transcribed, and translated into English. A hierarchical coding scheme was generated using an inductive/deductive approach. Two coders independently coded the transcripts. Both theme saturation and consensus between the coders were achieved. Responses were compared between intervention and control groups.

Results: We conducted seven focus groups with 43 participants. Demographics did not differ from the overall sample: the average parent age was 33 (SD 6) years; 53% reported household income <$35,000. Analysis of coded data showed that the intervention increased healthy behaviors (e.g., fruit/vegetable consumption) despite barriers (e.g., time, cost, culture, family dynamics). Control participants identified general desires to improve family health. Intervention participants described specific behavior change strategies promoted by the intervention, including substituting ingredients in culturally-normative recipes, avoiding grocery shopping when hungry, and coping with inability to meet goals with acceptance, perseverance, and problem solving. Control participants reported little success in achieving healthy changes for their family. Intervention participants described successful health behavior changes that were spread across family generations as well as to community members and were maintained after the program. Intervention participants were more likely to consider health a process where current behaviors dynamically impact future health (i.e., participants became more aware of their own agency in promoting their health).

Conclusions: Qualitative evaluation of COACH provides a more detailed understanding of the intervention's quantitative effectiveness: health behaviors and personal agency were improved by the intervention. This should encourage the incorporation of personalized, culturally-sensitive approaches for childhood obesity in low-income minority populations.
Is self-determined motivation associated with the effects of an intervention aimed to increase physical activity and exercise levels?: An 80-day follow-up

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: State-of-the-art technologies, for instance smart watches and smartphones, have the potential to positively influence physical activity and exercise in sedentary populations. Psychological factors, such as self-determined (SD) motivation, might influence the impact state-of-the-art technologies have on level of physical activity and exercise. The aim of this study was to investigate if self-determined motivation influences an intervention on both physical activity (PA) and exercise in a sedentary population.

Methods: 16 participants (men = 5, women = 11) with a self-reported low level of PA over the last year and predominantly sedentary jobs volunteered to participate in the study. PA data (steps and exercise time) were collected over an 80-day period using a wrist-worn accelerometer (Apple-watch and iPhone). Motivation was measured with the Behavioral Regulation in Exercise Questionnaire-2. At the start of the study, each participant completed the questionnaire and received their Apple-watches. Data analysis: All PA and exercise data were recorded through the Apple-watch and via Health App. Data for PA (steps) and exercise time were then extracted and aggregated to daily totals. Statistical analysis: Group means and standard deviations were calculated. A linear regression analysis was used to analyze the relationship between exercise time, PA, and SD, the R2 value effect size (ES) was used to estimate the magnitude of the differences. All data analyses were performed in MatLab (software, R2016b).

Results/findings: SD motivation (3.9±0.9) had a medium (R2 = 0.09) but not statistically significant (p = .26) effect on the amount of moderate to high-intensity exercise time (33.3±39.6 minutes) during the 80-day period. There was no statistically significant effect (R2 = 0.003, p = .84) of SD on PA (12953±7717 steps).

Conclusions: Given the small sample size, achieving a medium effect size has meaningful significance despite not achieving statistical significance. This result suggests that self-determined motivation effects the amount of daily exercise but not PA in a sedentary population. Combining technology and other strategies (e.g., motivational interviewing, coaching) to promote behavior change is promising, and these interventions should include theoretically derived behaviour change techniques and take level of SD motivation into account.
Personality attributes and diet habits of young adults attending college in US

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Personality traits are related to health status and can inform the reasons for differences in health behaviors, such as diet habits. Determining potential underlying causes of diet habits of individuals is important in weight management or reduction for therapeutic or clinical purposes. Therefore, the objective of this study was to determine if there is a difference in diet habits among different personality types.

Methods: After Institutional Review Board Informed Consent was signed, young adults attending a large university completed an online survey that assessed food intake using the Dietary Screener Questionnaire (DSQ) which measures frequency of intake of food groups and the Ten Item Personality Inventory (TIPI) measures the Big Five Personalities: Extraversion, Agreeableness, Conscientiousness, Openness to New Experiences, and Emotional Stability.

Results: Among respondents (n=1512), the mean frequency of added sugar consumption was 1.7 ± smn; 1.3 times per day and the mean frequency of fruit and vegetable consumption was 2.6 ± smn; 1.4 times per day. Lower emotional stability and openness to experiences scores were associated with higher added sugars intake (p=.0001 and p=.0133, respectively). Higher extraversion and openness to new experiences scores showed higher fruit and vegetable intake (p=.0068 and p=.0050, respectively).

Conclusions: Personality characteristics influence eating patterns of young adults. Individuals with higher extraversion and openness to experiences showed higher consumption of fruits and vegetables, and those with lower emotional stability and openness to new experiences showed higher consumption of added sugars. Professionals involved in programming, marketing, and engaging young adults need to consider their personality tendencies to best encourage behavior change in both clinical and community-based settings.
Objective: Research shows that online support groups play a prominent role in weight loss efforts. We designed a 4-week intensive online program in an attempt to identify motivational factors that help participants finish the program and to identify factors that affect motivation.

Methods: We adopted a motivational questionnaire from psycholinguistics research of motivation to study a second language. The analysed factors included ideal self, self-efficacy, social support, anxiety, motivational behaviour and intrinsic motivation. A seven-point Likert scale was employed to measure the extent to which participants agreed with various statements.

Results: The initial motivational questionnaire was filled out by 557 participants. The final 4-week questionnaire was completed by 79 participants. Among those the highest scores were observed in motivated behaviour (M = 6.3) followed by future ideal self (M = 5.87) and intrinsic motivation (M = 5.81). Interestingly, the lowest score was obtained for self-efficacy (M = 4.03). In addition to the motivational questionnaire, the participants were asked to fill out an extensive weekly report assessing various factors affecting their motivation. Interestingly, although motivation levels stayed stable throughout the program, the importance of peer support in a group chat increased two-fold compared to initial levels. In the comments many participants noted that chat support was one of the major factors affecting motivation in addition to visible results and time constraints.

Conclusions: These preliminary study results show the importance of peer-support and that highly motivated behaviour and ideal self scores are important for successfully finishing an online weight loss program. Our primary goal at this point is to compare the questionnaire results of the finishers with the dropouts at week 1, 2 and 3. This could help identify predictors for success in such online programs and help adjust future programs to fit those who were struggling to finish.
Contributions and gaps of a physical activity intervention for rural women: a qualitative exploration of barriers and facilitators

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Objective

Rural women in the United States are less likely to engage in physical activity than their non-rural counterparts. Knowledge is limited about barriers and facilitators to physical activity engagement for rural women, and a better understanding of what fosters or undermines physical activity participation could provide information for the development, refinement, and dissemination of future interventions. The present study aimed to explore experiences among overweight, sedentary midlife and older women who participated in a 6-month lifestyle change intervention: Strong Hearts, Healthy Communities (SHHC). The SHHC intervention was implemented in 11 medically underserved rural communities in upstate New York between 2017 and 2018. Intervention strategies focused on building individual exercise capacities (aerobic and resistance strength training) and creating supportive social and built environments for physical activity engagement.

Methods

Seven focus groups were conducted among 33 SHHC participants. Focus group participants were asked to share about their experience in the SHHC intervention and discuss facilitators and barriers to engaging in physical activity over the course of the intervention. Guided by a socioecological perspective, thematic content analysis was performed on focus group transcripts.

Results

Barriers and facilitators related to personal, social, programmatic, and environmental factors were identified. Participants reported that the main personal factors deterring exercise were physical health, fear of injury, and work-life balance. The main social facilitators for exercise were their fellow SHHC peers and their children. When considering programmatic factors, most participants mentioned that the structure of the SHHC intervention facilitated exercise by promoting accountability and providing additional resources such as a FitBit. Important factors related to the physical environment included weather and road conditions, as well as the lack of promotion of physical activity programs in their communities.

Conclusions

The SHHC intervention successfully provided key social and programmatic supports for rural women to increase physical activity. However, rural women face other obstacles beyond those factors. Overcoming those barriers coupled with promotion of facilitating factors may be helpful to enhance opportunities for physical activity among rural women, a group at elevated risk for not meeting physical activity recommendations.
Predicting transport-related cycling in Chinese employees using an integration of perceived environment and social cognitive factors

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Objective: Transport-related cycling can contribute to employees' increased physical activities in their daily lives, with potential health and environmental benefits. Although the relations between built environment and cycling for transport have been explored, the underlying decision-making process that could link the environment and cycling are yet unclear. The purpose of this study was to apply the theory of planned behavior to explain the underlying decision-making processes between the perceived physical environment and cycling for transport.

Methods: Using a prospective design, Chinese employees (N = 193) self-reported their perceived physical environment of their workplace neighborhood (i.e., residential density, land-use diversity, land-use accessibility, street connectivity, infrastructures, aesthetics, traffic-related safety, and crime-related safety), attitudes, subjective norm, perceived behavior control (PBC), intention, and duration and frequency of transport-related cycling in the last week. One month later, self-reported cycling for transport was again collected from a subset sample of employees (N = 98).

Results: A structural equation model revealed significant and positive effects from residential density to attitudes and subjective norm, from land-use diversity and street connectivity to subjective norm and PBC, and from aesthetics and crime-related safety to attitudes. Attitudes, subjective norm, and PBC predicted intention, in which intention further predicted employees' transport-related cycling. Importantly, attitudes, subjective norm, and PBC mediated the relations from land-use diversity and street connectivity to intention of transport-related cycling, while intention mediated the effect from PBC to transport-related cycling. No moderating effects of the perceived physical environmental variables on the intention-behavior relations were found. Past behavior had significant and direct effects on attitudes, subjective norm, PBC, and intention of transport-related cycling and also significantly predicted the transport-related cycling one month later. The indirect effect from past behavior to intention of transport-related cycling was mediated by the social cognitive variables of attitudes, subjective norm, PBC.

Conclusions: Current results indicate that Chinese employees' transport-related cycling are a function of environmental (i.e., perceived physical environmental attributes) and social cognitive (i.e., attitudes, subjective norm, perceived behavioral control, and intention) factors. Findings of the current study can inform the development of multi-component behavioral change interventions targeting the improvement of transport-related cycling for employees.
Process evaluation by study center after 6 months of Sophia Step Study

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Objective
The Sophia Step Study is a two-year RCT aiming to evaluate the use of self-monitoring of steps with and without counselling in primary care. The study is delivered at three primary care centers with varying populations. Many factors may influence the implementation and effectiveness of behavioural interventions of long duration. Process features becomes important to describe to understand outcomes in behavior. The purpose of this study was to describe the context, delivery, intervention dose and change in daily steps in each of the three centres after the first 6 months of the RCT Sophia Step Study.

Methods
The intervention context is described in terms of uptake area and participants' demographics. Delivery was obtained by continuous contact with the nurses delivering the intervention. Intervention dose was measured by adherence to each of the intervention components. Change in daily steps was objectivity measured by ActiGraph GT1M accelerometers.

Results
By October 2016 104 participants had been recruited and randomized at an urban primary care center, 28 at an urban insurance clinic and 27 at a primary care center in a village in southern Sweden. Response rate was 63%, 24% and 53% respectively. There were significant differences (p<0.05) between the centers in age, baseline number of daily steps and in the proportions of participants having prediabetes, being female and having university education. Drop-out rates were 5%, 0% and 4% for each center, respectively. The intervention was delivered as intended and intervention dose was high in both intervention groups at all three centers. Mean daily steps increased by 1097 (95% CI 232, 1962) in the self-monitoring of steps + counselling group and by 1242 (95% CI 313, 2171) in the self-monitoring of steps group while it decreased by -457 (95% CI -1164, 250) in the control group. There was no statistical difference in mean change of daily steps between the centers in total, or per intervention group.

Conclusion
This study demonstrates that although response rate and demographics differed between the centers there was no difference in intervention dose received or in behavior change in terms of change of daily steps between the three centers.
Living a successful weight loss after severe obesity

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Motivation and behavior change (SIG)

Purpose: To describe the experiences of adults who have had severe obesity and who have lost weight and maintained weight loss (WL) for the long-term (>5 years). Across programs, WL maintenance remains difficult and weight regain is common. Experiences of successful non-surgical WL after severe obesity are unexplored. Knowledge about long-term WL processes and how health care professionals can be of help to those living them is scarce. The current study investigates what it is like for individuals with severe obesity to lose weight and keep it off for the long-term.

Methods: The study design is qualitative, with a phenomenological approach. We conducted in-depth interviews with 8 women and 2 men aged between 27 and 59 with a median age of 37. Participants had lost weight ranging from 30 to 100 kilos, with a median WL of 50. Phenomenological methodology guided our analysis (van Manen, 1997, 2014).

Results: Findings show that after severe obesity, sustained WL has no endpoint, yet is always easy to end. Keeping weight off means committing to oneself, continuing profound changes and cultivating sensitivity towards oneself and others. The essential meaning structure of our analysis is "never-ending story", including four themes "self-driven, but not alone, a transformed relationship to self and others", "still different, joining new communities", "distrusting one's own body, building systems and structures to lean on", and "interrupted".

Conclusions: The participants who lived successful weight losses drew on common strategies, but not as if they participated in a lifestyle programme professionals had planned for them and whose goals they accepted. They did not identify as subject to an intervention or an institution. Rather, they incorporated WL as they had incorporated excess weight. Our study points to the existential domain, and that processes needed to change weight for the long term are deeply personal. A phenomenological understanding of sustained WL can inform professionals who deal with health issues and challenges occurring in the life of individuals leaving severe obesity.
Validity and Reliability of the Basic Psychological Needs in Exercise Scale in the Context of Active Commuting to and from School with Adolescents

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: The understanding of the determinants of active commuting to and from school in adolescents is the first step to promote active commuting behaviour and contribute to meet the physical activity recommendations. Self-determination theory, specifically through the satisfaction of basic psychological needs for autonomy, competence, and relatedness, is a widely used theoretical framework for explaining health-related behaviours, such as active commuting. This research aimed to adapt the Basic Psychological Needs in Exercise Scale and to examine the psychometric properties of the resulting instrument (Basic Psychological Need Satisfaction Scale in Active Commuting to and from School, BPNS-ACS) in Spanish adolescents.

Method: The participants were 400 (188 men and 212 women; Mage = 14.28, SDage = 1.33) secondary school students from four different Spanish cities who completed the BPNS-ACS. Data were statistically examined via confirmatory factor analysis and multi-sample factor analysis of invariance across gender to examine the internal validity. Both multivariate techniques were performed using the maximum likelihood method along with 5000 resampling bootstrapping. Cronbach's alpha and Raykov's composite reliability coefficient were estimated to inspect the instrument's reliability.

Results: Confirmatory factor analysis showed a good fit for the 12-item three-factor correlated model (x2/df = 1.78; CFI = .99; TLI = .98; SRMR = .043; RMSEA = .044 [90%CI = .029, .059]). Invariance across gender was also supported given that no statistically significance differences were found in the x2 test among each of the successively progressively constrained models. Reliability analysis indicated acceptable values for Cronbach's alpha and Raykov's composite reliability coefficient for autonomy (a = .76, rho = .82), competence (a = .91, rho = .92), and relatedness (a = .86, rho = .87) need satisfaction.

Conclusions: This study initially provides validity and reliability evidence to consider the BPNS-ACS as a psychometrically robust instrument to measure the students' perceptions of basic psychological need satisfaction in active commuting to and from school.
Changes of active commuting to and from school in Spanish preschoolers during the last 5 years: the PACO project

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: This study aimed to describe the changes of mode of commuting to and from school in Spanish preschoolers in the period 2013-2017.

Methods: A total of 6270 preschoolers aged between 3 and 6 years old, belonging to 5 cross-sectional original studies conducted in Spain between 2013 and 2017, were analysed. Parents reported their children's mode of commuting to and from school, age, gender, and time of commuting between home and school (categorized as "<15min" if they commuted less than 15 minutes and as "=15 min" if they commuted 15 minutes or more). The differences between mode of commuting to and from school, age, and time of commuting (i.e, duration of the route home-school) with survey year were analysed by Chi-square test. The association between mode of commuting to and from school with the survey year was analysed using a multilevel logistic regression model. Age and gender were included in the model as covariates. Additionally, a sensitive analysis was performed including the time of commuting as covariate.

Results: The preliminary results using Chi-square test showed significant differences along the survey years for active commuting to and from school (ACS), age, and time of commuting (all, p<0.001). However, there were no associations between the survey year and ACS in Spanish preschoolers (all, p>0.05) in the multilevel regression analysis. When the time of commuting was included in the model as covariate, the results remained (all p>0.05).

Conclusions: The rates of ACS did not change in the last five years among Spanish preschoolers. Regarding the fact that ACS has been reduced in different countries around the world it maybe be a promising result as a consequence of the promotion of public health initiatives. Actually, the spreading of information may have increased the awareness of a healthy lifestyle in the Spanish families. However, it is necessary to conduct more researches looking for the causes of this trend on active commuting to school in preschoolers and secondly, to design and implement focused family-based interventions to increase the rates of ACS from early ages.
Objective: This study protocol is for a wellness coaching intervention focusing on methods that aim to improve physical literacy (PL) and bodily knowledge among obese adults. PL has been presented as a resource promoting engagement in physical activity (PA) throughout the life. However, it has been rarely studied among adults. As a part of PL, bodily knowledge can improve one's ability to interpret body messages, help in the enhancement of PA, and promote weight management planning.

Methods: The design of the study is a randomized controlled trial (RCT) accompanying a qualitative longitudinal study. Subjects (BMI = 30 kg/m2) are recruited via occupational health care in the Central Finland region and randomly allocated to either the intervention group (n = 120) or a control group (n = 120). The 12-month intervention will have a 12-month follow-up. The intervention includes both face-to-face and online coaching along with supervised and independent training. The programme will have four main areas to be supported: 1) Practical PA skills (e.g. bodywork exercises and physical exercises), 2) Knowledge and problem solving (e.g. individualized information, self-monitoring and biofeedback) 3) Psychological flexibility and self-regulation (e.g. value work, goal-setting) and 4) Social support (e.g. group exercises, online discussion forum). The participants will keep online logbooks about their feelings, experiences, reflections of objective measures (body fitness test, Firstbeat-wellbeing analysis), subjective assessments (e.g. self-rated PA) and self-directed exercises throughout the intervention.

Results: Results from the pilot study are available in June 2019 and the intervention starts in August 2019. The main outcome is self-perceived quality of life and the secondary outcomes will address psychological flexibility, body self-perception, PA, dietary habits, sleeping, and from physiological measurements body composition, waist circumference, and weight loss. The effectiveness of the intervention will be assessed using the register-based data on sickness absence, and the intervention includes an economic evaluation.

Conclusions: The study will increase understanding on obese participants' behaviour change processes, changes in body self-perception and feelings of engagement in a physically active lifestyle. No previous RCT studies have tested the efficacy of a wellness coaching intervention for obese adults, targeting PL and bodily knowledge in combination.
An exploratory study of the relationship between annual sick leave and physical activity in South African factory workers

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Objective
To investigate the relationship between annual sick leave in factory workers and moderate and vigorous physical activity.

Methods
Data were collected on factory workers at a pharmaceutical manufacturing company in Johannesburg. The outcome was the number of sick days taken in a 12 month period. Independent t-tests and Chi-squared tests were used to compare self-reported moderate and vigorous physical activity between male and female workers. Adjusted linear regression models were conducted to determine the association of physical activity and annual sick leave.

Results
Female workers took more sick leave than males (mean ±smn; standard deviation (SD); 7.1 ±smn; 6.34 vs 4.66 ±smn; 6.46; p<0.05). A relationship between sick leave days and moderate intensity physical was not observed. Amongst females, being vigorously physically active for at least one day per week had a negative association with sick leave days (unstandardized ßa; coefficient: -5.59 (95% CI: -10.7; -0.51); p<0.05), while higher frequency vigorous physical activity (=3 days/week) was positively associated with sick leave days (unstandardized ßa; coefficient: 4.93 (95% CI: 1.24; 8.61); p<0.05).

Conclusions: This study demonstrates that annual sick leave is lowered through engaging in at least one day of vigorous physical activity per week, but sick leave increases with a frequency of more than 3 days per week.
P2, P2.31 A descriptive study of the physical activity profile of workers at a South African pharmaceutical company

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective
The aim of this study was to determine the physical activity profile of a cohort of workers at a South African pharmaceutical company, and to identify the anthropometric and metabolic correlates with physical activity domains.

Methods
Data were collected from 116 adult workers, aged 39.3 ±smn; 9.96 and 61.2% female. Moderate-to-vigorous physical activity (MVPA) data were collected using self-reported. Body mass index (BMI) was used as a marker of body fat. Blood pressure, random glucose, and total cholesterol were measured. Covariates included age, smoking, alcohol consumption, and highest level of education.

Results
The preliminary findings of this study demonstrate that 91% meet the recommendations for physical activity. 72% of the sample were physically active during leisure-time. Work-related MVPA contributed the most to total MVPA (43.6%), followed by leisure-related MVPA (32.7%), and walk for travel (23.7%). In an adjusted linear regression model, walking for travel was correlated with lower BMI (adjusted βα= -0.30, p<0.005). The majority of the females (54.9%) were obese compared to 20% of males, p<0.0001). The prevalence of elevated blood pressure was also noted to be high in males and females but not different, 26.7% vs 26.8%, respectively.

Conclusions:
In a cohort of adult South African factory workers, most are meeting physical activity guidelines, despite the presence of obesity and elevated blood pressure. Walking for travel seems to protect against obesity, but contributes the least to overall physical activity.
Could be social norms approach applied in promotion of physical activity and prevention of excessive sedentary behaviour?

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Purpose:
Interventions based on social norms approach, i.e. evidence-based feedback to correct one's erroneous perception of his/her peers' behaviours, have been successfully implemented in prevention of substance use. However, it has been only rarely applied as means to promote physically active lifestyle. Therefore, this study aimed to test what were adolescents' perceptions of their peers' level of physical activity (PA) and sedentary behaviour (SB), so-called descriptive norms, to get a cue if there is a space for this approach in the field of PA promotion.

Methods:
On-line questionnaire on PA and SB was filled by 1574 respondents aged 11, 15 years from 12 schools across the Czech Republic in Autumn 2017. The respondents reported on their own moderate-to-vigorous (MVPA) PA and time spent being sedentary and were also asked to estimate the MVPA/SB level of their peers. Chi-squared tests were used to analyse differences in estimates by three MVPA/SB categories (high, moderate, low) and Spearman's rho to assess correlations between respondents' own PA/SB and estimate of their peers' PA/SB.

Results:
We observed that respondents underestimated their peers' PA level and, vice versa, slightly overestimated their peers' time spent being sedentary. Actually, almost 40% of respondents reached 60 minutes of MVPA on at least 5 days/week, while only below 20% of them estimated their peers to do so. Similar pattern was apparent for low level of time spent being sedentary (actual 33% vs. estimated 18%). Chi-squared tests indicated significant differences in estimates of peers' PA and SB by respondents' own PA and SB category (p>.001). We found significant correlations (p<.001) between own and estimated level of peers' MVPA (r=.448) and overall sitting time (r=.205), which did not vary markedly by gender or age.

Conclusions:
The principle of "judging others by one's own standards" was in place among Czech adolescents, i.e. the least physically active respondents also underestimated PA and overestimated SB of their peers. Providing them with feedback that their PA level is lower and their SB level higher than their peers' PA/SB thus seems as a feasible opportunity to target the adolescents who are less physically active and more sedentary.
Integrating Motivational Dynamics, Family Systems and Public Health Theory to Create a Father-Focused Obesity Prevention Program for Mexican-heritage Families


Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Most obesity prevention programs with families have focused on mothers or mother-child dyads. In addition, programs often have applied common behavioral change strategies like self-monitoring or goal-setting. However, to more effectively support sustainable changes around nutrition and physical activity within families, programs must employ new approaches to engage fathers and affect family systems. This study applied motivational dynamics and theory to create an innovative obesity prevention program for Mexican-heritage family triads of fathers, mothers and children (9-11 years).

Methods: Through collaboration with community advisory boards, promotora-researchers (community health workers trained in research), and an interdisciplinary academic team, we developed a father-focused, family-centered program specifically for Mexican-heritage families living in Texas-Mexico border communities. The program will be implemented by promotora-researchers, who were trained using the train-the-trainer approach. Training focused on knowledge and skills related to nutrition and food preparation, physical activity, family functioning, and motivational interviewing. A motivational interviewing approach was adopted to create an inclusive and supportive program. All lessons incorporate motivational interviewing principles, such as using open questions, reflective listening and summarizing to build motivation for behavior changes. Theoretical targets are based on the circumplex model for family functioning (cohesion, adaptability, and communication) and social cognitive theory (self-efficacy, observational learning). All program materials were simultaneously developed in English and Spanish.

Results: The program consists of six, in-person group sessions, at-home activities, and interim in-home visits, which are designed to affect the physical and socio-emotional aspects of the home environment, such as mealtime policies and providing more fruits and vegetables in snacks and side dishes. Each 2.5-hour session includes an interactive lesson on nutrition, physical activity, or family functioning; active games or a physical activity break; hands-on food preparation lesson; time to eat together; and goal setting. Program materials include: comprehensive leader's guide for interventionists, family guide (personalized binder with activities, resource handouts, and self-monitoring sheets for families), and colorful visual posters in English and Spanish.

Conclusions: This contextually- and culturally-relevant program with Mexican-origin families addresses a lacuna in obesity prevention. Results from this father-focused, family-centered program may be used in other behavioral nutrition programs with Latino families.
Assessment of the integrated association of potential determinants of leisure-time physical activity

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Physical activity has been well-known for many health benefits regardless of the intention of the activity. The objective of this study was to examine the comprehensive effects of potential determinants on physical activity in the longitudinal design.

Methods: Longitudinal data of 56,200 Korean adults aged 40-69 from the Health Examinees study (KoGES HEXA) were used in analysis [1, 2]. The median follow-up duration was 4.2 years. Duration (min/week) and intensity of participating in leisure-time physical activity (LTPA) were repeatedly assessed. Determinants such as sociodemographic factors, social support, behaviors, psychological factors, and past chronic diseases were selected based on the results of previous longitudinal studies. Hypothetical models for LTPA considering the complex associations between the determinants were evaluated using structural equation modeling. Direct, indirect, and total effect of each determinant were estimated.

Results: The results of structural equation modeling indicated that education, income, social support, and self-rated health had positive direct and indirect effects, while smoking status and stress had negative direct and indirect effects on duration of LTPA in both men and women. For BMI, negative direct effect and positive indirect effect were observed, and the estimate of total effect was close to null. Chronic diseases showed positive direct effect and negative indirect effect which resulted in positive total effect. For the intensity of LTPA, BMI, chronic diseases, and self-rated health were more strongly associated with moderate intensity, while income, social supports, and smoking status were more strongly associated with vigorous intensity. The goodness-of-fit indices were confirmed in all analyses.

Conclusions: In this study, BMI had null total effect on LTPA resulted from opposite direct and indirect effects, and each determinant had differential effects on LTPA by intensity, which means that there may be different mechanisms. The findings from this study highlight the practical importance of considering the integrative association of the determinants.

Reference
The Health Action Process Approach model for understanding parents’ reflective motivation towards reducing unhealthy foods

**Objective**
Parents are one ideal target for interventions to improve children's eating habits and reduce their unhealthy food intake, which is excessive and accounts for 36% of total energy intake. Parents need to be sufficiently motivated, and have the required knowledge and resources to change their provision of unhealthy foods to children, and in turn intake. The Health Action Process Approach (HAPA) model provides an in-depth understanding of aspects of motivation related to behaviour change. This study explored the relationships between, and relative importance of, constructs of the HAPA model and children's intake of unhealthy foods.

**Methods**
A cross-sectional online survey was administered in Australian parents of 3-8 year old children containing validated questions related to parent motivation (using the Parental Food Attitude Questionnaire), child dietary intake (Short Food Survey) and socio-demographics. Structural equation modelling was performed to understand interrelationships between constructs of risk perception, outcome expectancies, self-efficacy, intention and planning, and children's mean serves of unhealthy foods.

**Results**
Four hundred and ninety-five parents completed the survey. Model fit statistics (CMIN 210.033, df 83, p<0.001; CFI 0.956; TLI 0.936) supported the HAPA model as suitable, with parental motivation accounting for 9.2% of children's unhealthy food intake. The strongest relationships were seen between self-efficacy constructs (action to maintenance, standardised coefficient beta .69, p<0.05; maintenance to recovery, beta .70, p<0.05), and between maintenance self-efficacy to planning (beta .82, p<0.05). Followed by the relationships between intention and planning (beta .21, p<0.05), and planning to unhealthy food intake (beta -.32, p<0.05).

**Conclusions**
The HAPA model is a promising framework for examining parental motivation towards limiting unhealthy food provision, but the overall model variance signals there are other important factors that influence children's unhealthy food intake not accounted for by motivation alone. Future interventions should include strategies to enhance parents' self-efficacy, intention and plans for reducing unhealthy foods to their children. Research is needed to understand parents' capability (knowledge and skills) and opportunity (resources and support) as other potential intervention targets. A greater understanding of the sources of behaviour (motivation, capability, opportunity) can improve researchers ability to develop interventions to support parents' behaviour change.
Teacher-perceived barriers and facilitators for using classroom-based physical activity: Results from a mixed methods study.

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective
It is well established that physical activity (PA) is beneficial for both mental and physical health as well as cognition and academic performance for children and young people. Research has also found that schools are optimal settings for promoting healthy and active behaviour among this target group. Schools are therefore increasingly called upon to implement different forms of PA during school days. A viable component of many school-based initiatives are classroom-based physical activity (CBPA) putting teachers at centre stage as facilitators. In general, teachers have a positive perception of using CBPA and find it beneficial for students' health, well-being and academic performance. However, barriers for fully integrating PA remain. Moreover, little is known about the best ways to support teachers. Since 2014, it has been mandatory for all Danish public-school teachers to integrate, on average, 45 minutes of daily PA. The purpose of this study was to explore teacher-perceived barriers and facilitators for using CBPA among Danish schoolteachers.

Method
The study used a mixed methods approach. A survey asking participants to identify barriers and facilitators for using CBPA on a one to five ranking scale. Five factors were selected; time, resources, competences, relevance and support. In a subsequent in-depth interview, respondents were asked to elaborate on the survey findings. 206 public-school teachers across subjects, year, age, experience, and gender answered the survey. Nine teachers recruited from the survey sample were interviewed.

Results
Respondents identified lack of time and resources as key barriers, and time and relevance as the two most important facilitators for using CBPA. Results from the interviews supported survey findings. However, interview findings also indicated that factors such as lack of support, lack of teacher collaboration, and lack of resources are key barriers for using CBPA. Collegial support, training, and professional development were identified as key facilitators.

Conclusion
The findings from this study pinpoint key teacher-perceived barriers and facilitators for integrating CBPA. Such findings can help frame new research questions and inform stakeholders, such as school management, decision-makers and subject advisers, on innovative ways to foster, for instance, teachers' motivation for and commitment to CBPA.
Aligning diet and physical activity interventions with adolescent values

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: UK adolescents have poorer diets than other age groups, and fewer than 20% meet physical activity guidelines. Intervening at this life-course stage represents an opportunity to bring triple benefit: to improve adolescent health now, to support health in adulthood, and to improve the health of the next generation. Activating adolescent values can lead to improved health behaviors. However, little is known about adolescents' values related to diet and physical activity and how best to target them in interventions. This study explored the key values that were important in adolescents' lives and behavior, with which our health interventions need to align.

Methods: This was a qualitative study using a person-based approach to intervention development. We conducted 13 group interviews with adolescents 12-13 years of age (n= 54) to explore their perspectives on facilitators and barriers to healthy eating and physical activity, and to identify ways to intervene to support adolescent health behaviors. Thematic analysis was used to identify key underlying adolescent values for intervention design.

Results/findings: The analysis identified 4 themes. (1) I do want to be healthy: the relevance of health behavior to adolescents is in enabling them to feel good about themselves, both in terms of mental and physical well-being, and enabling them to function well socially. (2) Mum makes it for me: families are influential in adolescents' health behaviors, though friends are the main influences on food choice outside the home. (3) This is my life: health behavior change requires effort and more money than they have. (4) What would help: adolescents want support for change that is fun and engaging, takes into account what they like, and has social components.

Conclusions: Adolescents value being with their friends, doing things they are good at and that they enjoy, being seen and heard as individuals, and being respected and supported. These values overlap with the three basic psychological needs outlined by Self-Determination Theory (SDT): autonomy, competence and relatedness. By aligning health agendas with adolescent values, interventions can support these three basic psychological needs and optimize engagement with, and therefore effectiveness of, interventions.
17261

P2, P2.40

Enhancing social-connectedness among at-risk adolescent girls through the girls united and on the move program

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Purpose: Rates of physical activity (PA) among adolescents are on a continuous descent, with girls appearing to be most susceptible to these declines. 'At-risk' adolescent girls, whom may experience a number of negative preceding lifestyle conditions, may be exceptionally vulnerable to these declines. Girls United and on the Move (GUM) is a 9-week integrated PA and psychosocial program aimed at improving self-perceptions and social-connectedness among 'at-risk' adolescent girls. The overarching goal of the GUM program was to explore the relationship between PA behaviours and various psychosocial factors. This presentation focuses on the preliminary findings of social support as a result of the GUM program.

Methods: This study utilized a quasi-experimental mixed methods design. Participants (n=50) between the ages of 11-15 and classified as 'at-risk' were recruited from five different middle schools in British Columbia, Canada. Data was collected at baseline, 6-weeks, and 9-weeks post-intervention. PA and social support were assessed through self-report (i.e., PAQ-C and CASSS). Semi-structured interviews were also undertaken to further explore the importance of social support among the participants.

Results/findings: A paired samples t-test revealed a significant difference between perceived social support from teachers/facilitators from baseline to post-intervention (M = 0.56, SD = 1.34), indicating a moderate effect size (r = 0.39). Additionally, perceived close friend support was maintained or slightly increased from the start (M = 5.01, SD = 1.06) to program completion (M = 5.12, SD = 1.09), although no significant differences were found. Data from the interviews revealed important themes which acknowledged the support provided from teachers/facilitators, as well as emphasized the importance of the development of close friendships as a result of participating in the GUM program. Many participants voiced that the program provided the opportunity to discuss inherent feelings and issues with their close friends and program facilitators within the group, and that GUM provided the chance to create or strengthen existing friendships through the group activities.

Conclusions: The results indicate that an integrated approach to enhancing levels of PA and self-perceptions among at-risk adolescent girls may be beneficial in elevating levels of social support from certain facets of their social environments.
17443

P2, P2.41

The development of ‘Move for Life’: A community intervention designed to help inactive older adults become more active

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose:
There is overwhelming evidence to support the promotion of physical activity (PA) in adults in terms of benefits to wellbeing, physical and mental health. Yet, in Ireland, 63% of adults do not meet international PA guidelines, with consequences to their health and the economy. This presentation will describe the development of Move for Life (MFL), an innovative intervention designed to augment and up-scale existing community PA programmes delivered by professionals and cascaded by way of peer mentors to help reach inactive 50+ year olds and increase their PA.

Methods:
As part of a large feasibility cluster randomized controlled trial involving 544 participants from eight community sport and PA Hubs in Western Ireland, the MFL intervention was developed using a pragmatic approach that included consideration of: (1) relevant behaviour change and motivational frameworks, (2) existing evidence-based community PA programmes for adults, and (3) the opinion of stakeholders regarding issues of participant recruitment and retention, intervention scalability, and the role of peer mentors.

Results/findings:
After short MFL training, PA professionals reported increased confidence to teach behavioural skills, implement social support and group cohesion strategies, communicate with participants in an autonomy-supportive way, and work with peer mentors to achieve the aims of the intervention. They also reported compliance with most intervention strategies and suggested ways of modifying some of these strategies to make them more effective or realistic in their own settings. Initial feedback led to the refinement of the MFL model which impacted on methods of recruitment and training of peer mentors and was instrumental in redefining the content of subsequent training for peer mentors. Ongoing evaluation activities will provide a more comprehensive and detailed picture of the effectiveness of the MFL intervention on an array of primary and secondary outcomes.

Conclusions:
Development and ongoing evaluation of MFL will contribute to our understanding of the potential effect of empowering professional and non-professional members to use individual and group behaviour change strategies and develop a sustainable community model of peer mentorship, and how this might promote and upscale effective PA interventions and reduce sedentary behaviour in a cost effective manner.
Co-designed intervention strategies to support healthier eating and safer alcohol use among young adults

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Purpose: Heavy alcohol use in young adulthood impacts on eating behaviours and is associated with a higher risk of gaining excess weight. Furthermore, a high body mass index linked with excessive alcohol consumption increases the risk of further health conditions, such as liver disease. Both obesity and excessive alcohol intake are major public health concerns. There has been limited work to date on understanding the links between eating behaviours and alcohol use in young adulthood and the possibility of dual-focused interventions to support behaviour change. Therefore, this novel research aims to co-design, develop and refine intervention strategies supporting linked healthier eating and safer alcohol use amongst young adults (aged 18-25).

Methods: A participatory action research approach was used. Qualitative data were collected across a series of co-design workshops with young adults and practice and policy partners. A range of participatory techniques were used to elicit discussion and facilitate collaboration. Verbatim transcripts, written outputs generated by participants, and field notes were analysed using a thematic framework developed deductively based on formative stages of the project.

Results: The key themes that emerged for intervention strategies to support healthier eating and safer drinking were: involvement of social networks; personalisation through optional content (e.g. budgeting, calorie awareness in alcohol, and/or links to mental health); and policy changes relating to the regulation of the food and alcohol environment. The most important barrier to intervening in these behaviours, was considered to be the persistence of unquestioned norms among young adults relating to the links between fast-food and heavy alcohol consumption.

Conclusions: While interpersonal factors are important in determining the link between eating behaviours and alcohol use in young adulthood, such links are also driven by wider cultural shaping, including the actions of the food and alcohol industry, population-level policy and the urban landscape. Therefore, interventions to support healthier eating and safer alcohol use need to utilise a combination of complementary approaches, tackling both social and policy-level determinants. The final output from this research will be prototype intervention/s, which aim to reduce heavy alcohol consumption and/or unhealthy eating behaviours associated with excess body weight amongst young adults.
Changing behaviour when faced with new nutrition-related health information – perceptions of risk and acceptability

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: New links between nutrition and adverse health outcomes are frequently identified and reported to the public. Despite the risks, many individuals continue to make poor dietary food choices. In order to change behaviour and ensure the effectiveness of interventions, it is important to conduct qualitative research to understand acceptability and underlying reasons for behaviours.

Methods: Six focus groups were conducted with a variety of consumers to understand their opinions and attitudes towards different behaviours which can be used to prevent chronic diseases. Using the presence of arsenic in rice (which has been associated with heart disease, diabetes and cancer) as a new nutrition-related health information scenario, a semi-structured topic guide was designed to ask participants their thoughts on three different possible behaviours to reduce their risk: 1. Convenient behavior, buying reformulated rice with reduced level of arsenic; 2. Semi-convenient behavior, buying a newly created rice cooker that will reduce levels of arsenic in rice; 3. Inconvenient behavior, using a lengthy cooking method involving pre-soaking and rinsing to reduce levels of arsenic in rice. Audio from the focus groups was transcribed and NVivo was used for thematic analysis.

Results: Individuals were unaware of the links between arsenic in rice and chronic diseases, confirming its use as new nutrition-related health information. Across the themes, individuals demonstrated their desire to be informed of links between nutrition and health on packaging and labels. While participants identified additional benefits of the semi-convenient and inconvenient behaviours such as better taste, texture, and further reduced health risks, overall there was a preference for the convenient time saving option and a reluctance to change habitual practices.

Conclusions: Even though participants were concerned at potential risks to their health, they were not prepared to be inconvenienced to reduce their risks. Time saving and convenience may be the most important factors to consider in designing interventions and changing behaviours to reduce health risks in the face of new nutrition-related information. Environmental or industry focused actions such as reformulation may be more acceptable and successful than attempting to change behaviour at the individual level.
Addressing the psychology of weight loss and maintenance: Feasibility and acceptability of the Skills for weight loss Maintenance (SkiM) weight management programme.

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Background: We aimed to evaluate the feasibility and acceptability of integrating novel techniques supporting "skills for weight loss maintenance" (SkiM) into two existing weight management programmes.

Methods: People with BMI 30 kg/m2 or more, identified through general practice databases and a NHS weight management referral system, were offered the SkiM programme. Content included regular progress review and topics relating to a) the providers' usual weight management programmes, and b) skills for weight loss maintenance based on the "tension model" of Greaves & Poltawski (2017) (including self-regulation skills, managing impulses, meeting needs more healthily, managing emotional/stress-related eating and managing unhelpful thoughts and attitudes). The intervention was delivered bi-weekly for six months in local community centres to groups of 11-15 people. Two phases of intervention were delivered, with feedback from phase one used to refine the intervention for phase two.

Results: Of 100 participants randomised, 65, 58 and 56 provided data at 6, 12 and 18 months. The sample had a mean BMI of 37 kg/m2 and mean age 56. For people providing data, the mean weight loss was 4.2kg at 6 months (post intervention), 4.4kg at 12 months and 3.1kg at 18 months. Physical activity of at least moderate intensity increased from baseline to six months by 49.0 mins/wk (95%CI: 17.9 to 80.2), but this was not sustained at 12 months. In the second phase we recruited more men than in phase one (36% vs 21%) and more people with high area deprivation (34% vs 23%). The weight maintenance profile improved from phase one to phase two (0.5kg regain from 6 to 18 months, vs 1.7kg), with better session attendance (55% vs 47%). Considerable individual variations in weight loss, along with high early drop-out rates, indicate that the intervention did not suit all participants. Fidelity analysis indicated variable delivery quality, which improved in phase 2. The intervention delivery cost was estimated at between £233 and £297 per participant.

Conclusions: The SkiM weight loss and maintenance intervention seems promising, but did not suit all participants. Future directions may include matching participants to intervention components depending on individual assessment of needs.
Latino fathers’ perceptions of and preferences for intervention delivery methods

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Purpose. The purpose of this study was to gain an understanding of Latino fathers’ perceptions of and preferences for different delivery methods of a family-focused, childhood obesity prevention program and activities: 1) electronic delivery (e.g., texts, emails, websites, videos), 2) in-person sessions and 3) blended approach (electronic delivery/in-person sessions). The importance of paternal participation in family-centered interventions to prevent childhood obesity is supported, yet few studies exist. Low attendance is a highly reported barrier to full participation. The innovation behind this proposal is two-fold: 1) participation of Latino fathers and 2. assessment of interest/potential engagement via different intervention delivery methods.

Methods. Guided by the grounded theory research approach, qualitative data were collected through focus group interviews. Fathers of a child (10-14 years) were eligible. Focus groups were conducted in Spanish and held in both urban and rural locations. Focus group questions centered on technology use to access new information to improve the health of their families and their preferences for different delivery methods. Discussions were recorded, transcribed verbatim and coded using NVivo Pro 11 software. Inductive thematic analysis was used to identify themes and patterns.

Results. A total of 29 fathers participated in 4 focus groups (2-2.5 hours in length) with 4-13 participants per group. The majority of fathers identified comprehensiveness, ease of use, speed of obtaining information, and convenience of accessibility as the most liked factors for using technology to access new information to improve their family's nutrition and physical activity. Advantages for in-person sessions included social connectedness based on enjoyment, participating as a group and sharing ideas. Advantages for the blended approach included convenience and access to content learned outside of programming. Overall, participants agreed that technology is a "necessary" part of life. They also preferred technology as the dominant way to access information to improve their families' health (e.g., recipes, local activities at parks) when busy schedules prohibited attending in-person sessions.

Conclusions. Results from this study may inform the development of future interventions to prevent childhood obesity that could reach larger numbers of underserved Latino audiences who may be constrained from attending in-person sessions by time.
Experiences of health promotion professionals designing and implementing healthy eating campaigns on social media

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Motivation and behavior change, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective:
Social media (SM) platforms have disrupted the way health professionals engage and reach communities to encourage healthy behaviours. This study explored the experiences of health promotion professionals (HPP) delivering healthy eating campaigns via SM platforms.

Methods:
In-depth semi-structured interviews were conducted in a purposive sample of nine Australian nutrition focused HPP involved in the development and implementation of SM campaigns. Interviews explored experiences of campaign planning, delivery and evaluation. Inductive content analysis was used to identify the main themes.

Results:
Participants were mainly from health organisations, with backgrounds in nutrition and communication or marketing. Three themes emerged from the data: i) HPP reported feeling they lacked the capacity to remain competitive with 'influencers' and food industry on SM. Day-to-day SM management and evaluation activities were limited by the amount of time to dedicate to SM and budgetary constraints. To overcome these obstacles, HPP cross-promoted messages from other organisations and collaborated on SM campaign creation. ii) SM messaging strategy was fundamental to campaign success. Effective messages were short, relatable, and positively toned. HPP also identified that content should include a mixture of formats (e.g. videos and photos) and not sound overtly health-related or didactic. Co-creation and sharing content from the community appeared to boost engagement. iii) All participants described the need to understand the target audience. However, those with a greater understanding of marketing strategies identified the need to segment the population using behavioural characteristics to target specific behaviours.

Conclusions:
This study provided insights into the approaches HPP use and the challenges experienced in delivering SM health campaigns. HPP designing and implementing SM campaigns would benefit from an understanding of marketing strategies such as audience segmentation and co-creation activities to enhance engagement with their audience. Capacity planning and forming partnerships with other HPP organisations may also support SM campaign success.
Effect of integrating a video intervention on parenting practices and related parental self-efficacy regarding health behaviours within the Feel4Diabetes-study in Belgian primary schoolchildren from vulnerable families

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Children and families (SIG)

Purpose: This study aimed to investigate the effect of integrating a video intervention "Movie Models" within the Feel4Diabetes-study on specific parenting practices and related parental self-efficacy regarding children's physical activity, screen-time and eating behaviour in vulnerable families (i.e. families living in low socioeconomic municipalities and at risk for developing type 2 diabetes). Additionally, there was examined how the intervention was perceived by the parents.

Methods: Within randomly selected low socioeconomic municipalities in Belgium, families were recruited through primary schools. Families at risk for developing type 2 diabetes were identified using the FINDRISC questionnaire (n=462). Afterwards, the municipalities were randomly assigned to the intervention or control condition. At risk families assigned to the intervention group were invited to participate in seven Feel4Diabetes counselling sessions in which families were encouraged to adopt a healthier lifestyle. The "Movie Models" videos were integrated within two sessions by using a face-to-face group discussion approach. Parenting-related factors were assessed before and after the integration of the videos, using a questionnaire. After integrating the videos, some extra evaluation questions were assessed. Valid data were obtained from 149 families and were used in the Repeated Measures analyses.

Results: Some favourable intervention effects were found on parenting practices and related parental self-efficacy regarding children's eating behaviours, however almost no effects were found on parenting-related factors regarding children's physical activity and screen-time. In total, 55.6% of the participants indicated that they applied tips regarding parenting practices and that discussions with other participants regarding the videos were useful for them.

Conclusions: The integration of "Movie Models" within the Feel4Diabetes-study was effective in improving some parenting-related factors regarding children's health behaviours. The implementation of "Movie Models" as a face-to-face group discussion approach was relatively well received and may be a promising way to improve parenting-related factors in vulnerable families.
Impact of year-round and traditional school schedules on weight gain and fitness loss over the summer

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Children and families (SIG)

Objective: To compare the changes in weight status and cardiovascular fitness in children attending schools with year-round and traditional calendars.

Methods: Participants were a convenience sample of 334 children from two elementary schools in the same school district in the Southwestern United States. Schools were exactly four miles apart with similar demographic characteristics, school layouts, physical activity space, and physical activity opportunities. The traditional calendar school had a 12-week summer break. The year-round calendar schools had either a 3- or 7-week summer break, depending on the assigned track. Children completed the Progressive Aerobic Cardiovascular Endurance Run (PACER) and had their height and weight measured in May and again in August. Students also answered questions regarding their summer camp and sport participation. BMI and estimated VO2 Peak (from PACER) were calculated. Multi-level general linear mixed effects models were utilized to examine changes in weight status (BMI) and cardiovascular fitness over the summer while also considering summer camp and sport participation.

Results: For BMI, there was a statistically significant time main effect, suggesting marginally higher BMI during Fall 2018 compared to Spring 2018 (b = 0.23 kg/m², p = 0.010). However, this time effect was modified by Break Length, with students with 3-week and 7-week breaks displaying attenuated increases in BMI compared to students enrolled in Traditional Schooling with 12-week breaks (b = -0.25 kg/m², p < 0.05). For estimated VO2 Peak, students who participated in summer sports displayed increases in estimated VO2 Peak compared to students who did not participate in summer sports (b = 1.62 ml/kg/min, p = 0.001). There was no break length x time interaction for estimated VO2 Peak (p = 0.099).

Conclusion: Shorter summer breaks appear to have a protective effect on summer weight gain when compared to a traditional 12-week break. While no differences in cardiovascular fitness were evident between the school calendars, children who participated in organized sport over the summer did see a significant improvement in their estimated VO2 Peak. More research is needed to confirm these findings but schools might consider a year-round school calendar for its potential to protect against summer weight gain.
Changes in foods and beverages served and consumed by youth in summer day camps: a non-randomized controlled trial

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Summer day camps (SDC) across the U.S. adopted healthy eating (HE) standards calling for a fruit or vegetable (FV) to be served at every snack and meal. Interventions designed to assist SDCs to meet this standard have not been conducted. The objective of this study was to evaluate a multi-component intervention designed to increase FV served and consumed at every eating occasion in SDCs.

Methods: The study was a group non-randomized controlled trial with data collected during summer 2015 (baseline) and 2016 (intervention). Nineteen SDCs serving 1,832 children (5-12yrs) allocated to intervention (n=13) or control (n=6) conditions participated. The primary focus of the intervention targeted food providers and SDCs to increase the number of eating occasions (i.e., breakfast, lunch, snack) with a FV served. Secondary intervention targets were to increase role modeling of healthy-eating behaviors by SDC staff and child consumption of FV. Direct observation was used to measure foods/beverages served at breakfast, lunch, and snack, and staff role modeling of healthy-eating behaviors. Weighed plate waste at breakfast and lunch were collected on a random sample of children at both time points to measure consumption. Repeated-measures random effects models for categorical and continuous outcomes were used to estimate intervention effects.

Results/findings: No between or within group changes were observed for the proportion of eating occasions a FV was served. Staff in intervention SDCs increased the number of days they role modeled healthy eating (+32%, 95%CI 9%-56%). Children attending intervention SDCs increased their consumption of FV during lunch (20%, 95%CI 8%-33%). A major challenge encountered throughout the study was the reluctance of third-party providers to alter the foods served to SDCs.

Conclusions: This intervention did not increase the proportion of eating occasions where a FV was served. Staff training can lead to increased role modeling which may influence child FV consumption. This study highlights the complexity of the SDC food system and suggests that changing the foods served in SDCs may be outside the control of SDC providers.
Is self-compassion related to body esteem, intuitive eating, and emotional eating? A look at intrapersonal and interpersonal associations within dyads of mothers and their adult daughters

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Previous research has demonstrated that mothers transmit body-related attitudes and eating behaviors to their daughters (e.g., Rodgers, Paxton, & Chabrol, 2009; Wetheim, Martin, Prior, Sanson, & Smart, 2002), but little is known about the role of self-compassion in this transmission. Objective: This research examined the intrapersonal and interpersonal associations between mothers' and daughters' attitudes (self-compassion and body esteem) and eating behaviors (intuitive eating and emotional eating). Self-compassion is characterized by treating oneself with kindness and being mindful about one's experiences (Neff, 2003), while body esteem is characterized by positive self-evaluations about one's appearance (e.g., Mendelson, Mendelson, & White, 2001). Regarding eating behaviors, intuitive eating is eating in response to physiological hunger and satiety cues (e.g., Van Dyke & Drinkwater, 2013), and emotional eating is the tendency to overeat in response to negative affect (e.g., Macht & Simons, 2000). Methods: Participants were 152 dyads of Canadian mothers (mean age: 57 years) and daughters (mean age: 28 years). Mothers and daughters independently completed self-report questionnaires including the Self-Compassion Scale (Raes et al., 2011), Body Esteem Scale (Mendelson et al., 2001), Emotional Eating subscale from the Three Factor Eating Questionnaire (TFEQ-R18; de Lauzon et al., 2004; Stunkard & Messick, 1985), and Intuitive Eating Scale-2 (Tylka & Kroon Van Diest, 2013). Results: Structural equation modeling analyses were conducted. After controlling for mothers' and daughters' body mass index, self-compassionate mothers reported higher body esteem, which positively predicted their own intuitive eating and negatively predicted their emotional eating. These patterns of eating behaviors were echoed by their daughters. Additionally, daughters of self-compassionate mothers were more self-compassionate, an attitude associated with higher body esteem in the daughters, which in turn predicted their own higher intuitive eating and lower emotional eating. Conclusions: Adding to the literature on the intergenerational transmission of eating-related attitudes and behaviors, results suggest a relation between mother and daughter self-compassion, body esteem, and eating behaviors. Results also showed that attitudes toward oneself (i.e., body esteem and self-compassion) are related to eating behaviors. Mothers' self-compassion might provide a model for daughters, which in turn is associated with daughters' improved body esteem and eating behaviors.
Generation X vs millennial mothers: comparison of weight-related cognitions and behaviors by generation

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Purpose: 'Generation' is defined as an identifiable group sharing birth years and significant life events at critical developmental ages. Generational differences in work values, agentic self-evaluation, locus of motivation, and consumer good preferences are documented. Despite the emphasis marketers place on generational differences when aiming to change purchasing patterns, generational differences have received scant attention in the health behavior change literature. Thus, this study examined weight-related cognitions and behaviors by generation.

Methods: Participants were mothers of preschool children who completed the baseline survey of the HomeStyles trial. Mothers were born in the U.S. and categorized as Generation X (born 1965-1981, n=164) and Generation Y (aka Millennials; born 1982-1999, n=169). The survey included a comprehensive array of scales assessing Social Cognitive Theory constructs vis-à-vis weight-related cognitions and behaviors.

Results/Findings: Generation X had significantly higher levels of education and family affluence; thus, these were controlled for in subsequent linear regression analyses. Linear regression analyses indicated that maternal outcome expectations for healthy eating and outcome expectations for exercise both were significantly higher in Millennials (p<.03). Mothers' self-efficacy for promoting healthy diets to children and managing child weight as well as self-efficacy for personally engaging in weight-protective behaviors was higher in Millennials, though only approached significance (p<.08 and .06, respectively). Mothers' modeling of weight-related behaviors as a means for children's observational learning about healthy eating, physical activity, and sedentary behaviors did not differ by generational group. Value mothers placed on family meals did not differ by generation, however value placed on physical activity for themselves was significantly higher in Millennials (p<.01). No generational differences occurred with regard to weight-related parenting behaviors (e.g., child feeding practices, screentime limits), except Millennials reported significantly more frequent family meals (p<.04.). Similarly, mothers did not differ in their own weight-related behaviors (e.g., dietary intake, screentime, total sleep, eating behaviors), except Generation X engaged in more emotional eating (p<.04).

Conclusion: Overall, generational groups were more similar than different in weight-related cognitions as well as personal and parenting behaviors. Results suggest that tailoring interventions for individuals at a similar life-stage (e.g., parenting young children) by parent generation may not be warranted.
Implementation and evaluation of an exercise prescription in a rural school setting

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Childhood obesity is a global epidemic with obese children becoming obese adults suffering consequences of chronic diseases. While nutritional intake is often out of children's control, they do have control over their physical activity. School-based interventions have been successful in helping elementary children increase their physical activity to combat obesity. Further, exercise prescriptions have demonstrated effectiveness in adult populations; however, there is little effectiveness research of exercise prescriptions in youth populations. The purpose of this study was to determine the effectiveness of giving rural-based elementary-aged children an exercise prescription in the school setting to increase the amount of students meeting daily physical activity goals.

Methods: Participants (n=89) included students ages 5-13 in grades Kindergarten through Sixth. A majority of participating students were female (62.1%) with an average age of 9 years and a fairly even distribution across grade level. After baseline measures, students were given an exercise prescription stating their daily physical activity goal should be 60 minutes in accordance with national guidelines. Using a pre-post test design, weekly minutes of leisure time physical activity was assessed with the Physical Activity Questionnaire for Children. A sheet of suggested physical activities which included ideas such as dog walking or playing outside was provided. Children also tracked daily physical activity on log sheets over the 8 week study.

Findings: There was no significant change in the reported frequency of leisure time physical activity before and after the intervention; however, changes were seen in the anticipated direction. Seventeen-percent of students were classified as having little or sometimes accumulating leisure time physical activity pre-intervention, which decreased to 14% post-intervention.

Results: While many healthcare providers educate their pediatric patients on the importance of physical activity, their likely brief and infrequent interactions with their patients may not reinforce the importance of this teaching. School-based obesity prevention programs have proven to be an effective tool in educating our youth on the importance of physical activity and the health benefits on an active lifestyle. The importance of a partnership between school systems and healthcare providers could bridge the gap in the fight against childhood obesity.
Dietary intake in a laboratory-based feeding study is associated with diet quality across pregnancy

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Controlled laboratory-based feeding studies enable precise measures of eating behaviors and have strong internal validity. However, scant research has examined whether direct measures of eating behavior relate to long-term diet quality. This study investigates the association of eating in the absence of hunger (EAH) with diet quality across pregnancy.

Methods: Participants (n=46, enrolled at <12 weeks gestation) completed at least one 24-hour diet recall in each trimester. Diet quality across pregnancy was assessed by the Healthy Eating Index-2015 total score (HEI), which reflects adherence to the 2015 Dietary Guidelines for Americans. Two subscales assessed adherence to dietary adequacy components (HEI-adq) and moderation components (HEI-mod). Higher scores reflect better diet quality. During the 2nd trimester, EAH was assessed in two conditions (1-highly-processed, HP; 2-low processed, LP) using a cross-over, counterbalanced design, each following a standardized meal providing ~50% of estimated daily energy needs. HP foods included cookies, brownies, candy, chips and cheese popcorn; LP foods included unsalted roasted peanuts and raw fruit and vegetables. Linear regressions estimated associations of pregnancy diet quality with EAH intake in each condition (energy, EAH-kcal; and percent offered, EAH-%) for all foods and separately for sweet and savory foods.

Results: Greater EAH-kcal and EAH-% total and sweet food intake in the HP condition were associated with lower pregnancy diet quality (all indicators). Each 100-kcal increase in EAH of highly processed foods was associated with a 2-3-point decrease (SE=0.7, 0.8) in HEI (P<0.01); each 10% increase in EAH intake was associated with a 5-7-point decrease (SE=2.0) in HEI (P<0.01). Greater EAH-kcal and EAH-% of savory food intake in the HP condition were associated with lower HEI-adq, but not HEI or HEI-mod. EAH in the LP condition was not associated with diet quality.

Conclusions: Greater EAH of highly processed, especially sweet, foods relates to worse long-term pregnancy diet quality, whereas EAH of low-processed foods did not reflect long-term pregnancy diet quality. Findings suggest that intake of HP foods during fullness reflects generally less healthy dietary intake throughout pregnancy.
Development of a parenting intervention at community-based playgroups targeting obesity-related behaviours: what parents want

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Objective:
Establishing healthy behaviours regarding nutrition, activity, and sleep early in life may be a key strategy in childhood obesity prevention. Parents are the primary influence on the development and establishment of obesity-related behaviours in young children. There is evidence that autonomy promoting parenting practices are crucial for the development of self-regulation and the internalisation of healthy behaviours in children. It is therefore imperative that parenting practices are targeted as part of an obesity prevention intervention. However, there is limited understanding of barriers and facilitators to parents using autonomy promoting parenting practices with their children aged 0-5 years. Therefore, the aim of the study was to identify barriers and facilitators for parents in respect to using autonomy promoting parenting practices. A secondary aim was to determine parent preferences in respect to an intervention to be delivered in community playgroups.

Methods:
Parents were recruited through Playgroup Queensland, a not-for-profit organisation in Brisbane, Australia, to attend a focus group during their usual playgroup session. The focus group interview guide was designed to promote discussion among the participants in respect to their shared experiences as parents of young children. The focus group transcripts were coded and analysed using qualitative content analysis. Five focus groups with parents (n=30) were conducted in May 2018. Most of the participants were mothers (27), and the majority (76%) had a child at playgroup aged between 2 and 4 years.

Results:
The support and guidance received from other parents at playgroup was a facilitator to autonomy promoting parenting practices. Barriers included beliefs around the need to use rewards to encourage child eating, beliefs around the need for screens as "babysitters", and feeling disempowered to change sleep behaviours. Parents were enthusiastic about a potential program that would leverage off the existing playgroup support networks, but they did not want to be "educated", or to lose their "playgroup time" to an intervention. Rather they wanted strategies and support to deal with the frustrations of food, screen and sleep parenting.

Conclusion:
These results will be used to inform the development of a parenting intervention to be delivered in a community playgroup setting.
An active play intervention to improve physical activity and fundamental movement skills in children of low socio-economic status: feasibility cluster randomised controlled trial

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Active play is a novel approach to addressing low physical activity levels and fundamental movement skills (FMS) in childhood and new interventions must be developed and evaluated. This study aimed to determine the feasibility of a 10-week school-based 'Active Play' intervention, and present preliminary findings on school day physical activity levels and FMS.

Methods: This was a feasibility cluster RCT in which eight schools (one primary 3 class per school) were matched and randomly allocated to either the 10-week intervention (n=4) or waiting-list control (n=4). The Active Play intervention consisted of a 1-hour outdoor physical activity session per week, incorporating 30 minutes of facilitated games and 30 minutes of free play. School day physical activity was measured using an ActiGraph GT3X accelerometer and FMS were assessed using the Test of Gross Motor Development-2 (TGMD-2).

Results: 66% of eligible children (n=137) agreed to participate in the research. No schools withdrew from the study and three participants were lost to follow-up. Compliance to the intervention was high—none of the participants missed more than two of the 10 scheduled Active Play sessions. Data lost to follow-up were minimal; most were lost (14%) for school day physical activity. Active play sessions were shorter than planned by 10-minutes on average, and participants spent a mean of 39.4% (SD= 14.2) of the session time in moderate-to-vigorous-intensity physical activity (MVPA). Preliminary findings suggested that there was no evidence of significant differences between the intervention and control group for the change in percent of school time spent in sedentary behavior (p= 0.62; d= 0.1) light intensity physical activity (p= 0.16; d= 0.3), MVPA (p= 0.13; d= 0.3), or total FMS score (p= 0.06; d= 0.4).

Conclusion: The Active Play intervention was feasible and benefitted from a relatively high MVPA content; however, preliminary findings suggest the intervention had no significant effect on the outcomes. Having more Active Play sessions per week and/or extending the duration of the intervention may increase the effects and should be tested in a future definitive cluster RCT.

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Several studies have previously reported secular trends of total steps and moderate-to-vigorous physical activity (MVPA). However, there have been no studies of secular trends of total steps and MVPA among Japanese children. Therefore, the purpose of this study was to examine the secular trends of total steps and MVPA among Japanese children at 2003/2004 and 2016/2017. We hypothesised that the total steps and MVPA of Japanese children in 2016/2017 are lower than those in 2003/2004.

Methods: This cross-sectional study was conducted in 2003/2004 and 2016/2017. This study was performed at a school in the city of Okayama Prefecture in Japan. A total of 455 participants (224 boys and 231 girls; mean age, 9.3 ± smn; 0.5 years) participated in the study. We measured anthropometry, total steps and MVPA of the participants. Height and body weight were measured in light clothing without shoes. Total steps and MVPA on weekdays were measured using a uniaxial accelerometer (Kenz Lifecorder EX, Suzuken Co. Ltd, Nagoya, Japan). The participants tied an accelerometer on their waists for eight consecutive days, including two weekend days and six weekdays, at all times excluding swimming, bathing, or contact sports. Accelerometer data were collected on at least three weekdays. A valid day was defined as a minimum of 600 min of wear-time during weekdays. Non-wearing-time was defined as at least 90 min of consecutive zero counts. The secular trends of total step and MVPA were analysed using non-paired Student's t-test.

Results: For boys, in 2003/2004 total steps was 18184.2 ± smn; 3693.2 steps/day and MVPA were 60.4 ± smn; 17.2 min/day, and in 2016/2017 total steps was 15500.7 ± smn; 3539.5 steps/day and MVPA were 49.3 ± smn; 15.5 min/day. For girls, in 2003/2004 total steps was 14096.6 ± smn; 3135.0 steps/day and MVPA 42.1 ± smn; 14.3 min/day, and in 2016/2017 total steps was 13042.9 ± smn; 2786.6 steps/day and MVPA were 37.6 ± smn; 12.5 min/day. In both boys and girls, the total steps and MVPA on weekdays in 2016/2017 were significantly lower than those in 2003/2004.

Conclusions: This study suggested that total steps and MVPA of Japanese children were lower in 2016/2017 than in 2003/2004.
Associations of leisure screen time and physical activity with academic performance in Japanese children

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective. Recent studies have shown the potential effects of sedentary behavior and physical activity on not only physical and mental health, but also academic performance in children. Nevertheless, previous studies only focused on either sedentary behavior or physical activity. Examining the joint effects of both active and sedentary behaviors on academic performance will provide detailed insight into the patterns of these behaviors in relation with children's academic achievement. The present study examined the joint longitudinal associations of physical activity and leisure screen time with academic performance in a sample of Japanese children.

Methods. Elementary schoolchildren (n=261) aged 7, 10 years completed a survey assessing screen time and physical activity via a self-report questionnaire in 2016. Academic performance was evaluated a year later (2017) via the total grade point average of four school subjects. To determine the joint relationship of screen time and physical activity with academic performance, we used logistic regression analysis, adjusted for demographic characteristics, stratified by gender.

Results. A total of 261 children (134 girls) completed the survey (response rate: 65.7%). Children in the low screen time/low physical activity group had 2.04 (95% confidence interval: 1.11-3.78) times greater odds of having high academic performance compared with those in high screen time/low physical activity. Similarly, children in low screen time/high physical activity group had 2.75 (1.17-6.43) times greater odds of having high academic performance. Among boys, those with low screen time and high physical activity had 4.12 (1.19-14.24) times greater odds of high academic performance. No significant association was found among girls.

Conclusions. This was the first study to examine the joint effects of physical activity and leisure screen time with academic performance in a sample of Japanese children. Children with lower leisure screen time had greater odds of high academic performance after one year, regardless of their physical activity. Notably, these odds were even higher for those who engaged in high levels of physical activity as well as low screen time. These findings highlight the need for effective strategies to promote physical activity as well as decrease leisure screen time to improve the academic performance of Japanese children.
Challenges and opportunities to establishing healthy eating behaviours during weaning: a qualitative exploration

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Purpose: Taste experiences that occur with the introduction of solid foods in infancy can have a significant impact on future dietary habits. However, the circumstances in which parents undertake these feeding practices in this time period have not been investigated in depth. This study used a qualitative methodology to gain a better understanding of mothers' experiences of weaning a child, particularly in relation to the circumstances that favour establishing healthy eating habits and those that impede it.

Methods: Thirty-seven mothers of healthy infants 3-14 months with no previous history of allergies or food-related disorders were recruited. Eight semi-structured focus group discussions were conducted, transcribed and analysed thematically.

Results: Discussions revealed a number of opportunities and challenges to establishing a healthy relationship with food during weaning. Seven opportunities were identified: 1) acting as a role model for healthy foods; 2) using covert approaches to feed; 3) giving multiple opportunities to try a food; 4) "it starts in the womb"; 5) facial expressions not being indicative of food rejections; 6) food variety "so you don't have a fussy eater"; and 7) without food variety "things aren't going to work properly". On the other hand, challenges include: 1) offering a variety of foods only if mum likes them; 2) misconceptions about the definition of food variety; 3) "they have their own personality"; 4) being flexible about the feeding environment; and 5) distractions occurring during feeding.

Conclusions: To our knowledge, this is the first study to identify aspects of weaning that pose an opportunity or an obstacle in establishing positive eating behaviours in infancy. Mothers were mindful of their role in instilling a healthy relationship with food in their children and used strategies such as modelling and repeated food exposure. The importance of a diverse diet in infancy was acknowledged, although knowledge gaps exist in relation to its definition. Distractions were tactfully employed by mothers to assist feeding. Findings of this study have applications in developing interventions for nutritional education during weaning.
Parenting Healthy Habits in Children with Mental Health Disorders: Barriers, Facilitators and Practical Strategies

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Prevalence of pediatric mental health disorders (MHDs) is increasing globally. MHDs, which often include comorbid neurodevelopmental, anxiety and mood disorders, are associated with greater risk of poor dietary, physical activity (PA), screen-time, and sleep habits in youth, contributing to elevated lifetime chronic disease risk. MHD symptoms can present unique parenting challenges, such as competing priorities and reduced capacity to instill healthy habits. Given little data characterizing parenting of healthy habits in youth with MHDs, the objective of this study was to describe barriers, facilitators, and strategies to parenting healthy lifestyle behaviors in children and teens with MHDs.

Methods: Using a structured interview guide, three trained researchers conducted interviews with 24 parents of children with MHDs attending a Boston-area therapeutic day school serving K-10th. Participants were asked about parenting related to PA, diet, sleep, and/or screen use. Interviews were transcribed, double-coded using constant comparative methods, and summarized into themes using NVivo 11.

Results: Parents included 23 mothers and 1 father. Average age of the focal children with MHDs was 11.2 years (range: 8-15); most were boys (75%) and had multiple MHDs (88%) including autism spectrum disorder (50%), attention deficit-hyperactivity disorder (67%), anxiety (67%), and mood disorders (58%). Barriers to promoting healthy lifestyle choices included depleted parenting resources, child dysregulation, a lack of supportive programming available to children with MHDs, and medication side effects. Facilitators included specialized therapeutic options, accessible community and school programming, and parents' social capital. Effective parenting strategies included setting clear, often structural boundaries, using positive reinforcement, supporting child agency by presenting healthy choices, and use of role modeling to promote healthy habits. Almost one third of parents extensively discussed the role of pets or therapy animals as key to establishing and maintaining healthy routines, particularly PA and screen-time management.

Conclusions: Parenting healthy habits in children with MHDs is difficult, and undermined by competing demands on parenting resources. Parents of children with MHDs need tailored materials and specialized guidance on strategies to promote the development of healthy habits in this special population. Interventions should be developed that reach across multiple settings including home, schools and community organizations.
The contribution of snacks to overall diet quality among a racially/ethnically diverse population of boys and girls.

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Public health advocates are concerned by an observable increase in the frequency of snacks, total calorie intake per snack, and number of energy-dense, nutrient poor foods and beverages consumed as snacks that has occurred over the past several decades among children. There is a need to understand how snacking contributes to children's overall diet quality and to explore for potentially important differences across population subgroups. Thus, this study sought to 1) explore the contribution of snacks to markers of children's daily dietary intake, including total calories, Health Eating Index (HEI), whole food groups, macro- and micro-nutrients and 2) examine race/ethnicity and sex differences in the contribution of snacks to markers of daily dietary intake.

Methods: Children ages 5, 7 years old and their parents (n = 150 dyads) from six racial/ethnic groups (n = 25 from each; Black/African American, Hispanic, Hmong, Native American, Somali, White; 50% boys) participated in this study. Children's dietary intake data was collected via three 24-hour dietary recalls completed by the parents using the Nutrition Data Systems for Research; participants self-reported eating occasion type (breakfast, lunch, dinner, snack). A decomposition strategy was implemented to examine how snacking contributed to child dietary intake using conditional fixed effects estimators to model within-person variation the effect that snacking had on dietary intake. Dietary intake including all meal occasions was compared to intake less snacking occasions.

Results: Snacking was an important source of fruit and dairy, but also contributed to children's consumption of refined grains and sugar sweetened beverages. Very few vegetables were consumed as snacks. Removing snacking disadvantaged boys relative to girls on the HEI index, suggesting that boys are getting more nutrition from snacks than girls. Further, snacks contributed more to the diet quality of Native American and Somali youth as compared to youth from other racial/ethnic backgrounds.

Conclusions: In sum, findings suggest that snacks contribute positively to children's overall dietary intake. Further, findings highlight several important opportunities for intervention; in particular, snacks may provide an opportunity to increase children's daily consumption of vegetables. Further, interventions that seek to improve the quality of snacks consumed by girls are needed.
Czech translation and cross-cultural adaptation of the family eating and activity habits questionnaire

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Introduction: The Family Eating and Activity Habits Questionnaire (FEAHQ) was designed to evaluate the overall obesogenic environment in a family. The questionnaire was developed and validated in 1989, and revised (FEAHQ_R) in 2013. The questionnaire has been used as a tool for the assessments of family environment and behavioral factors that may predispose a child to weight-related problems, as well as the evaluations of interventions aimed at promoting a healthy lifestyle in Israel, the United Kingdom and the United States. We have decided to translate FEAHQ-R due to the lack of valid and reliable tools to measure these parameters in the Czech Republic.

Objective: To translate the English version of FEAHQ-R into Czech and to assess its suitability for use in a different language and socio-cultural environment.

Methods: Translation into Czech and FEAHQ-R cross-cultural adaptation was carried out according to the protocol in seven stages: (1) forward translation into Czech independently carried out by two native-speakers of the target language, the versions of the questionnaire CZ1 and CZ2, (2) arbitration of discrepancies by the expert panel, the version CZ3, (3) the back-translation carried out by a native speaker of English fluent in Czech, version EN1, (4) confrontation EN1 with the original questionnaire and expert panel assessment, (5) reviewing all the documents and developing version CZ4, (6) pre-testing and cognitive interviewing, (7) developing the final version of the questionnaire.

Results: FEAHQ-R, a 32-item self-report instrument, was translated into Czech and its clarity was verified on a sample of 10 families with children ages 6-12. Pilot verification has demonstrated good clarity of the final version questionnaire. The scoreboard for questionnaire evaluation was translated too.

Conclusions: The Czech version of the questionnaire is clear for the respondents. Additional work is needed to verify its psychometric properties.
What’s for lunch at school? Content and preferences of Dutch primary school children.

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective:
To investigate the current content of school lunch boxes of Dutch primary school children and to examine their preferences for different healthy school lunch concepts. To provide insights in their preferences differences between gender, class and migration background are investigated.

Methods:
This is a cross-sectional study among children from seven primary schools in the Netherlands. To investigate the content photographs of children's lunch boxes were taken. Preferences for healthy school lunch concepts were examined via a self-reported questionnaire in which six different concepts were presented (ranging from a hot meal on a plate to a packed sandwich). Preferences were measured on a five point Likert scale (ranging from a red smiley to a green smiley). Associations between children's preferences for the concepts and gender, class and migration background were examined with Chi-square tests.

Results:
A total of 639 children were included, with an average age of 9.9 (SD=1.2). The content of children's lunch boxes mostly consisted of bread (71%) with sweet bread toppings (47%), water (44%) or sugary sweetened beverages (44%). Few lunchboxes contained fruit (5.1%) or vegetables (6.0%). The school lunch concepts elicited mixed preferences among children. Most children were positive (green smiley) to neutral (yellow smiley) for the concepts "prepare your own sandwich" (80%), "healthy lunch from home" (78%), "hot lunch buffet" (74%), "hot meal on a plate" (72%), "soup or salad with bread" (71%) and "packed sandwich" (66%). Compared to boys, girls showed higher preferences for the concepts "hot meal on a plate" (p=0.009) and "prepare your own sandwich" (p=0.008). Children with a non-Western migration background showed higher preferences for the concepts "hot lunch buffet" (p=0.001) and "prepare your own sandwich" (p = 0.001) compared to children with a Western migration background.

Conclusions:
The current content of the school lunch boxes consumed by Dutch primary school children leaves room for improvement, especially regarding sugary sweetened beverages, fruits and vegetables. Preferences of children for the healthy school lunch concepts are mainly positive, although gender and migration background differences have to be taken into account when developing a healthy school lunch program.
High weight-for-length ratio is not associated with developmental outcomes in infancy

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Infants and toddlers with high weight-for-length (WFL) ratio experience poorer outcomes in the broad categories of motor and mental development (Cataldo et al., 2015). However, research has yet to explore the specific developmental domains in which these youth experience greater delays (e.g., gross motor versus fine motor delays). The current study examined whether infants with high WFL at 6 months are at greater risk for delays in the specific domains of communication, gross motor skill, fine motor skill, problem solving, and personal/social functioning at 9 months and 18 months of age.

Methods: Participants were 607 infants (63% Black; 90% public insurance) attending primary care visits at a United States children's hospital who were born at > 34 weeks gestation and had a WFL > 5th percentile. Anthropometrics and development were assessed during well-child visits and abstracted through a retrospective medical chart review. Caregivers completed the developmental screening tool Ages and Stages Questionnaire-3 (ASQ-3). Binomial logistic regressions explored whether WFL category (i.e., normal WFL, WFL > 85th percentile) was associated with greater risk for developmental delay in each domain while controlling for birth weight and gender.

Results: Twenty-seven percent (n = 162) of infants had a WFL > 85th percentile at 6 months of age, and 18% and 12% of infants were identified as at-risk for developmental delay in at least one domain of functioning at 9 months and 18 months, respectively. WFL category was not associated with delays at either 9 months (communication: Wald = .99, p = .32; gross motor: Wald = .08, p = .78; fine motor: Wald = 1.36, p = .24; problem solving: Wald = .78, p = .38; person/social functioning: Wald = 1.13, p = .29) or 18 months (communication: Wald = .25, p = .62; gross motor: Wald = .01, p = .93; fine motor: Wald = 2.56, p = .11; problem solving: Wald = .83, p = .36; person/social functioning: Wald = .45, p = .50).

Conclusions: Infants with high WFL were not more likely to be identified as at-risk for delays on a developmental screening measure. Intervention efforts for infants with high WFL may not need to target immediate developmental outcomes and rather should prioritize altering growth trajectories.
Maternal feeding dimensions of responsiveness and demandingness as predictors of low-income preschoolers’ eating self-regulation: a longitudinal analysis

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Background: Research supports the role of parent feeding styles on the development of children's eating behavior, including the ability to self-regulate eating. However, previous studies have explored feeding styles using a person-centered approach and have relied primarily on parental self-report. The objective of this study was to examine the relation between maternal feeding responsiveness and demandingness with child eating self-regulation over time, using both mother-reported and observational methods for assessing maternal feeding dimensions and child eating self-regulation.

Methods: A total of 138 low-income Latina mothers and their preschool-aged children were observed during a buffet meal in a laboratory setting on two separate occasions 18 months apart. Videotapes were coded for a wide range of maternal feeding behaviors and strategies. At each time point, mothers completed the Children's Eating Behavior Questionnaire and the Caregiver's Feeding Styles Questionnaire, and children completed an eating in the absence of hunger (EAH) task. Hierarchical regression was used to assess associations between maternal feeding responsiveness and demandingness with measures of child eating self-regulation.

Results: Maternal self-reported feeding demandingness was inversely associated with child food responsiveness and enjoyment of food 18 months later. There was a significant interaction between observed responsiveness and demandingness in predicting children's enjoyment of food 18 months later. Children of authoritarian mothers showed the lowest enjoyment of food. There was no significant association between reported or observed maternal feeding dimensions and EAH, and no interaction effects were found.

Conclusion: These results suggest that maternal feeding responsiveness and demandingness are related to children's ability to self-regulate their eating over time. Other studies should continue the use of both objective and parent-report measures and a longitudinal design to understand the influence of parental feeding on child self-regulation of intake.
Effects of a family- and community-based diet and physical activity intervention on home availability of fruit, vegetables, and sugar-containing foods in low-income, primarily Hispanic households

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Assess the efficacy of a family- and community-based diet improvement and physical activity promotion intervention for low-income, primarily Hispanic households on home availability of fruit, vegetables, and sugar-containing foods.

Methods: One adult parent (M=38.2±smn;6.7 years old; 96.2% Hispanic) and one child (M=9.3±smn;1.7 years old) from the same household were randomized to the Athletes for Life (AFL) intervention or a wait-list control group. AFL was delivered at a community center in a Southwestern U.S. metropolitan area in twice-weekly 90-minute sessions with concurrent activities for parents and children. The parent curriculum included behavioral modification strategies for diet improvement, emphasizing increased fruit and vegetable consumption, reduced sugar intake, with modifying home food availability as a strategy for diet improvement. Trained research assistants assessed home food availability in 131 households (67 control, 64 intervention) using a modified version of the Home Food Inventory, capturing the number of types of vegetables, fruits, low- and high-sugar breakfast cereals (separately), prepared desserts, candy, low-sugar beverages, and sugar-sweetened beverages available in the home. Intervention effects (i.e., between-group differences in change) were examined in Poisson mixed models via Condition (control vs. intervention) x Time (pre- vs. post-intervention) interaction terms, adjusting for study cohort, household size, and number of days since last shopping trip.

Results: Groups differed significantly on pre- to post-intervention changes in types of vegetables available (8.39 to 10.38 for intervention; 8.69 to 8.55 for control; p=0.013); types of vegetables, excluding potatoes (7.70 to 9.65 for intervention; 7.92 to 7.83 for control; p=0.014); and types of prepared desserts available (from 2.85 to 1.75 for intervention; from 2.42 to 2.52 for control; p= 0.004). The effect for candy approached statistical significance (1.41 to 0.94 for intervention; 0.78 to 0.80 for control; p=.096). No other effects approached statistical significance.

Conclusions: Encouraging changes towards a healthier home food environment as part of the AFL intervention resulted in participants increasing the types of vegetables and reducing the types of prepared desserts available in the home. Future research is needed to assess if promoting a healthy home food environment is conducive to dietary improvements.
Development of a food parenting questionnaire in a low-income Latina sample: The food parenting inventory

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective:
No single questionnaire simultaneously assesses constructs considered important in the current food parenting literature. Vaughn and colleagues offered a conceptual map of food parenting practices covering three higher order constructs. Our purpose was to develop a questionnaire assessing a variety of practices within one instrument supporting Vaughn's concept map.

Methods:
Data were collected from low-income Latina mothers of preschoolers in an urban area in Southern US and rural Pacific Northwest US (n = 254). Mothers completed questionnaires including items for the Food Parenting Inventory (FPI), Children's Eating Behavior Questionnaire (CEBQ), and Caregiver's Feeding Styles Questionnaire (CFSQ).

Confirmatory Factory Analysis (CFA) was run for three a priori domains: encouraging trying new foods (n = 16) resulting in four subscales, mealtime structure (n = 38) resulting in seven subscales, and external control (n = 19) resulting in five subscales. Reliability was examined through mean inter-item correlations for each subscale. Validity was examined by correlations between resulting FPI subscales and child eating behaviors from the CEBQ. MANOVA examined differences between four maternal feeding styles from the CFSQ and the FPI subscale scores.

Results:
CFA showed good fit for the food parenting domains. Items loaded highly on factors and good internal consistency was established through inter-item correlations ranging from .26 to .70. For validity, more than half of the correlations were significant ranging from -.41 to .40. For example, four of six possible correlations between highly controlling practices (external control domain) and the food avoidance subscales of the CEBQ were significant. In addition, mothers with low responsiveness feeding styles (authoritarian and uninvolved) scored highest on indifferent feeding (mealtime structure); authoritative mothers were highest on child involvement in food preparation (mealtime structure), and authoritarian mothers were highest on food as a reward (external control). Uninvolved mothers were least likely to encourage trying new foods (all four domain subscales).

Conclusion:
Findings suggest evidence for reliability and validity of the FPI among Latina families with preschoolers. The questionnaire advances the field of food parenting by assessing neglected constructs playing an important role in the development of child eating behaviors.
School nutrition professionals’ perceptions of fruit and vegetable marketing materials for school-aged youth

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: When marketing healthy foods to youth, governmental programs and non-profit organizations often compete with large corporations that concurrently market unhealthy foods. Because of limited budgets, most marketing materials to promote healthy foods to youth, particularly in schools, remain virtually untested. We sought to examine nutrition professionals' perceptions of existing fruit and vegetable (FV) marketing items targeted to school-age youth.

Methods: A representative sample (n=64) of existing FV marketing items (i.e., posters, table tents, and announcements) from key organizations (e.g., USDA, Team FNV) were tested for various behavioral and visual aspects. School nutrition professionals (n=1635) across the US completed an online survey to rank likability, audience appropriateness, and ability of items to evoke FV selection and intake. Each professional evaluated three randomly selected marketing items; each FV item was evaluated by at least 35 respondents.

Results: Respondents were predominantly female (88.7%), white (83.3%), middle-aged (mean=50.0±smn;10.2 years), with over 10 years in current position. Overall, school nutrition professionals did not rank the materials highly, with average scores (out of 10) of the marketing items ability to influence students to eat FVs, take FVs, and likability of the materials was 5.3±smn;8, 5.2±smn;8, and 5.7±smn;1.0, respectively. On average posters ranked the highest, and announcements tended to rank the lowest. Common components that school professionals liked about materials included: use of humor, color, and common foods. Common components that school professionals disliked about marketing materials included: lack of prompts/nudges/reminders/call to action, and too much text. Respondents also struggled to identify target audiences of the materials, with most items rated relatively equally appropriate for primary and secondary grade levels. Respondents had difficulty identifying whether the purpose of items was to encourage students to take, consume, both, or neither FVs. Most items (96.8%) were rated as easy for youth to understand.

Conclusions: Existing freely available materials for schools to market FVs are not well perceived by school nutrition professionals. More innovation is needed to develop quality FV marketing materials with clear messages that effectively promote selecting and consuming FVs. Rigorous testing on how marketing items influence student FV consumption is needed.
Addressing the challenges of delivering an online parent curriculum as part of a childhood obesity prevention program with low income families

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Objective:
Parenting practices that hinder children's ability to respond to internal cues of hunger and fullness can contribute to childhood obesity. Researchers have posited that family focused programs are important for the prevention of child obesity because parents influence the development of child eating patterns. Despite the popularity of delivering such programs online, significant challenges arise in implementing these programs with low-income, low-literate audiences. An online parental feeding curriculum was developed and added to an established nutrition education program for low-income families, Eating Smart Being Active, which is widely used by the Expanded Food and Nutrition Education Program (EFNEP) in the United States (US). The objective will be to describe the process we used to develop and implement online videos, games/activities, and infographics to deliver parental feeding content and messages to low-income parents of young children between the ages of 2 and 8 years.

Methods:
The development of the program materials was guided by self-determination theory to encompass the following concepts: 1) strategies for planning grocery shopping with children; 2) strategies to encourage acceptance of new foods; 3) understanding children's portion sizes; 4) explaining satiety; 5) establishing mealtime routines; 6) increasing parental awareness of environmental cues to eat; and 7) recognizing parent and child roles in feeding. Videos, online activities/games, and infographics were developed in English and Spanish and formatted to be viewed primarily through a smartphone platform.

Results:
Numerous challenges emerged in a series of pilot implementations of the program at various locations. These challenges were addressed by developing: 1) a user-friendly interface; 2) clear instructions and processes to provide access to the online materials for a low-literate audience; 3) processes to ensure effective communication between participants, in-class educators, and the online facilitator; and 4) processes for tracking participant involvement and engagement.

Conclusions:
The challenges, the specific steps taken to address them, and the successful implementation of this program in a randomized control trial conducted in six EFNEP regions in two US states involving approximately 550 low-income participants will be described.
Increasing parent and child consumption of calcium: A randomized controlled trial

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Purpose: Adequate consumption of calcium is crucial for bone and growth development in children. However, 37% of Canadian children between 4 and 9 years of age fail to consume the recommended dietary allowance (RDA) of calcium. Over 70% of young children's food choices and consumption is determined by their parents. Surprisingly, no interventions have targeted parents of children who are underconsuming calcium as a means of increasing children's calcium consumption. The aim of this research was to compare the effectiveness of a calcium-specific intervention targeted towards parents in increasing calcium consumption in children, compared to a generic healthy diet intervention.

Method: Parent and child dyads were recruited from across Canada. Eligible dyads (child consuming less than the RDA of calcium) were randomly assigned to one of two arms: calcium-specific messages for the parent ([CS]; n=58), or generic educational messages ([GM]; n=75). Both conditions received mailed out material at weeks 0, 8, 16 and 34. The CS intervention incorporated behavioural strategies for increasing calcium consumption in the household, discussed the importance of parental role modelling, and provided information on expected outcomes from calcium consumption. The GM intervention incorporated Canada's Food Guide and generic healthy diet information. Parents and children in both conditions were asked to set a calcium intake goal based on RDA. Total calcium intake in the parent and child were assessed at weeks 0, 34 and 52 with 3-day food diaries.

Results: For parents there was a main effect of time, F(2,124)=4.38, p=.02, such that calcium intake increased following the intervention and was maintained at 12-month follow-up, with an increase of 170mg and 80mg for CS and GM respectively from baseline to 12-month follow-up. Parents' calcium intake was significantly higher in the CS compared to the GM condition (p=.04). For children there was a main effect of time, F(2,124)=9.88, p<.001, with increased calcium intake maintained at 12-month follow-up (increases of 224mg and 199mg in CS and GM, respectively). Children's calcium intake did not differ between conditions.

Conclusions: These findings suggest parents are a potent medium through which to promote calcium intake in children aged 4 to 9 years.
Exploring the me’akai Tongan children eat in Ha’apai using wearable cameras

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective
This research examines the food consumed by Tongan children in Ha'apai using wearable cameras. It also explores the source of that food. It is one of the first studies to document actual food consumption in real time and an innovation in nutrition research in the Pacific.

Methods
Thirty-six randomly selected 11-year-old children from the outer Tongan island of Ha’apai used wearable cameras to record their lives for three days. Images were analysed to assess the participants' food consumption according to a new data analysis protocol for Tonga. Coders achieved 90% concurrence with model answers on a test dataset of 100 images before coding commenced. Tongan researchers led the research in partnership with the government of Tonga.

Results
Overall, children were observed to have consumed a mean of 4.7 (95% CI 3.3, 6.7) non-core and 2.2 (95% CI 1.8, 2.9) core foods per 10h day. Children were observed eating an average of 5.8 (95% CI 4.3 to 8.3) snacks per day, 4.0 (95% CI 2.5 to 6.5) non-core and 1.8 (95% CI 1.3 to 2.6) core food. Unhealthy snack foods such as raw noodles and chippies were the most common (1.5 (95% CI 1.1 to 2.1)) food type consumed by the participants daily. The most common sources of food were the home, other children and the supermarket. On average, we observed one product purchase per day per child, nearly all for non-core foods 0.9 (95% CI 3.3 to 6.7).

Conclusions
This research adds to the very limited literature on food consumption of children in Tonga, one of the countries with the highest rates of obesity and non-communicable diseases globally. The findings support efforts by the Tonga government for the implementation of a healthy school food policy, maintenance or increases in junk food taxes and initiatives to ban the importation of junk food. This study has relevance for other Pacific Island nations and all nations concerned with addressing obesity.
Communication about food and nutrition within the parent-young child dyad

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Purpose: The impact of communication about food and nutrition on the development of healthy behaviors in young children provides a potential area for intervention in the development of a healthy lifestyle. Therefore, the purpose of this study was to describe the content, context, and purpose of communication about food and nutrition between the parent and young child and develop a theoretical model of these interactions.

Methods: Twenty parents of children aged three to nine years old completed a semi-structured in-person interview that was developed to explore communication about food and nutrition within the parent-child dyad. Interviews were transcribed and coded using open coding, and a substantive theory of communication about food and nutrition was developed using grounded theory.

Findings: A theoretical model describing food and nutrition communication within the parent-child dyad was developed. Three themes including purpose, content, and utilizing connections emerged. The purpose of communication included encouraging or discouraging consumption, increasing the variety of foods, and balance (consumption of food items from all food groups). The content of communication was divided into two categories, content related to the food, or the utilization of food in the body. In food-related content, messages included properties of food items such as color, taste, texture, nutrient value, and how food items can be prepared. Alternatively, communication related to the body included how food items are utilized in the body, or how the consumption of food items can influence how the body feels. Parents often described making connections, such as a relationship to another food item, or something relevant to the child, when presenting new information to their child. The child's response to the content of communication creates a feedback loop back to the parent and affects future communication.

Conclusions: This description of communication about food and nutrition in the parent-child dyad offers new insight into the development of eating behaviors in young children and provides a potential mechanism for intervention to promote healthy eating behaviors. Based on these findings, the development of consistent, relevant, food and nutrition-related messages for parents could support the development of lifelong healthy eating behaviors.
Less screen time and more physical activity is associated with more stable sleep patterns among Icelandic adolescents

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Emerging evidence suggests that inconsistent sleep may affect physical and psychological health. Thus, it is important to identify modifiable determinants of sleep variability. Screen time and physical activity are both thought to affect sleep, but studies of their relationship to sleep variability using objective measures are lacking. We examined cross-sectional associations between these variables in mid-teen adolescents using objectively measured sleep and activity.

Methods: Wrist-worn accelerometers were used to measure one week of sleep and activity in 315 tenth grade students (mean age 15.8y) from six elementary schools in Reykjavik, Iceland. Participants reported their daily hours of screen time. Regression analysis was used to explore associations of screen time and physical activity with nightly variations and weekend shifts in duration, quality, and timing of sleep, adjusting for DXA-measured body fat percentage, parental education, and physical activity or screen time.

Results: Screen time was associated with nightly variations in duration and timing of sleep, especially in bed time. Physical activity was inversely associated with nightly variations in number of awakenings and rise time. In general, both screen time and physical activity were associated more strongly with nightly variations than weekend shifts in sleep parameters. Boys had less stable sleep patterns and more frequent associations between screen time/physical activity and sleep variability parameters.

Conclusions: Less screen time and more physical activity were independently associated with less sleep variability among mid-teen adolescents. Our results indicate that encouraging youngsters towards an active lifestyle with limited screen use may be important to achieve more consistent sleep.
Canada’s 2018 report card on physical activity of children and youth: leading or lagging in comparison to the Global Matrix 3.0 Findings?

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Purpose: Canada was one of 49 participant countries in the Global Matrix 3.0 (GM3) of physical activity report card grades for children and youth, released in November 2018 in Adelaide, Australia. This analysis ranks Canadian children and youth relative to their peers in other GM3 countries on several indicators of physical activity. Methods: Canada and 48 other countries from six continents developed physical activity report cards using a standardized grading system to assign evidence-informed, rank-order letter grades (A+ to F) to 10 indicators of child and youth physical activity (Overall Physical Activity, Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviours, Physical Fitness, Family and Peers, School, Community and Environment, and Government). The letter grade assigned for a given indicator within a country report card was a function of the proportion of children and youth meeting the predefined benchmark(s) (A = 80-100%, B = 60-79%, C = 40-59%, D = 20-39%, F = 0-19%). Rank-order numeric scales were also computed using the letter grades from all or select indicators to create three aggregate scores for each country (overall aggregate score, behavioural aggregate score, settings of influence aggregate score). Results: Canada had sufficient evidence available to grade all 10 indicators and ranked 18/49 (65th percentile rank) on the overall aggregate score with mostly European (10) and Asian (4) countries in the top 17. Canada ranked 29/49 (43rd percentile rank) on the behavioural aggregate score and 14/49 (73rd percentile rank) on the settings of influence aggregate score. Among five of the indicators, Canada ranked from the front (Organized Sport and Physical Activity, Community and Environment) to the middle (Family and Peers, School, Government) of the pack. Canada ranked near the back of the pack for most of the remaining indicators (Active Transportation, Physical Fitness, Active Play, Overall Physical Activity and Sedentary Behaviours). Conclusions: Relative to other countries in the GM3, Canada stands out for the amount of physical activity data available. Canada is also among the leaders for Organized Sport and Physical Activity, and Community and Environment; however, Canada is lagging behind for many other indicators, especially the behavioural indicators.
Are parents accurate reporters of their child’s height, weight, and calculated Body Mass Index? And does their accuracy change between pre- and post-intervention?

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Online parent-reported child height and weight may be an efficient and inexpensive method of collecting child anthropometric data for both research and clinical practice. However, limited studies have examined parents' accuracy in reporting child height and weight via web-based approaches. The study aimed to determine the accuracy of online parent-reported child height, weight, calculated Body Mass Index (BMI) and weight category before and after participating in a 3-month web-based child obesity intervention.

Methods: The study uses data from a 3-month pilot randomized controlled trial in parents and their 4-11 years old children. Parents reported their child's height and weight via an online survey at pre- and post-intervention before their child's height and weight were objectively measured by a researcher at both time points (i.e. baseline and 3 months). Parent-reported data were compared to researcher-measured data using Lin's concordance correlation coefficient (rho c; ranges from 0 (poor) to 1 (perfect) concordance) which measures both correlation and agreement, Cohen's kappa coefficient, and multiple logistic regression models.

Results: Data from 42 families at baseline and 35 families (83%) at 3 months were analysed. Parents' accuracy was moderate in reporting child height (rho c=0.94), substantial in reporting child weight (rho c=0.96), and poor in calculated child BMI (rho c=0.63). Parents under-reported child height by 0.9cm and 0.2cm and weight by 0.5kg and 1.6kg at pre- and post-intervention, respectively. Overall inter-rater agreement of child weight category was moderate at baseline (k=0.59) and 3 months (k=0.54). There were 31 (74%) and 23 (70%) parents who reported child height and weight that correctly estimated the child weight category at pre- and post-intervention, respectively.

Conclusions: The majority of parents in the current study were accurate in reporting the height and weight of their 4-11 years old children, and correctly estimated their child's weight status at pre- and post-intervention. Online parent-reported child height and weight may be a valid method of collecting child anthropometric data ahead of participation in web-based intervention and clinical telehealth programs. Future studies with larger sample sizes and repeated measures over time in the context of eHealth and web-based research are warranted.
Influence of preschooler and parent nutrition education on skin carotenoid scores of Mexican-heritage children during an obesity prevention intervention

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: The purpose of this study was to determine the effects of preschooler and parent nutrition education on changes in skin carotenoid scores in Mexican-heritage children, ages 3-8 years. Despite public health efforts to curb childhood obesity, Latino children continue to be at higher risk of obesity than non-Latino white children.

Methods: To address health disparities, a three-year, quasi-experimental, community-based, obesity prevention intervention was conducted from 2012-15 in California's Central Valley. Two rural school districts were randomly assigned to either: 1) an intervention group where families received monthly vouchers to purchase fruit and vegetables; parent and child nutrition education; and a school-based, physical activity program or 2) a comparison group (education unrelated to nutrition). As a biomarker for fruit and vegetable consumption, skin carotenoid intensity scores were measured in the children four times from 2013-15 using resonance Raman spectroscopy. Analysis of variance was used to examine the effect of preschool nutrition education (1=yes, 0=no) on change in carotenoids in the intervention children (n=225).

Results: Having participated in preschool nutrition education was independently related to increase in carotenoid scores (βa;=4347, SE=1524, p=0.0005), controlling for child's age, mother's attendance at nutrition classes, acculturation, and income (F-value=28.3, R2=0.43, p-value =0.001).

Conclusions: Compared to children who received nutrition education starting in K-2nd grades, preschoolers showed greater improvement in a biomarker of fruit and vegetable consumption. Early intervention starting in preschool is a promising strategy to improve dietary outcomes and reduce disparities in Mexican-heritage children.

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The impact of a parent-focused paediatric overweight/obesity intervention on parent self-efficacy and children’s body composition outcomes

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Purpose: Interventions that enhance parent self-efficacy (SE) have been correlated with reductions in body mass index (BMI) and improved health behaviours in children. The purpose of this study was to examine the impact of a group-based, parent-focused childhood obesity intervention on parents' SE for enacting child health behaviours and children's BMI-z.

Methods: C.H.A.M.P. Families was a 13-week community-based program delivered to parents of children with overweight or obesity (aged 6-14 years, BMI = 85th percentile). The intervention involved 8 group-based (parent-only) education sessions plus 8 home-based activities, and 2 booster sessions for families. Child BMI-z was measured using researcher assessed height and weight and parent-reported sex and date of birth. Parents' SE was measured using a 34-item "Parental Self-Efficacy Questionnaire" to generate a composite score. Outcomes were measured at baseline, mid-intervention, post-intervention, and 6-month follow-up. Visual analysis of the level (i.e., change scores from baseline to post-intervention, and post-intervention to 6-month follow-up) and trend (i.e., slope from baseline to 6-month follow up) of data points was conducted using a single-subject design with inter-subject replication.

Results: Nine parents (Mage= 41.5 years, SD = 6.1) completed the study, most of whom were female (n = 8), White/Caucasian (n = 7), and married (n = 6). From baseline to post-intervention, 8 of 9 children experienced improvements in BMI-z (MLevel = 0.07, SD = 0.10) and 8 of 9 parents experienced improvements in SE (MLevel = 1.05, SD = 0.80). A small rebound effect was observed in five participants from post-intervention to 6-month follow-up for both child BMI-z (MLevel = 0.00, SD = 0.10) and parents' SE (MLevel = 0.30, SD = 1.18). An examination of trends across the study period showed positive outcomes for most participants (n = 6) regarding BMI-z (MTrend = 0.01, SD = 0.01) and parent SE (MTrend = +0.06, SD = 0.12).

Conclusions: Preliminary findings suggest that the C.H.A.M.P. Families intervention had a small, positive effect on both child BMI-z and parent SE, but that improvements were not maintained 6 months post-intervention. Implications and considerations for future interventions and single-subject designs within the childhood obesity field will be discussed.
Inter-generational park use and active co-participation in suburban parks: An observational study using SOPARC

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Children and families (SIG)

Globally, 1 in 4 adults are not sufficiently active, with more than 80% of the world's adolescent population insufficiently active. Suburban parks offer opportunities for all ages to be active and engage across generations, yet are often under utilized.

OBJECTIVE: To quantify the level of inter-generational park use and active co-participation in 12 suburban parks located in SE Queensland, Australia.

METHODS: Systematic direct observations using the System for Observing Play and Recreation in Communities (SOPARC) were conducted in 12 suburban parks purposively sampled from a local government database. Assessments were modified to record inter-generational interactions, defined as two or more people of different age groups interacting by talking, touching, or playing. Observations were conducted on two weekdays and two weekend days, and included four time periods per day (two AM and two in the PM).

RESULTS: Data collectors completed 192 visits to the parks, completing 3,194 scans of the designated target areas. A total of 4,245 park users were observed: N=651 early morning (7:00, 8:00 am); N=1,094 mid-morning (9:00, 10:00 am); N=1,084 mid-afternoons (3:30, 4:30 pm); and N=1,406 late afternoons (5:30, 6:30 pm). 50.2% of park users were adults, 37.9% children, and 11.9% seniors. The age group composition of park users differed by observation period and day of week. For children, park use was greater on weekends during afternoons, while seniors were more likely to use parks on weekdays during the early morning hours. When observed, 26.9% of park users were sedentary, 24.4% were standing, 32% were walking or engaging in moderate PA, and 16.6% were engaging in vigorous PA. PA levels were highest in the early morning periods, with > 70% park users engaging in moderate-to-vigorous PA. When observed, only 19% of park users were engaged in inter-generational interactions, with fewer than 6% co-participating in active recreation or play. Co-participation was more likely to occur in smaller parks in the mid-morning.

CONCLUSIONS: Across the 12 suburban parks observed, the prevalence of inter-generational park use and active co-participation was generally low. The development of evidence-based design guidelines for active inter-generational parks is a research priority.
Factors influencing parental safety perception, school travel mode and satisfaction with school travel in primary school children

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Motive
Several studies indicate that the amount of active travel among children is decreasing worldwide, including in the Netherlands. Children increasingly spend their journeys to school being transported by car, which is an unfavorable development that negatively influences children's health and well-being. As it is imperative to reverse the decrease in active travel among children, a better understanding in the influencing factors of school travel mode is required.

Objective
Using a social-ecological approach, factors of several layers such as the person and household, the social environment and the built environment have been found to influence transport mode and participation in active travel of children. In addition, the attitude that parents have towards the transport modes of their children appears to be an important indicator for active travel among children. The current study will search for empirical evidence on the determinants of children's active school travel specific to the Netherlands. Additionally, the manner in which the parental safety perception relates to this will be looked into as well as the relation between school travel mode and children's subjective well-being (satisfaction with school travel).

Methods
In order to study these relationships, survey data were collected from 660 children and their parents of 14 primary schools in the Netherlands in grades 5 - 8 (7 - 12 years). The data were analyzed using three subsequent multilevel regression analyses to predict parental safety perception, school travel mode choice, and children's satisfaction with school travel as a function of personal and household characteristics, and characteristics of the social and built environments.

Results
Findings show that parental safety perceptions are related to the age of the child, perceptions of neighborhood infrastructure and social cohesion. Transport mode choice is influenced by travel distance, weather, and parental commute mode. Satisfaction with school travel is higher when it is sunny, when traveling with a friend and when travelling by an active transport mode.

Conclusions
These insights can be used by policy makers and school management in the development of interventions to increase active travel among primary school-going children, which may by extension improve their well-being and health.
Associations of screen viewing time at age 2-3 years with abdominal adiposity in 4.5-year-old children from Singapore

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Screen-viewing time (SVT) occupies a prominent and increasing place in young children's leisure activities, and past research has demonstrated that SVT is associated with overall adiposity. In a multi-ethnic cohort of Asian children from Singapore, we assessed overall and sex-specific associations of total and device-specific SVT at ages 2 and 3 years with abdominal adiposity at age 4.5 years, as measured by magnetic resonance imaging (MRI).

Methods: Parents of the Growing Up in Singapore Towards healthy Outcomes (GUSTO) cohort reported the time their children spent viewing television (TVT), handheld devices (HDVT) and computer screens at ages 2 and 3 years. Total and device-specific SVT at 2 and 3 years were averaged. From water-suppressed abdominal MRI (echo-planar fast spin echo) images acquired at 4.5 years, an automated segmentation algorithm was used to quantify subcutaneous (SAT) and internal adipose tissue (IAT) compartment volumes. Manual segmentation was used to further separate SAT into deep (DSAT) and superficial compartments (SSAT). The associations of SVT with abdominal adipose tissue volumes were examined by multivariable linear regression, adjusted for potential confounders including baseline adiposity.

Results: In the overall sample (n=307), the median [interquartile range] hours/day spent in total SVT, TVT and HDVT were 2.42 [1.34, 3.71], 1.50 [0.75, 2.50] and 0.57 [0.25, 1.11], respectively. Total SVT was positively associated with abdominal adiposity (SSAT 14.85 [95% CI 3.73, 25.96], DSAT 11.10 [2.74, 19.43], IAT 3.94 [-0.48, 8.36] mL per hour/day increase in total SVT). Sex-specific analyses showed associations in boys (SSAT 22.95 [8.68, 37.22], DSAT 16.69 [6.54, 26.84], IAT 7.40 [1.66, 13.14] mL per hour/day increase in total SVT), but not in girls (p for interaction = 0.028). HDVT was strongly associated with abdominal adiposity in boys, whereas TVT was not associated with abdominal adiposity in any of the models.

Conclusion: Greater total SVT (in particular, HDVT) was associated with increased volumes of all abdominal adipose tissue compartments in boys, but not in girls. Additional studies are necessary to confirm our findings and to explain sex- and device-specific associations. Such research may help to develop more effective public health strategies to prevent childhood obesity.
A music mat exercises in children and their parents: Effects on sedentary behavior, physical activity, and exercise adherence

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Purpose:
Exercises on a recently innovated music mat (Taction Enterprises Inc., LA, USA) were developed to promote 4-6-year-old children's and their parents' physical activity (PA) and decrease sedentary behavior (SB) in the home environment.

Methods:
In this within-subject study, fifteen families who were recruited in Central Finland 2017-2018 performed eight weeks exercise intervention using a music mat. SB and PA were assessed objectively by tri-axial hip-worn accelerometer (Hookie AM30, Traxmeet Ltd, Espoo, Finland). Exercise activity and adherence were assessed by exercise diaries and questionnaires. The statistical methods employed an intention-to-treat and linear mixed effects model design. The associations between children's musical background and exercise adherence were examined using chi-square test.

Results:
Children (n=14) used music mat an average 219 minutes (min 10, max 505) during the intervention period. Altogether, five children out of 14 used the music mat as instructed throughout the intervention, and nine children less than instructed. However, 11 out of 14 children used the mat during the last intervention week. Regarding children and mothers (n=14), any statistically significant differences in the PA or SB outcomes over time were not found. Among fathers (n=8), in turn, the reduction of sedentary behavior was statistically significant (p=0.031), but none of the fathers used the music mat as much as instructed. Further, an individual daily variation was larger than an average change over time both in children and their parents. Those children who had music-based hobbies had higher exercise activity and adherence to an exercise program with the music mat than those without music-based hobbies.

Conclusion:
Based on these results, the use of music mat in the home environment does not promote PA or reduce SB among 4-6-year-old children and their parents. However, music mat exercises might be a good addition to daily PA and a way to break a prolonged sitting.
Potential associations of physical activity between family members: A systematic review.

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: To investigate interrelationship between levels of physical activity of parents and their child/children.

Methods: A systematic review of the literature, using electronic bibliographic databases were searched in March 2018. After removing the duplicates, all references were imported into Covidence for further screening. Abstracts of studies retrieved using the search strategy were screened independently by two review authors to identify studies that potentially met the inclusion criteria. Inclusion criteria were; studies must report findings for at least one parent/child pair. Associations between parents’ and children's levels of physical activity must be reported. The child's/children's physical activity must be measured objectively by accelerometer or pedometer. The parents' physical activity may be measured either objectively by accelerometer or pedometer or subjectively by self-report. If the abstract suggested that a study was eligible, a full text copy of the article was obtained. The two independent review authors screened the full text articles and decided whether they met the inclusion criteria. Any disagreement over the eligibility of particular studies was resolved through discussion with a third reviewer. A tool for data extraction has been developed. The quality of the papers will be assessed according to a modified version of the ROBINS-I tool and the ROBINS-E tool.

Results: A total of 4205 articles were identified through database searching. After removing duplicates 2268 papers were remaining. Seven additional papers were identified through other sources. After screening of abstract, 74 papers were selected for full text screening. A total of 42 papers met the inclusion criteria for the current review. Results will be presented at the ISBNPA conference followed by a scientific paper.
Active transportation among children and youth: A 49-country comparison

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Purpose: In the context of the global crisis of physical inactivity among children and youth, active transportation represents an opportunity for regular and sustainable physical activity, with multiple benefits for health. The objective of this study was to compare the prevalence of active transportation among children and youth from 49 countries at different levels of development. Methods: This study used the data reported for the active transportation indicator in the Report Cards on physical activity for children and youth from the 49 countries that participated in the Global Matrix 3.0 initiative. Estimates of the prevalence of active transportation were calculated at the global level and by groups of countries according to the Human Development Index (HDI) (low and medium vs. high vs. very high). The estimates were based on the grades reported in the Report Card of each country. Countries reported active transportation using different tools and time frames. Results: Data on active transportation prevalence were available for 47 of the 49 countries. The global average grade was a "C", indicating that about half of children and youth engage in active transportation (47% to 53%). Similar proportions were observed in high HDI countries where the average grade was "C". Slightly higher proportions were observed in low and medium HDI countries, where the average grade was "C+" (54% to 59% engaged in active transportation), and a lower proportion was observed in countries with a very high HDI, where the average grade was "C-" (40% to 46% engaged in active transportation). The highest prevalence estimates were reported by Japan, Nepal and Zimbabwe, all of which reported an "A-" grade (80% to 86%). The lowest prevalence was reported by Chile, where an "F" grade was assigned (less than 20%). Conclusions: Approximately half of children and youth are enjoying the benefits of active transportation globally. Compared to other domains of physical activity, this prevalence is not negligible. Wide variability between countries was observed. The gradient of differences between HDI groups suggests the need to design context-specific interventions to promote active transportation and make it a desirable and sustainable behavior.
Untapped resources: 10- to 13-year-old primary schoolchildren’s views on additional physical activity in the school setting: a focus group study

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective:
Schools are considered ideal venues to promote physical activity (PA) in children. However, a knowledge gap exists on how to adequately integrate PA into the school day and in particular, on the preferences of children in the late years of primary school, where, PA tends to decline. Therefore, the aim of our qualitative study was to gain comprehensive insight into 10, 13-year-old children's perspectives on how to increase PA in the primary school setting.

Methods:
We conducted nine focus groups, five with girls (n=32) and four with boys (n=20), with children attending the final two grades of primary school in the Netherlands. We used inductive thematic analysis to analyze the data.

Results:
The results showed that children were enthusiastic about additional PA in school. Children suggested various ways to increase PA, including more time for PA in the existing curriculum, e.g., physical education (PE), recess, and occasional activities, such as field trips or sports days; school playground adaptation; improving the content of PE; and implementing short PA breaks and physically active academic lessons. Children emphasized variation and being given a voice in their PA participation as a prerequisite to keep PA enjoyable and interesting in the long term. Furthermore, children identified teachers as both a key barrier and facilitator of their participation in PA. Finally, making efforts to accommodate all children and their different preferences was considered as important.

Conclusions:
Children have concrete ideas, acknowledging the challenges that accompany integrating additional PA in school. We therefore recommend actively involving children in efforts to increase school-based PA and to make "additional PA in school" a shared project of teachers and students. Overall, our study provides a comprehensive overview of children's voices regarding additional PA in school, which could be used to inform the development of future PA interventions aimed at increasing the activity levels of children in primary school.
The importance of school lunches to dietary intake in Sweden — findings from a nationally representative dietary survey

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**Children and families (SIG)**

Objective: To describe the composition of school lunches eaten and the contribution of school lunches to students' total dietary intake on weekdays. In addition, to investigate how these intakes differ by sociodemographic factors.

Methods: Students in grade 5 and 8 (n=2002) who participated in the Swedish national dietary survey Riksmaten ungdom 2016-17 constitute the study population. Foods and drinks were self-reported using a web-based dietary assessment method. Mean intake of energy, absolute and energy-standardized intakes of nutrients (nutrient density) and food groups were calculated for the school lunch and the rest of the day. The relative proportion of each student's total daily intake covered by the school lunch and energy density of the school lunch (kJ/g) was also calculated. Linear mixed-effect models were computed to assess sociodemographic differences in the students' relative, as well as energy-standardized dietary intakes at lunch.

Results: The school lunch provided 24% of the total energy intake. The mean (SD) reported vegetable intake at lunch was 65 (68) g and accounted for almost half of the students' total intake. The nutrient density was significantly higher and the energy density significantly lower at lunch compared with intake during the rest of the day. Intake of fish and red/processed meat was significantly higher, and vegetables significantly lower, in boys than in girls. The intake of vitamin D and fish was significantly higher for students of parents with ≤12 years of education than for those with more educated parents. Students with a non-Nordic background reported a significantly larger proportion of their dietary intake at lunch, but nutrient and energy density did not differ significantly between those with a Nordic and non-Nordic background.

Conclusions: Swedish school meals provided around a quarter of students' energy intake. The nutrient density was higher and the energy density lower at lunch compared with the rest of the day. The results confirm that school meals constitute an important part in providing essential nutrients as well as healthy foods to Swedish school children.
Factors associated with water consumption among children: A systematic review

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Water is recommended as the main beverage for daily fluid intake. Previous systematic reviews have studied the consumption of sugar-sweetened beverages (SSBs) among children, but none have focused on water consumption. Insight in the factors that are associated with water consumption among children is needed to inform the development of interventions aimed at the promotion of water consumption. The objective of this review was therefore to summarize the current evidence on the factors associated with water consumption among children aged 2 to 12 years.

Methods: A systematic literature search in seven electronic databases (Embase, Medline Ovid, Web of Science, Cochrane, PsychINFO Ovid, CINAHL EBSCOhost, and Google Scholar) was conducted in May 2018 and retrieved 17,850 unique records. Studies were selected if they had a cross-sectional or longitudinal study design, focused on children aged 2-12 years and were published in an English language peer-reviewed journal. Participants from clinical populations, studies that included data of less than ten participants and non-human studies were excluded.

Results: A total of 63 articles met the inclusion criteria and were included in the analysis. We identified 76 factors that were investigated in these studies. There was evidence of positive associations between child's self-efficacy, parental education level, parental self-efficacy, parental restrictive feeding practice, parental encouraging feeding practice or time (study year) and water consumption. Evidence was inconsistent (<60% of studies reported an association) for child's age, sex, BMI, consumption of SSBs and ethnic background of the parent. There was no evidence (=33% of studies reported an association) of associations between consumption of dairy or juice, parental emotional-, modelling- or instrumental feeding practices, eating school lunch or outside temperature and water consumption. The remaining 54 factors were investigated in fewer than three studies.

Conclusions: Promoting the self-efficacy of the parent and child, and specific parental feeding practices related to water consumption have been identified as potential key elements of interventions to promote children's water consumption. However, more research is necessary to investigate environmental, parental and child-related factors that are currently under-studied and could further inform intervention strategies.
Factors that influence parents’ intentions & decisions regarding the timing to introduce solid foods to infants

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: The introduction of solid foods during infancy is essential to optimise health and development and provide for the nutritional requirements of an infant during the first year of life. In both Ireland and internationally, a significant proportion of children are prematurely weaned onto solid foods. This study explored what factors predict parents’ intentions to introduce solid foods at 6 months.

Method: 190 mothers with infants aged 2-4 months completed an online survey. Predictor variables were drawn from the theory of planned behaviour and social cognitive theory. These include attitudes, self-efficacy, outcome expectancies, descriptive and injunctive norms, as well as demographic information and infant feeding intentions. The majority of participants were exclusively breastfeeding (77%), had a postgraduate qualification (56%) and were multi-parous (62%). A follow-up survey is currently underway to explore the timing in which the introduction of solids foods actually occurred.

Results: 70% of mothers intended on introducing solids to their infant at six months of age. The logistic regression model was statistically significant ($\chi^2 (13, N = 190) = 45.48, p < .001$): exclusively breastfeeding ($\beta_a = 1.72$) and supportive peer injunctive norms ($\beta_a = .29$), predicted intentions to introduce solids at six months. A further regression analysis will be conducted to identify factors that predict the actual timing in which solid foods were introduced.

Conclusions: Findings highlight the co-occurrence of feeding behaviours i.e. those who breastfed had stronger intentions to delay the introduction of solids foods until 6 months (in line with recommendations). The findings also highlight the importance of the social context and the influence of peer approval on intentions to introduce solid foods to infants.

This study provides a theory-driven approach to identify the factors that predict intentions and decisions around the timing of the introduction of solid foods. As such, it adds to the limited research available in this area and can highlight factors that may be important to target in intervention approaches to promote adherence to infant feeding guidelines.
A school-based intervention to promote active commuting to school focused on families: the PACO Study

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Background: In the last decades, the percentage of young people who actively commute to school has decreased. Active commuting to school presents several benefits to youth (e.g. cardiovascular health and stress level) and to society (e.g., reduction of pollution). Different studies showed that the parental perceptions towards active commuting to school are highly important to determine the children's mode of commuting. Therefore, the main purpose of this study is to design and implement an intervention to reduce the parental barriers towards active commuting to school.

Method: The design is a cluster-randomized controlled trial with school as the unit of randomization. Participants will be 160 parents of adolescents aged 14-15y belonging to 4 schools from 4 cities in Spain (Granada, Valencia, Jaen and Toledo). The intervention will last one month. One school (20 parents) per city will participate as intervention group and one school (20 parents) per city will be the control group. The intervention includes three electronic tools: a mobile app, a WhatsApp group and a blog. The mobile app called "safe routes" is designed to select the safest route to go to any destination cycling or walking. WhatsApp will be used as a communication platform between parents and researchers, and two weekly messages forward to parents will be sent. The first message of WhatsApp will consist on a tutorial video about how they can use the mobile app. The following seven messages will address different barriers that parents perceived to active commuting. Every message will include one infographic and one question related to it with a link to extend the information in the blog. The last message will be a short conclusion of the parental barriers and the importance of active commuting. Finally, the blog will compile additional information about the WhatsApp messages and other inquiries about the active commuting to school and its barriers, addressed to parents.

Conclusion: This intervention will be implemented and tested with parents, in order to reduce or change parental barriers towards their children’s active commuting to school. This is an initiative to increase the percentage of children using active modes of commuting.
Addressing food neophobia in school-aged children

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Objective:
Food neophobia is characterized as the rejection of novel foods, and can be detrimental to dietary quality among children, but less is known about food neophobia in school-age children and the best approaches to address it. The purpose of this study is to describe the relationship between food neophobia and cooking skills among school-age children, and to recommend potential family-based actions to address food neophobia.

Methods:
Baseline data were analyzed from the NU-HOME study, a randomized trial to prevent childhood obesity in a rural community by delivering a family meals-based intervention program over a 7-month period. Parent/child dyads completed baseline data collection in 2017/2018 that included surveys and height/weight measurement. Children (n=114) were predominantly female (59%), with a mean age of 8.95 years (SD=1.05). Fruit and vegetable neophobia were assessed separately using two valid and reliable scales taken from a 16-item Fruit (alpha=.86) and Vegetable (alpha=.89) Neophobia Instrument, with a higher neophobia score indicating more hesitation to try new fruits or vegetables. Cooking skills were assessed using a valid and reliable 9-item scale (alpha=.69), with a higher score indicating stronger cooking skills. Fruit (M=15.2, range=8-32) and vegetable (M=17.2, range=8-32) mean neophobia scores were calculated. Correlational associations between fruit/vegetable neophobia and cooking skills were examined.

Results:
Both fruit (r=-.37, p=<.0001) and vegetable (r=-.29, p=.0015) neophobia were inversely associated with cooking skills. Differences in fruit neophobia were observed by gender, with boys being more neophobic. There were no differences in fruit or vegetable neophobia by age, economic assistance, or weight status category in stratified analyses.

Conclusions:
Study findings of an inverse association between fruit and vegetable neophobia and cooking skills indicate that the involvement of children in meal preparation, which has been shown to be an effective method to increase cooking skills, may increase the likelihood of school-age children trying unfamiliar foods. The promotion of family cooking, which incorporates and promotes children's assistance in the kitchen, may help diminish food neophobia, and increase the introduction of novel fruits and vegetables, which can ultimately lead to a more sustainable healthful diet.
Home cooking: Transference of attitudes, feelings and practices between generations

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Previous research has established a link between home cooking and healthier diet choice but we do not know how best to encourage home cooking and reverse its declining trend worldwide. Intergenerational influences on home cooking are incompletely understood, especially from the qualitative aspect of experience. This study explores women’s views about the intergenerational transmission of cooking within the context of family life.

Method: Twenty-seven individual interviews were undertaken with a convenience sample of Brazilian women who expressed varying degrees of engagement and enjoyment with preparing food (process of cooking). The semi-structured discussions explored what is transmitted from one generation to the next with regards to home cooking over the family life course. All interviews were transcribed verbatim and analysed using an inductive thematic analysis supported by NVivo 11.

Results: Three major themes were identified, representing what is purposively or unintentionally transmitted from mothers to children with regards to home cooking: 1) who is responsible for cooking; 2) attitudes towards cooking; and 3) cooking practices. Results showed that mothers often reinforced the popular stereotype that ‘cooks are women’ and that it was a woman’s responsibility to cook and thus care for her husband and children. Not all mothers performed this 'submissive role' and demonstrated (by example) that women can be in the workforce and not fulfil this duty. Secondly, mothers transmitted their pleasure and enthusiasm for cooking or their resentment for the ‘chore’ through a variety of different ways (e.g. complaining about the task). Thirdly, when mothers cook, children learn cooking skills both actively and passively, and acquire an idea of how food should taste and appear.

Conclusion: Mothers can both encourage and discourage home cooking in future generations through their attitudes and actions. The idea that home cooking is solely a woman’s responsibility needs to be challenged in order to help individuals and families benefit from the protective nature of home cooking.
Three generation perspective: Narrative review

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**Purpose:** To carry out a systematic review of the literature focused on the theme of physical activity of school children and their caregivers from an intergenerational perspective (i.e., studies with child-parent-grandparent triad data). The aim was to evaluate the distinct roles that grandparents and parents play in supporting children's physical activity, and how their roles may interact in creating a physical activity friendly family climate.

**Methods:** We conducted a systematic search of literature according to Prisma standards. The studies were searched from selected databases (Web of Science, PubMed, EBSCO, Scopus) and manually through reference list checking. Selected studies examined the relationship of three generations to children's physical activity (PA).

**Results:** 9 studies out of 1798 included an intergenerational perspective of three generations in the area of physical activity. One of the 9 presented study protocol without data. Out of the 8 remaining, 3 articles focused primarily on obesity, 1 on nutrition where PA was considered a secondary outcome, 2 articles focused on PA through cultural traditions (like dance). Two of the 9 studies examined PA in women, 1 in both sexes, and 6 did not report gender. 2 of the studies had a specific focus on immigrants and in 6 out of the 9 sedentary behavior was referenced. Overall, children were most active, with caregivers expressing low motivation toward physical activity. Still, there was evidence of bidirectional influence on physical activity between children and caregivers, with parents and grandparents playing differential roles in supporting children’s physical activity (e.g., grandparents transporting children to activities versus parents setting rules and schedules). Caregivers see ensuring physical activity at school and through active transport as potential strategies for increasing physical activity of their children. Cultural influences were evident in studies with immigrant families, with cultural traditions such as dance imparted on children.

**Conclusions:** Children’s physical activity is partly formed through intergenerational family dynamics, with parents and grandparents providing distinct forms of support. Capitalizing on culturally appropriate strategies in the family context may facilitate physical activity in school-aged children.
Effect of adult leader participation on physical activity, peer-victimization, enjoyment, and self-efficacy in children

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Introduction: The relationship between adult leader participation (LP) and children's physical activity (PA) levels during recreational sessions is unknown. Some evidence indicates that when adults are active in a structured environment, children are more likely to be active. However, when children are engaged in a free-play recreation setting, it is unknown whether adults influence children's moderate-to-vigorous PA (MVPA) levels. Additionally, it is important for children to enjoy opportunities to be physically active. Thus, the purpose of this research is to examine the impact of adult LP on child PA during recess (free-play recreation), and on children's PA self-efficacy, PA enjoyment, and peer victimization (bullying).

Methods: Children (n=21) in grades 3-5 (mean age=8.8; male=52%; white=71%; overweight/obese=33%; free/reduced lunch=19%) enrolled in the YMCA summer program participated in two, 15-minute recess sessions each day over four consecutive days alternating between LP or No LP. Free-play recess was conducted in the indoor gym with CATCH equipment. Adult LP was defined as being active, enthusiastic participants, and modeling PA. Before and after each free-play recreation session, children completed a brief 11-item questionnaire which assessed their enjoyment and self-efficacy of PA, and feelings of peer victimization. PA was objectively assessed using a SenseWear armband and reported in minutes of MVPA and step counts. Data were analyzed using a condition (LP or No LP) by day repeated measure ANOVA.

Results: Contrary to our hypothesis, children spent more time in MVPA during No LP compared to LP (92.6% vs. 85.3%, p=0.005) and less time in sedentary behavior (p=0.005). Children averaged more steps during No LP (4,265 steps) compared to LP (3,799 steps, p=0.03). Self-efficacy and peer-victimization were no different in LP compared to No LP, but were more favorable following a bout of PA. Children's enjoyment increased after No LP (p=0.031), but not after LP.

Conclusions: Regardless of condition, children exhibited very high levels of MVPA and enjoyment during recess. Future research should examine how to best decrease peer-victimization and increase enjoyment and self-efficacy during recess. Further examination of the effects of LP on PA levels in children in other age groups and weight status categories is needed.
The healthy eating and living against non-communicable diseases (NCD) Study (HEAL-NCD): An innovative family-based intervention to prevent non-communicable diseases

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Objective: Inadequate nutrition literacy within families is a barrier for making healthy dietary choices and influences the risk for obesity and related chronic diseases. The present pilot study examines the feasibility of providing an in-person nutrition literacy intervention for families identified at a high risk of developing a non-communicable disease (NCD).

Methods: Twelve English-speaking families (n=35(16 adults; 19 children)) were recruited online through family-based forums and distribution of flyers, from the metropolitan New York area. Eligible families had 1) at least one family member with a history of NCD or overweight/obese/hypertensive, and 2) to be willing to attend 3 in-person nutrition workshops. The workshops included didactic and experiential activities on food label reading, portion sizing, and information about lifestyle-related NCDs. Participant height and weight were measured and they completed screeners to assess health literacy, fruit/vegetable and dietary fat screeners at baseline and after completion of workshops. Families also voluntarily participated in focus groups to evaluate the program. The focus group data were transcribed and coded.

Results: Participants self-identified race as Asian (n=14; 40%), Hispanic (n=11; 31%) or Black (n=10; 29%). Adults had a mean age of 40y (SD=±8.93), BMI of 32.29kg/m² (SD=±11.53), and 15/16 had college degrees. Children ranged from 1-17y with a mean age of 7.56y (SD=±4.0). Daily fruit/vegetable intake and dietary fiber increased from baseline to 3-week follow-up from 2.55 to 3.31 servings and 11.86g to 13.99g respectively. Consumption of whole grains increased by 34%(1.05 to 1.41 servings) and total fat intake remained unchanged (82.44 to 80.23g). Focus groups indicated that (a) attending three sessions was acceptable, (b) families enjoyed interactive and hands-on group learning and (c) more activities appropriate for children should be included.

Conclusions: Families were best recruited through schools or referral by enrolled families. The study met its recruitment goals within 6 months. Families reported overall satisfaction with the program, improved knowledge of food labels, strategies for grocery shopping, portion sizing, and increased awareness of the links between diet quality and NCDs. This pilot study suggests that the intervention was acceptable and that its scale-up is feasible in future community-based participatory research aimed at nutrition education to prevent NCDs.
Integrating juggling with math lessons: a randomized controlled trial assessing effects on maths performance and enjoyment in primary school children

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Background
There are careful indications that physical activity (PA) during school time can be beneficial for children's academic performance. So far, most studies have focused on the effects of moderate-to-vigorous PA, for example in the form of energizers or extra lessons physical education. Little is known about the effects of the integration of PA and the academic content of the lessons. The theoretical framework of embodied cognition advocates that task-relevant physical activity can facilitate learning. Accordingly, we developed an intervention in which we integrated juggling with multiplication tables. The intervention duration was 5 weeks and consisted of 20 short movies (4 lessons per week, on average 7 minutes).

Aim of the study
The aim of the current study was to assess the effects of integrating juggling with math practice in primary school children, on (1) performance on multiplication tests and (2) enjoyment during the math lessons.

Methods
We conducted a cluster randomized controlled trial, in which 312 children (mean age 10.4 years) from nine Dutch primary schools participated. Fourteen classes were randomly assigned to either a group that learned juggling whilst practicing multiplication tables (math-juggling group), or to a group that solely practiced multiplication tables (control group). We used multivariable regression analysis to examine the effect of the intervention on multiplication tests, adjusting for pretest values, age, general motor skill level (assessed by PE teacher), and academic math performance.

Results
No significant intervention effect on multiplication performance were observed. Multivariable regression analyses showed that the math-juggling program significantly increased enjoyment of children during the math lessons.

Conclusion
More high-quality research is needed to gain insight on the cognitive effects of integrating physical activity with academic content in a school setting. The increased enjoyment in the math-juggling group can serve as an important starting point for structurally incorporating physical activities in the classroom setting.
P2, P2.108

Influence of weather conditions and season on children's active school transportation and physical activity in three diverse regions of Canada

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Children and families (SIG)

Introduction:
Children who engage in active school transportation (AST) have higher levels of physical activity (PA). Climate and weather were shown to influence adults' daily travel behaviours, but their influence on children's AST and PA has been less examined. This study examined the influence of weather conditions and season on children's AST and PA.

Methods:
Children aged between 9 and 12 years old (N=1,699; 55.0% girls, 10.2 ± smn; 1.0 years old) were recruited in schools located in urban, suburban and rural areas, stratified by area-level socioeconomic status (SES), in three different regions of Canada (Trois-Rivières, Québec; Ottawa, Ontario; Vancouver, British Columbia). Mode of school travel was reported by self-report and physical activity was measured using a pedometer. Gender-stratified generalized linear mixed models were performed with school as a random effect. Linear regressions were used to explore the associations between season, temperature and precipitation on children's PA, controlling for age, site, urbanicity, and SES. Binomial logistic regressions were used to estimate odds ratios (OR) related to active (i.e., walking) versus motorized (i.e., automobile, school bus) mode for school trips, controlling also for distance between home and school.

Results:
Girls' PA was negatively related to both winter season (βa; = -1368, p=.041) and daily precipitation (βa; = -72, p<.001). In boys, with every year increase in age, average steps decreased (βa; = -487, p<.001). In addition, boys' daily PA decreased with every millimeter of precipitation (βa; = -95, p<.001). The influence of season and weather conditions (precipitation, temperature) on children's AST was not significant. For both genders, increased distance to school was associated with lower odds of AST (p<.001). Girls attending a rural or a suburban school had lower OR of AST than those attending urban schools (0.25 and 0.29, respectively). For boys, higher age (in years) was associated with higher OR of AST (1.25).

Conclusions:
In Canada, season and weather do not influence children's AST. However, season and weather appear to affect children's daily PA. In particular, precipitation lowers PA level in boys and girls, while a decrease of PA was observed only in girls during the winter months.
Longitudinal sugar-sweetened beverage consumption in early childhood in relation to parents’ source of feeding information

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Purpose: Reducing sugar-sweetened beverage (SSB) consumption in early childhood remains important for obesity prevention. How parents' source of child feeding guidance influences SSB intake longitudinally is unknown. We examined SSB intake during early childhood in relation to parents’ primary source of infant feeding information, with the hypothesis that children of parents reporting healthcare sources would have lowest intakes.

Methods: We conducted a secondary analysis of data from a prospective cohort study in Cincinnati, Ohio, USA (2001-2006) with enrollment at 3y and follow-up every 4 months until 7y (13 visits). At baseline, parents recalled their main source of infant feeding information and child's age when introduced to SSBs. Parents completed 3-day food records at each visit to estimate child daily SSB servings. We used linear mixed effects models to examine longitudinal trends in SSB intakes (log-transformed (+0.1)) and associations by feeding information source.

Results: A total of 372 children were included in the analysis (47.6% female; 78.0% white; 59.7% parents with college degree). Age at which children were introduced to SSBs varied: before 2y (28.4%), between 2-3y (28.9%), and "never" before 3y (42.7%). Median (range) SSB intakes were 0.69 (0.00-5.06) and 0.92 (0.00-6.50) 8-ounce servings/day at 3y and 7y, respectively. Healthcare professionals were the most common information source (58.0%), followed by self-experience/reading (17.0%), child's grandmother (13.5%), family/friends (8.9%), and other (2.7%). Compared to healthcare referents, children of parents reporting use of self-experience/reading for feeding information had a 21.6% lower geometric mean of SSB intake at 3y (adjusted for race, parent education, birth order, age of SSB introduction (95% CI: 0.66, 0.94)). Associations with other information sources were not statistically significant. Differences in SSB intake for healthcare versus self-experience/reading sources were consistent over time (interaction p=0.32).

Conclusions: Parents often received feeding information from healthcare professionals, yet children whose parents relied on self-experience/reading materials had lower SSB intakes, independent of parent education. Given the diversity of information sources, SSB interventions may benefit from engaging multiple sources and channels early in life to curb consumption increases with age.
17378

P2, P2.110

Infant-feeding attitudes of expecting fathers

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Children and families (SIG)

Purpose: In Western societies, an infant's father is the most important source of support for a breastfeeding woman. The degree to which he supports his partner is likely determined by his attitudes and social norms related to breastfeeding. However, fathers' attitudes to breastfeeding have seldom been investigated using a validated instrument. The purpose of this study was to investigate psychosocial and demographic differences in the infant-feeding attitudes of expecting fathers. Methods: Participants in this study were 1077 expecting fathers recruited from antenatal classes in Perth, Australia. Fathers completed the Iowa Infant Feeding Attitudes Scale (IIFAS) before their baby was born. The IIFAS is a validated instrument which consists of 17 items scored on a 5-point Likert scale. Total scores range from 17 to 85, with a higher score indicating positive breastfeeding attitudes predictive of successful breastfeeding outcomes. Psychosocial factors explored in this cross-sectional analysis included father's involvement in the infant-feeding decision making process, whether his own mother had breastfed and an 8-item breastfeeding social norms scale which was scored and grouped into low, medium or high social norms favoring breastfeeding. Demographic factors included age, education, country of birth and socioeconomic position. Differences in mean IIFAS scores were investigated using independent t-tests and one-way ANOVA. Results: The mean IIFAS score for the total sample was 62.2 (SD = 6.9). Fathers with a high social norms score had significantly higher IIFAS scores than fathers with a low social norms score (64.2 vs 60.6, p value < 0.001). Similarly, fathers who reported that they or their siblings had been breastfed had higher IIFAS scores (62.6 vs 60.6, p < 0.001), as did fathers who were involved in deciding how their baby was to be fed (63.4 vs 60.6, p < 0.001). University educated fathers had a higher score than less educated fathers (62.7 vs 61.5, p > 0.007). There was no association with age, ethnicity or SES. Conclusion: A father's infant-feeding attitudes were strongly associated with their social norms score, which reflected the breastfeeding attitudes and behaviors of friends and families. This finding supports the need for social marketing interventions designed to normalize breastfeeding in the broader community.
Differences in BMI and obesity-related movement behaviours of children with and without a family history of lifestyle diseases

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: This study aimed to assess differences in body mass index (BMI) and obesity-related movement behaviours (physical activity [PA], screen time [ST] and sleep) of children with and without a family history of lifestyle diseases (Type 2 diabetes, heart disease and hypertension).

Methods: Data were from The Mothers and their Children's Health study (MatCH), a sub-study of the Australian Longitudinal Study on Women's Health (ALSWH). In 2016-17, women in the 1973-78 cohort of ALSWH were invited to participate in MatCH. Eligible mothers who consented (n=3039) completed questionnaires and were asked to report on their three youngest children (n=5780). Mothers reported their children's height (cm) and weight (kg), used to calculate BMI (kg/m2) category, and compliance with the PA (=180min active play for 0-4y; =60min moderate- to vigorous-intensity physical activity for 5-12y), ST (0min for =2y; =1h for 2-5y; =2h for 5-12y), and sleep (14-17h for 0-3mo; 12-16h for 4-11mo; 11-14h for 1-2y; 10-13h for 3-5y; 9-12h for 5-12y) guidelines. In the 2015 ALSWH survey, women reported whether they had a family history (i.e., mother, father or siblings) of Type 2 diabetes, heart disease, or hypertension. Logistic regression models were used to determine differences between outcomes for children with and without a family history of lifestyle diseases, controlling for child age and sex, maternal education, and clustering by family.

Results: Compared to children without a family history of hypertension, children with a family history of hypertension were significantly less likely to meet ST guidelines (OR = 0.82, 95%CI 0.70, 0.96). Children were significantly less likely to meet sleep guidelines if they had a family history of either Type 2 diabetes (OR = 0.60, 95%CI 0.46, 0.78), heart disease (OR = 0.76, 95%CI 0.59, 0.98) or hypertension (OR = 0.75, 95%CI 0.59, 0.96). No significant associations were observed between family history of lifestyle diseases and child BMI category or the likelihood of meeting PA guidelines.

Conclusions: Family history of lifestyle diseases may predict children's obesity-related movement behaviours, particularly sleep. Parents with a family history of lifestyle diseases may need additional support to help their children develop healthy movement behaviours.
Experiences with implementing health promotion programs in organized sport clubs in Norway – EAT MOVE SLEEP

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objectives: Sport clubs might be a good setting for health promotion, also concerning other health related behaviors than physical activity (PA). However, little research has been devoted to the potential of such Health Promoting Sport Clubs (HPSC). The objective of this study is to describe and discuss the experiences with implementing and evaluating the Norwegian EAT MOVE SLEEP intervention.

Methods: EAT MOVE SLEEP is an initiative from the EAT Foundation (an organization working for sustainable diets), BAMA (the largest Norwegian fruit and vegetables retailer), and NFF (the Norwegian Football Association). The aim is to facilitate and motivate towards healthier diets, more PA and good sleeping habits within soccer clubs.

A convenient sample of 56 clubs, and 1011 children (age 9-10), were recruited in an intervention study. The clubs replied to a modified questionnaire of the HPSC index (HPSC-I, score 0-15), previously described by Kokko and colleagues, before and after an intervention. The index was dichotomized into high and low adherence (at median). The parents and children replied to a web-based questionnaire assessing diet, physical activity and sleep also before and after the intervention.

Results: The score on the HPSC-I at baseline ranged from 4 to 15 with a median of 11. The clubs with higher scores reported a better organization of specific health promoting issues relating to diet, PA and sleep in general (e.g. having specific guidelines regarding active transportation to and from training (46 vs 13%, p=0.006). The intervention clubs did significantly increase their score on the HPSC-I from baseline to follow-up (9.9 vs. 11.6, p=0.005). However, cross-sectionally, the children in the high HPSC-I clubs did not report healthier diet, PA or sleep patterns, and neither did the intervention have any impact.

Conclusion: Soccer clubs in Norway appear to be susceptible to the HPSC concept, however a link between the HPSC-I and child diet, PA and sleep was not present in this age group. Future studies should assess this missing link for a better understanding of the potential of HPSC.
Caregiver perceptions and their association with children’s participation in risky, outdoor play

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Objective
In order to successfully implement strategies to increase physical activity and improve wellbeing, caregiver perceptions towards such approaches must be understood. Risky, outdoor play has the potential to increase physical activity, improve social and cognitive development and enhance environmental awareness. However, while many caregivers appreciate these benefits, participation in this type of play is declining with each generation. The purpose of this study, therefore, was to explore how caregiver attitudes are associated with risky, outdoor play practices.

Methods
This is a secondary data analysis of the New Zealand State of Play Survey. In September-October 2015 and 2018, adults registered on an online database with at least one child living at home were invited by email to complete a 43-item online survey. The survey included questions on perceptions and practices of risky, outdoor play, regulations and demographics. Participation was coded binomially depending on whether the child participated regularly or not. General linear models were used to assess the relationship between risk and injury tolerance, attitudes towards health and safety rules and connection to nature and participation in outdoor, risky play. Models were controlled for demographic factors.

Results
There were ~1,500 respondents each year who comprised a nationally representative sample. Engagement in risky or nature play activities was low, with less than 41% of children regularly participating. Caregivers who were risk tolerant were 7.0 (95% CI 5.6-9%) times more likely to allow their children to regularly engage in risky play, and those who were injury averse or had conservative attitudes towards health and safety rules were 70% (65-78%) and 50% (41-63%) less likely, respectively. Those most connected to nature were 1.5 (1.2-2.0) times more likely to engage in nature play. Children spending more than 4 hours per week on a screen were 29% (9-44%) less likely to engage in risky play.

Conclusion
This study identifies several factors that predict whether a child will engage in risky, outdoor play. This has important implications for policymakers because attitudes can be changed with a shift in societal paradigm. If perceptions towards risky, outdoor play can be altered, participation, and thus, health and wellbeing may increase.
Prevalence and correlates of physical activity and screen time among Japanese children and adolescents: A cross-sectional study

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Physical activity (PA) and screen time (ST) levels among Japanese children and adolescents are unclear at the population-level. The purpose of this study is to investigate the prevalence and correlates of PA and ST among Japanese children and adolescents.

Methods: We evaluated 1,794 children and adolescents (10-15 years old) in a cross-sectional survey conducted in all primary schools (grades 4-6) and junior-high schools (grades 1-3) in Unnan city, Shimane, Japan. Moderate-to-vigorous PA (MVPA) of at least 60 minutes/day was assessed by the Japanese translation of the PA questions in the WHO Health Behaviour in School-aged Children survey questionnaire. ST on weekday and weekend was assessed by using a questionnaire previously proven reliable. Associations between the prevalence of PA or ST and its correlates were examined by a multivariable-adjusted Poisson regression.

Results: Only 20.1% of the Japanese children and adolescents met recommended levels of MVPA. A total of 12.1% and 3.6% met recommended levels of ST at less than 2 hours/day on a weekday and the weekend, respectively. Grade, gender, consumption of breakfast, PA preference and population density were significant predictors of meeting the global PA guidelines, whereas body mass index (BMI) z-scores had no association with PA. Grade, BMI z-scores, consumption of breakfast and population density were significant predictors of meeting the global ST guidelines on a weekday. Grade and BMI z-scores were significant predictors of meeting the global ST guidelines on the weekend.

Conclusions: This is the first study to show the prevalence of PA and ST among children and adolescents at the population-level in Japan. MVPA was strongly associated with PA preference. ST was strongly associated with grades.
A qualitative exploration of parent and adolescent experiences in the Health Online for Teens (HOT) program

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objectives
Technology offers increased reach for lifestyle interventions, however it is unknown how adolescents and their parents engage and experience group-based online programs. This study aimed to explore experiences of parents and adolescents who completed an online program.

Methods
Health Online for Teens (HOT) is a 14-week healthy lifestyle program for adolescents (13-17y) above a healthy weight, and their parents. HOT aims to improve diet, physical activity, and sedentary behaviours in line with Australian guidelines. To explore experiences with HOT, semi-structured interviews were conducted individually with adolescents (n=10) and parents (n=9) from 11 participating families following the program (8 adolescent-parent dyads). Interviews were recorded, transcribed verbatim, and analysed using an inductive thematic analysis.

Results
Analysis revealed five themes: 1) participant goals for HOT; 2) role of parents in adolescent health; 3) facilitators and barriers of engagement; 4) changes in behaviour; and 5) suggestions to improve experiences. Adolescents reported weight loss as their goal, while parents wanted to shift the focus away from weight loss to being healthy and feeling better. Most adolescents reported their parents had a supporting role and parents perceived their role to be a motivator for their child. Some adolescents preferred no parent involvement. Adolescents reported time spent on school homework as prohibitive to spending more time on HOT which itself felt like school work, while parents acknowledged HOT was not a priority for themselves. Despite these barriers, most adolescents reported making positive changes to lifestyle behaviours (improved diet, increased physical activity, regular sleeping pattern, reduced sedentary time). Some parents disagreed that their child had made changes, and some adolescents did not report lifestyle changes. To improve experience and engagement, adolescents suggested fewer goal setting activities and more interaction between participants. Parents and adolescents felt social media may have increased their engagement.

Conclusion
The mixed views of adolescents and parents highlight that optimal parent involvement may depend on the adolescent's independence and relationship with his/her parent. Future research should further explore the parent and adolescent relationship and its influence on lifestyle behaviours, and whether adolescent healthy lifestyle programs should provide options regarding parent participation.
17478

P2, P2.117

Results of Nepal’s 2018 Report Card on Physical Activity for Children and Youth

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Children and families (SIG)

Objective
Synthesis of evidence on the prevalence of physical activity of children and youth (5-17 years) across different domains is not available in Nepal. This report card has attempted to summarize the available physical activity data of children and youth, and identify the data and research gaps.

Methods
Report Card working group was formed in Nepal which systematically searched the literature in different databases (Medline, EMBASE, PsycINFO, and CENTRAL). Papers published between 2000 and February 2018 were identified and screened. A manual search of grey literature was also carried out. Out of 857 identified results, only six were included as they had relevant physical activity data related to the indicators of Global Matrix 3.0. Grading of indicators was done based on benchmarks and the grading scheme provided.

Results
Overall physical activity of children and youth in Nepal is graded as 'D+'. However, some papers using different benchmarks reported that Nepalese children are quite active. National surveys and studies representing different socio-economic and ecological context of the country are needed to validate this. Use of active transportation and support of family and peers were graded as 'A-' and 'A' respectively. Data were unavailable to grade five of ten indicators and all the included studies used the questionnaire to assess physical activity.
### Table 1: PA indicators and grades of Nepal

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Grade</th>
</tr>
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<tbody>
<tr>
<td>Overall Physical Activity</td>
<td>D+</td>
</tr>
<tr>
<td>Organized Sport Participation</td>
<td>INC</td>
</tr>
<tr>
<td>Active Play</td>
<td>INC</td>
</tr>
<tr>
<td>Active Transportation</td>
<td>A-</td>
</tr>
<tr>
<td>Sedentary Behaviours</td>
<td>B+</td>
</tr>
<tr>
<td>Physical Fitness</td>
<td>INC</td>
</tr>
<tr>
<td>Family and Peers</td>
<td>A</td>
</tr>
<tr>
<td>School</td>
<td>INC</td>
</tr>
<tr>
<td>Community and Environment</td>
<td>C-</td>
</tr>
<tr>
<td>Government</td>
<td>INC</td>
</tr>
</tbody>
</table>

### Conclusions/recommendations

The overall physical activity level of Nepalese children was found to be low, however, considering the small sample size and the study is limited to a small geographic area, it might not give a generalized scenario. Lack of data on five out of ten indicators highlights the gap and the need for further research.
P2, P2.199

GENEActiv accelerometer use by infants (0-6 months). A wear and non-wear time validation study

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Purpose: The aim of this observational study was to formulate and validate a method to determine GENEActiv accelerometer wear and non-wear time when used by infants on their right hip (over clothes).

Methods: GENEActiv accelerometer data obtained from 32 infants placed in a positioning protocol were analysed by a receiver operating curve (ROC) to obtain cut points to determine wear and non-wear time. These cut-points were tested (separately and in combinations) against direct observation on the same sample of 32 babies to determine sensitivity, specificity, positive and negative predictive value, false positive and false negative values. The leave-one-out validation method was used to determine if variability existed between results. Bland-Altman plots were used to determine differences in wear time as measured by the analysis methods in comparison to direct observation.

Results: Mean temperature, mean z-axis and z-axis standard deviation (SD) had the highest area under the curve from the ROC analysis (0.941, 0.889 and 0.851 respectively). This revealed cut points of 25.6°C for temperature, -0.8124mg for mean z-axis, and 0.01125mg for z-axis SD. The temperature and mean z-axis cut points together had a sensitivity of 0.84 (95% CI 0.8377 to 0.8421) and specificity of 0.948 (95% CI 0.9439 to 0.9463). Temperature alone had a sensitivity of 0.941 (95% CI 0.9394 to 0.9422) and specificity of 0.9422) and specificity of 0.814 (95% CI 0.8117 to 0.8156). There was minimal variation after the leave-one-out validation analysis. Bland-Altman plots showed using temperature and mean z-axis cut points together had the least bias of approximately 5 minutes (309.88s, LOA -955.18s to 1614.93s).

Conclusion: Analysis methods to determine wear and non-wear time among infants were obtained. These methods demonstrated high sensitivity and specificity to determine wear and non-wear time of the GENEActiv accelerometer worn by infants on their right hip (over clothes).
Associations between physical activity intensity and well-being in adolescents

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: This study aims to explore associations between physical activity intensity and well-being (i.e., positive and negative affect) in adolescents. A secondary aim was to determine if associations were moderated by sex.

Methods: Grade 8 students from 14 government-funded secondary schools in low socio-economic areas of Western Sydney (Australia) were assessed. Data from three timepoints (baseline, 7-8 months, and 14-15 months) were combined to increase the sample size. Physical activity was objectively assessed for 1-week at each timepoint using Actigraph accelerometers. Time (minutes/day) in light, moderate and vigorous physical activity was estimated. The short form Positive and Negative Affect Scale for Children was used to measure well-being. Quantile regression was used to analyse the data.

Results/findings: A total of 3,140 observations were collected from 1,223 students (mean age at baseline:12.9(0.54); 55.1% male). Light and moderate activity were not associated with well-being. Higher levels of vigorous activity were associated with more positive affect [$\beta$;(SE)=0.307 (0.06), $p<0.001$], to an estimated vigorous activity turning point [Point(95%CI)=36.48 mins/day (31.39-41.59)]. Similarly, higher levels of vigorous activity were associated with less negative affect [$\beta$;(SE)=-0.250 (0.06), $p<0.001$] up to the estimated vigorous activity turning point [Point(95%CI)=37.35 mins/day (31.27-43.44)]. The negative association between vigorous physical activity and negative affect was more pronounced in females than in males.

Conclusions: Study results suggest that engaging in ~36 min/day of vigorous physical activity is associated with improved well-being in adolescents, however a small number of adolescents who accumulate very high levels of vigorous physical activity may experience poorer mental health.
Neighborhood influences on women’s parenting practices for children’s outdoor play: a qualitative study

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Objective: To understand factors that influence parenting decisions for outdoor children's play in order to promote physical activity during critical years of child development.

Methods: This study explored physical and social environmental influences on parenting decisions and rules for their child's outdoor play in their neighborhood using semi-structured in-depth interviews with parents (n=30, 29 of whom were mothers) of children aged 10 to 18 years. Parents from both low- and high-disadvantage neighborhood environments were recruited in order to identify environmental factors that resulted in parenting decisions that either promote or hinder outdoor play and identify differences across neighborhood types. Data were analyzed using a grounded theory approach and methods consistent with qualitative research standards.

Results: Parents limit their child's independent play, as well as the location and time of their child's outdoor play, due to both social and physical aspects of their neighborhood environment. Seven themes (safety, social norms, sense of control, social cohesion and neighborhood composition, walkability, and access to safe places for activity) were identified as influencers of parenting practices for their child's outdoor play in their neighborhood. Parents in high-disadvantage neighborhoods reported facing greater neighborhood barriers to letting their child play outside without supervision.

Conclusions: Physical and social neighborhood factors interact and differ in low and high disadvantage neighborhoods to influence parenting practices for children's outdoor play. Community-level interventions should target both physical and social environmental factors and be tailored to the neighborhood, and target population in order to attenuate parental constraints on safe outdoor play and ultimately increase physical activity and health of developing youth.
Effect of recreational physical exercise on endothelial progenitor cells of healthy children

souza L, F De Meneck, MC Pinho Franco

Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

As cardiovascular diseases (CVD) are a leading cause of death in developed countries, studies have found that mechanisms involved in CVD development can begin to function even in childhood and adolescence. In addition, one of the main mechanisms involved in the development of CVD is vascular function. Considering that as endothelial progenitor cells (EPCs) may contribute to maintenance of vascular integrity and blood vessel formation, we hypothesized that a reduction in vascular endothelial modulating function may be related to CPE impairment. On the other hand, has been observed in physical training can increase the number and functional capacity of the EPCs. This way it becomes special evaluation of effects of physical training, it is not a number and capabilities of EPCs, in children and adolescents. Objective: To evaluate the effect of 10 weeks of exercise, recreation, number of posts and properties of EPCs in healthy children and adolescents aged 6-12 years. Methodology: For this purpose, 74 children (31 girls, 43 boys) aged 6-12 years were evaluated. Anthropometric reviews, body composition and physical abilities were performed. In addition, we evaluated the number of CPEs by means of flow cytometry (triple brands: CD34 + / CD133 + / CD309 +), a feature of CPEs by evaluating colony forming units (CFUs), as well as plasma levels of VEGF-A, MMP-9, MMP-2, NO. Results: After a practice of recreational physical exercise, there was a significant reduction of body weight, increase of lean mass, muscle strength and flexibility. Regarding CPEs, significant increase was observed both as a number and functionalities for cells. Regarding vascular markers, we observed a significant increase in the circulating levels of VEGF-A, MMP-9 and NO after 10 weeks of recreational physical exercise. On the other hand, after this period, we observed to reduce our circulating levels of MMP-2. Conclusion: We can conclude that the protocol of 10 weeks of recreational physical exercise and capable of promoting beneficial effects on the anthropometric parameters and body composition, in addition to a positive effect on the physical fitness of healthy children. We also found a significant increase in the number and functionality of CPEs.
Parental factors related to physical activity among adolescent men living in built and natural environment – a population-based MOPO study

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Purpose: Adolescents' physical inactivity is a global concern and it may lead to other unhealthy behavior. Parents are of great importance in children's health behavior, but the research on the role of parents in the context of residential environment is scanty. We aimed to reveal the parental factors associated with physical activity among adolescent men living in built and natural environment.

Methods: Entire age cohort of adolescent men can be reached every year in call-ups organized by the Finnish Defense Forces. All men who attended the conscription in the Oulu area of Northern Finland in 2012 and 2013 (N = 2,547) were asked to fill out a questionnaire enquiring about physical activity, parental factors, and lifestyle. Altogether, 1,904 men (75%) (mean age 17.9, SD 0.7y) completed the questionnaire. Daily moderate-to-vigorous physical activity (MVPA) in a sub-sample of 202 men was measured with a wrist-worn activity monitor for one week in 2013. Geographical information system methods were used to define the dominant land use type of residential environment within 1-kilometer radius buffer zones around participant's home address. Residential environment was divided into built environment (i.e. artificial surfaces) and natural environment (rural areas and areas dominated by nature).

Results: According to multivariable analysis, mother's physical activity (OR 1.9; 95% CI 1.3 - 2.8) was positively associated with physical activity in men living in built environment and father's physical activity (2.8; 1.7 - 4.8) in natural environment. Self-rated health was positively associated with physical activity level (built: 5.9 (4.0 - 8.7); natural: 5.2 (3.0 - 9.0)). Those with symptoms of depression were more likely to be physically inactive (built: 0.5 (0.3 - 0.8); natural: 0.3 (0.1 - 0.6)). Adolescent men were equally physically active regardless of the living environment (built: 60 minutes (SD 25) daily MVPA; natural: 62min (SD 29); p=0.531 for the difference between the groups).

Conclusions: Physical activity of parents is associated with PA in adolescent men but this association differed between the built and natural living environment. Factors associated with physical activity should be considered more individually when designing physical activity promotion in adolescent men by the residential environment.
(Dis)similarity of children’s and parents’ perception of parental support and its relation to children’s physical activity: A cross-sectional study with parent-child dyads

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Purpose: A large amount of studies examined different parental influences (e.g. parental support) on children's health behaviors. Literature shows that parents are "gate keepers" of children's engagement in physical activities. However, there is a lack of studies that addressed the (dis)similarity of children's and parents' perceptions of parenting behaviors especially in the physical activity (PA) context. The aim of this study was a) to examine the difference between children's and parent's perception of parental support, b) how both perceptions are related to children's behaviour, and c) how the perceptions are interrelated with children's and parent's psychosocial determinants of PA.

Methods: Two hundred eighty three parent-child dyads took part in the study. The children (51.9% female) had a mean age of 10.74 years (SD=1.34). Children's PA, children's and parents' perception of parental support, and their psychosocial factors (e.g. self-efficacy) were assessed with questionnaires. The difference between the child and parent report were tested with paired t-tests. Agreement between children and parents rating was quantified using the mean bias (mean child - mean parent) and intra-class correlation coefficient (ICC). Path analysis and structural equation modeling (SEM) were performed to analyse the interrelations between parental support, psychosocial factors and children's PA. A bootstrapping procedure was used to test direct and indirect effects.

Results: Children's and parent's perception of parental support significantly differed (p<.05). The ICC=.39 reflected a poor agreement, the mean bias was M=.12 (SD=.81). Path analysis revealed that only children's perception is associated with children's PA (βa=.26, p=.02). The applied model showed an acceptable fit (χ²=117.42, df=80, p=.004; χ²/df=1.47; CFI=.97; RMSEA=.03, CI .02/.04, p=.99) and explained 15% of the variance in children's physical activity. The model revealed that parents' as well as children's perceptions of parental support are with parents' psychosocial factors. Furthermore, parents' psychosocial factors are directly related to children's psychosocial factors and indirectly to their physical activity.

Conclusions: The results showed that there is a meaningful dissimilarity in the perception of parental support from children's and parents' view. In further analyses we will explore how similarity and dissimilarity within parent-child dyads is related to children's PA.
Associations of accelerometer-measured physical activity with subjective and objective measures of sleep in a sample of Nova Scotian preschoolers aged 3 to 6 years

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Objective: While poor sleep is common among children in today's society, it is clear that for optimal development children need to obtain sufficient sleep quantity and quality. A substantive body of research demonstrates various negative effects of poor sleep on health. It is therefore essential to develop ways to promote healthy sleep in children. Engaging in physical activity is often recommended to help children sleep better. Limited research exists examining this recommendation for preschoolers, and there are inconsistencies among the existing literature regarding the relationships between physical activity and sleep. The purpose of the current two-part study was to examine the relationships between objectively measured physical activity and subjectively and objectively measured sleep in preschool-aged children.

Methods: A sample of 34 children (20 boys, 9 girls) ages 3-6 years and their parents provided data. In sub-study 1, children's physical activity was assessed via waist accelerometry. Sleep was measured subjectively via parental report. In sub-study 2, children wore a wrist accelerometer to objectively measure sleep simultaneously to wearing the waist accelerometer to measure physical activity. Logistic regression was used to determine the relationship between total physical activity and sleep duration, sleep onset latency and night awakenings in sub-study 1. Linear regression was used to determine the relationship between total physical activity and total sleep time, sleep onset latency and sleep efficiency in sub-study 2.

Results: In sub-study 1, objectively measured total physical activity predicted subjectively measured sleep onset latency ($b=0.69$, SE=0.41, p=0.09) and night awakenings ($b=−1.75$, SE=0.54, p<0.01). In sub-study 2, objectively measured total physical activity predicted objectively measured sleep efficiency ($F(1,25)=4.37$, b=0.36, p<0.05).

Conclusion: Overall, objectively-measured physical activity predicted both subjective and objective measures of sleep quality, but not sleep quantity among this sample of preschoolers. This research therefore provides support for the role of physical activity in encouraging healthy sleep quality in the early years, which may help prevent consequences of poor sleep on health. Future research should determine the causal relationships between activity and sleep through experimental studies and should also further extend knowledge about which movement and non-movement behaviours activity parameters are most important to improve sleep.
What are preschool parents’ perceptions regarding active outdoor play and risk taking?

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Risky play is important for child health and development as it provides opportunities for children to build persistence and resilience, explore limits and boundaries, and to develop physical abilities. Restriction of risky play opportunities has been noted to have a negative impact on physical activity behaviours. Some studies suggest a relationship between parent's perceptions of risky play and children's active outdoor play, but further research is needed to describe the contributing factors that influence this relationship. The purpose of this study is to explore the parental perceptions regarding risky play and active outdoor play in the context of a broader research project.

Methods: The Physical Literacy in the Early Years (PLEY) project was a loose parts intervention to promote active outdoor play in preschool aged children. As part of this research, individual and group interviews were held with 20 parents of preschoolers in Nova Scotian licensed child care centres through a face-to-face, semi-structured format. Interviews were audio recorded and then transcribed verbatim. A qualitative description approach was used to identify key themes from the interviews.

Results: Preliminary results suggest that parents' perceptions of the importance of risky play and active outdoor play vary greatly. Many parents promoted risk-taking behaviours for their children, while some others displayed risk averse characteristics. Likewise, some parents expressed that they highly prioritize active outdoor play while others expressed that their child does not engage in much active outdoor play in comparison to their peers. Final results will identify influencing factors that underlie parents who promote risky play, and will be available at the time of the conference.

Conclusions: The results from this research will help to identify parental perspectives that contribute to risky play and active outdoor play. This will help to inform the development of strategies designed to help parents understand the value of risky play in overall child development.
Independent mobility and physical activity among children

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective
Independent mobility (IM) is defined as the freedom of children to move around in their neighborhood without adult supervision. IM has been found to be related to psychosocial, cognitive and developmental health for children. This study examined the associations between IM and physical activity for children in Hong Kong.

Methods
A total of 122 children aged 8 to 10.6 years (29 boys and 93 girls) were recruited from two schools. Moderate-to-vigorous physical activity (MVPA) was assessed by wearing an ActiGraph accelerometer for 7 consecutive days. Children's IM was assessed in two domains: parents' license granted to their children to travel independently and play outdoors without adults, and self-reported mobility behavior. The two IM variables were then categorized into tertiles. Linear mixed models were performed to assess the associations between IM categories and MVPA, adjusting for children's age and sex, maternal education attainment, wear time of the accelerometer, and parents' physical activity level which was assessed using the International Physical Activity Questionnaire (IPAQ) short form.

Results
One hundred and sixteen children provide valid accelerometer data. On average, they spent 46.9 minutes per day in MVPA and no sex difference was found. Boys were granted more license from their parents than girls, at the same time they self-reported a higher degree of IM than girls. Compared with the reference group, i.e., the highest tertile of the self-reported IM, MVPA minutes were fewer in the lowest tertile (b=-us;9.0, 95% confidence interval: -us;17.7, -us;0.4) and in the second lowest tertile (b=-us;10.3, 95% confidence interval: -us;17.9, -us;2.7). No relationships were found between parents' license and children's MVPA.

Conclusions
Self-reported IM was positively related to time spent in MVPA for children in Hong Kong. Future research should investigate how IM may affect domain-specific physical activity.
P2, P2.212

Exploring parents' experiences of promoting physical activity for their child with intellectual disabilities

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Purpose
Children and adolescents with intellectual disabilities participate in low levels of physical activity and experience numerous health inequalities, in comparison with their typically developing peers. Therefore, physical activity is an important behaviour to target and change to improve the health of this population. However, children and adolescents with intellectual disabilities have fewer opportunities for activity and face high levels of exclusion. Previous research has identified parents as having a key role in promoting physical activity, with parents themselves being either a facilitator or barrier. Therefore, the purpose of this study is to expand on existing research by exploring parents' experiences of promoting physical activity for children and adolescents with intellectual disabilities.

Methods
In-depth face-to-face interviews were conducted with eight parents of children and adolescents with intellectual disabilities aged 10-18 years to examine parents' experiences of promoting physical activity for their child with intellectual disabilities. Parents were purposively sampled through schools and clubs for children and adolescents with intellectual disabilities. Interviews were audio-recorded, transcribed, and independently coded and analysed by two researchers using thematic analysis.

Results
The key themes from the thematic analysis will be presented and discussed in relation to existing research and future implications.

Conclusions
Due to the reduced autonomy children and adolescents with intellectual disabilities have, in comparison to their typically developing peers, developing interventions focussed on parents could be an effective way to increase the physical activity levels of children and adolescents with intellectual disabilities. Therefore, the results of this study could provide essential insights that can be developed in future research.
Positive physical activity attitudes and behaviour are linked with wellbeing and lower levels of psychological distress in early adolescence

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Purpose: Mental health disorders rise sharply during adolescence. Their causes are complex and varied, but regular physical activity (PA) and high levels of fitness have been shown to reduce symptoms of depression and promote wellbeing. Recent evidence suggests PA and fitness might also be linked with broader symptoms of psychological distress, particularly in the domains of peer and emotional problems, but studies are typically small and do not include thoughts and feelings about PA. Our aim was to investigate associations between PA attitudes and behaviour, fitness, positive wellbeing and negative psychological distress among a large sample of adolescents.

Methods: Pupils aged 12-13 (n=18,261, 54.8% female) from 104 English schools were invited to participate as part of the Fit to Study Trial (www.fit-to-study.org). Psychological distress and positive self-esteem were assessed using the Strengths and Difficulties Questionnaire and the Physical Self Description Questionnaire. Fitness was measured with a 20m shuttle run test or the Cooper 12-minute run test during PE lessons. We used single-item measures of habitual and weekly PA and three items to assess attitudes. Using cross-validated canonical correlation analysis (CV-CCA), we tested the hypothesis that PA and fitness variables co-vary with individual differences in mental health variables, independent of sex, socio-economic status and school. Statistical significance was assessed with non-parametric permutation testing.

Results: 7,061 pupils (60.2% female) from 66 schools participated. We report one mode of PA/fitness and mental health co-variation: CV-CCA: rho = 0.50; p = 0.001, (based on 1000 permutations). Pupils who scored higher in this mode were those reporting higher levels of habitual PA, more positive attitudes to PA, higher physical self esteem and lower scores on the internalising dimensions of psychological distress (peer relations and emotional problems). Canonical weights were

Conclusion: We found preliminary evidence that a physically-active lifestyle, with a particular emphasis on habitual PA and positive attitudes towards PA, is linked with good mental health, especially positive wellbeing and fewer emotional and peer-related problems. These findings have broad implications for public health and education policies.
OBJECTIVE: To assess the feasibility and efficacy of a community-based youth empowerment intervention to reduce sugar sweetened beverage (SSB) intake and obesity risk among school-aged youth.

METHODS: Participant recruitment and study procedures took place through a youth-based after-school setting (Boys and Girls Clubs (BGC)) in Massachusetts, USA. Two BGC sites were selected for comparability in enrollment size and ethnic composition of participating children. One site was randomized to receive the intervention; the other site received usual care (standard BGC programming unrelated to SSB consumption). Youth ages 9-12 years and their parents/caregivers were eligible for the study. The 6-week intervention consisted of group-based weekly sessions (one-hour sessions twice a week) delivered by trained BGC program staff in the BGC setting. Sessions focused on empowering youth to improve their beverage intake patterns (e.g., replace SSBs with water) through health sessions that targeted nutrition knowledge, confidence, and skill-building activities; narrative sessions that Preliminary efficacy outcomes included child SSB and water intake and BMI z-scores, measured at baseline, 2 months, and 6 months. 6-month change in outcomes were examined using linear mixed models.

RESULTS: A total of 110 child participants (41.9% Black, 23.7% Hispanic, 9.7% multi-racial, 8.6% White, 8.6% Asian) and 97 parent participants were enrolled. Recruitment rates across study sites were >=95%; 6 month retention rates were >=82%. BGC child participants at the intervention site described the intervention as engaging and interactive, and BGC staff reported that the intervention was feasible and acceptable to deliver through the BGC setting. Compared to the comparison site, intervention site child participants reported decreased servings of SSBs per day ($\beta_a=-0.4; \text{SD}=0.7; p<0.01$), increased servings of water per day ($\beta_a=0.8; \text{SD}=0.2; p<0.01$), and decreased BMI z-scores (-0.01 units; $\text{SD}=0.025; p<0.01$) over 6 months.

CONCLUSIONS: Findings demonstrate the potential of reducing SSB intake among youth through a community-based youth empowerment intervention. Findings will guide a larger cluster-randomized controlled trial to test intervention efficacy on preventing childhood obesity through reducing SSB intake as a single behavioral target, as well as inform future interventions that aim to target additional diet and physical activity behaviors through youth empowerment.
Objective: Few studies have examined the implications of dietary concordance between spouses for maternal health, and no studies have investigated dietary concordance among mothers and fathers during pregnancy. This study aims to: (1) describe antenatal dietary concordance; and (2) investigate associations between antenatal dietary concordance and gestational weight gain (GWG) outcomes. We hypothesized that mothers in dyads demonstrating healthy dietary concordance would have lower GWG and lower risk of excessive GWG than dyads demonstrating discordance.

Methods: Mother-father dyads (n=111 dyads) in the First 1,000 Days Study completed surveys during their first trimester of full-term pregnancy. Surveys items assessed fruit/vegetable (FV) and sugar-sweetened beverage (SSB) consumption, and socio-demographics. Dietary consumption variables were dichotomized on consumption frequency >once/day and <once/day. Dyads were categorized as healthy concordant, unhealthy concordant, mother-healthy discordant, and father-healthy discordant based on dichotomized variables. Mothers' GWG was the difference between the last weight before delivery and the first trimester weight (kg) from electronic health records. General linear models and logistic regression were used to assess associations of dietary concordance with continuous and excessive GWG, controlling for marital status, age, education, and pre-pregnancy BMI.

Results: About 25%(n=28) of mothers were Hispanic, 43%(n=48) White, 6%(n=7) Black, and 23%(n=26) Other. Most mothers were employed (62%, n=69), making <$50,000/year (64%, n=71). Average maternal GWG was 11.63kg (SD=6.40), and 40 (36%) mothers had excessive GWG. Mothers and fathers reported eating FV 1.2 (SD=1.1) and 1.0 (SD=1.2) times daily on average, respectively (r=.36, p<.001). Mothers and fathers reported drinking SSBs 0.80 (SD=1.0) and 0.97 (SD=1.2) times daily on average, respectively (r=.13, p=.17). In multivariate adjusted models, the mother-healthy discordant FV group had greater GWG (B[SE]=5.92[2.02 kg], p=.004), compared to healthy concordant mothers. Additionally, mothers in the mother-healthy discordant FV group had higher odds for excessive GWG (OR=5.05, 95%CI=[1.20, 21.303]), as compared to healthy concordant mothers. SSB concordance was not associated with GWG outcomes.

Conclusions: Findings indicate that mothers had greater GWG when fathers had unhealthy dietary behaviors (FV<once/day), even if mothers report engaging in healthy dietary behaviors (FV>once/day) themselves. Researchers should investigate how dyadic antenatal health behaviors may be associated with other pregnancy outcomes.
Assessing the impact of supermarkets location in children’s weight status – a comparison between Portugal and Brazil

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Purpose: To analyse the association between the weight status of schoolchildren and the location of supermarkets by comparing the results among children from Belo Horizonte, Brazil and Lisbon, Portugal.

Methods: This is a cross-sectional study that analysis 697 children from Lisbon and 320 from Belo Horizonte. Children between 8 and 13 years old were assessed by trained people in 24 private/public schools from Lisbon and 17 schools from Belo Horizonte. BMI was calculated and dichotomized in "normal weight" and "overweight/obesity" according to the International Obesity Taskforce cut-off points. The number of supermarkets in different distances buffers around homes and the distance to the nearest supermarket from home was assessed using ArcMap (v.10.4.1). The relationship between proximity to the supermarket and BMI was estimated using the partial correlation test. Associations between the childhood obesity and the presence of supermarkets within buffers of different distances around each home (computed using ArcGIS) were estimated by binary logistic regression models. All analyses were adjusted for children's sex, age and SES (using mother schooling level as proxy).

Results/findings: In both municipalities the partial correlation between BMI and the distance to nearest supermarket shows a positive and significant correlation. In Belo Horizonte having a supermarket within 750m or more protects children from obesity and in Lisbon the same result is found only to distances of 250m.

Conclusions: This study shows that children weight status is influenced by the presence and distance to supermarkets both in Belo Horizonte and in Lisbon, in different ways. Thus, the association between specific aspects of the food environment and children weight status varies according to other local environment features.
Impact of a school-based nutrition intervention on fruit and vegetable waste at school lunches – Results from the Brighter Bites pilot plate waste study

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: To determine the preliminary impact of the Brighter Bites nutrition intervention on decreasing fruit and vegetable (F&V) waste at school lunches among 4th and 5th grade children.

Methods: This was a quasi-experimental pre-post evaluation study conducted in Houston and Dallas, Texas, USA. Two schools received the Brighter Bites intervention (n=76 children), and one comparison school did not receive Brighter Bites (n=39 children) in the 2017-2018 school year. Brighter Bites is a 16-week school-based nutrition intervention providing weekly distribution of 20-25 lbs of fresh, donated F&V plus nutrition education in school and at home among low-income families. Main outcome measures were direct observation and weights to measure the number of F&V dishes selected at school lunches, amount of F&V wasted, and related nutrient loss. Each child was measured at 4 time points throughout the school year at baseline, end of fall (mid point of intervention), beginning of spring, and end of intervention at the end of the school year. Mixed-effects linear regression analysis adjusting for clustering effects of the school and city were used for analysis.

Results: All the participating schools had 90% or more of the children were from low-income families. At baseline, 59% of the F&V at the school lunches were a 100% wasted. There was a significant decrease over time in proportion of F&V selected among those in the control school, but not the intervention schools (p<0.001). Children receiving Brighter Bites showed a significant decrease in the amount of F&V wasted at each meal ($\beta_a = -32.06, 95\% \text{ CI:} -48.9, -15.2; p<0.001$), and reduced waste per item ($\beta_a = -28.9, 95\% \text{ CI:} -39.5, -18.3; p<0.001$). We also found significant decreases in waste of energy (kcal), dietary fiber (g), vitamins B1 (mg), B3 (mg), B6 (mg), total folate (mcg), and B12 among those receiving Brighter Bites as compared to those in the comparison school (p<0.05). Overall retention rate across the four time points of measurement was 79%.

Conclusions and implications: F&V waste at school lunches continues to be a costly issue in the U.S. School-based nutrition interventions may have a significant impact on reducing F&V waste and related nutrient loss at the school lunches.
20473

P2, P2.219

Correlates of sugar-sweetened beverages consumption among adolescents

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Purpose. Sugar-sweetened beverages (SSB) consumption is associated with many health problems such as obesity, diabetes and dental carries. The study objective was to identify correlates and underlying beliefs regarding the intention to abstain from consuming SSB and the consumption of = one portion/day of SSB among adolescents.

Methods. A total of 311 adolescents from Eastern-Canada, aged 13-18 years, completed a self-administered online questionnaire based on the Reasoned Action Approach. Frequency and quantity of different types of SSB within the past month were measured. Linear regressions analyses were used to identify correlates and underlying beliefs of intention to abstain from SSB. Logistic regression analyses allowed the identification of correlates of = one portion/day of SSB and Spearman correlations, of underlying beliefs linked to SSB consumption.

Results. Total mean SSB intake was 156.3 kcal/day. Only 11.3% abstained from SSB within the last month. Intention to abstain from SSB was explained by personal identity (β= 0.47), perceived norm (β = 0.32), attitude (β = 0.30), ages 13-14 years (β = -0.27) and perception of the school environment (β = 0.14), which explained 66% of the variance. Consumption of = one portion/day of SSB was explained by intention to abstain (odds ratio [OR] = 1.55; 95% confidence intervals [CI]: 1.14-2.11), perceived control to abstain (OR = 1.80; 95%CI: 1.29-2.52), sex (girls vs. boys: OR = 2.34; 95%CI: 1.37-3.98) and socioeconomic status (advantaged vs. disadvantaged school: OR = 2.08; 95%CI: 1.21-3.56). Underling behavioral (i.e., more energy, decreased risk of addiction) and normative beliefs (i.e., friends) associated with intention to abstain were identified. Perceived barriers (i.e., access to SSB, after an activity that makes you thirsty, liking their taste, being with SSB consumers, seeing advertisement, eating at the restaurant, feeling the urge to drink SSB and special occasions), and facilitating factors (i.e., access to water, getting more information about the health effects of SSB ) associated with SSB consumption were also identified.

Conclusions. The results allowed the identification of targets to prioritize in interventions aimed at decreasing SSB consumption and associated health problems among adolescents. Interventions should ideally have both environmental and educational components.
CookKit: Development of a cooking skills and ‘meal kit’ intervention to improve dietary behaviours among primary-aged children from families experiencing deprivation

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Around 14% of UK cancer cases can be attributed to excess weight or dietary factors, with the greatest risk concentrated in those experiencing social and economic deprivation. Interventions to improve diets through enhancing dietary knowledge and teaching cooking skills have become widespread in primary schools, but their effectiveness is limited by skills not being transferred to the home. We aimed to develop a novel cooking skills intervention for primary-aged children from deprived areas that would improve knowledge of nutrition and cancer and promote transfer of skills outside of the classroom via the use of ‘meal kits’.

Methods: Researchers with expertise in nutrition, cancer, behaviour change and design developed the intervention. A steering group consisting of teachers, parents and organisations involved in the preparation and delivery of ‘meal kits’ or cookery classes provided additional input. A review of existing interventions from both the academic and grey literature was conducted to identify key features.

Interviews with teachers and parent-child dyads explored attitudes, barriers and facilitators for healthy eating, alongside preferences for a feasible, engaging school-based intervention. Recipes were trialled with families, and teachers ensured teaching materials were appropriate.

Results: A manualised intervention was developed to support the delivery of 4 cooking classes run once a week. The classes use a stepped approach, introduce new nutritional information and cooking skills each week, and involve 30 minutes in a classroom-style lesson and 90 minutes of cooking. The accompanying manual includes teaching materials, recipes, and instructions for preparing party bag-style meal kits for the children each week. These bags contain the ingredients, recipe and a 'shopping list' to encourage meal preparation at home. Materials re-emphasise nutritional messages taught within the session, including information on the associations between diet and cancer.

Conclusions: We have developed a novel cooking skills intervention based upon previous research, pilot work and involvement of experts, promoting the transfer of skills to the home environment and awareness of the associations between diet and cancer. A pilot study will assess the impact, feasibility and acceptability of the class with 8-year olds in one of the most deprived schools in the country.
How parental food choice motives and health promoting feeding practices predict the toddlers’ fruit and vegetables intake. Mediation analyses using data from the Food4toddlers study

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Objectives
Parents have a major influence on toddlers’ diet and are the main gatekeepers for the provision of fruit and vegetables. The aim of this study was to assess the association between parental motives underlying food choices and children's fruit and vegetables intake, and how parental feeding practices mediate this association.

Method
Participants were 298 parents of toddlers who attended the Food4toddlers study. Before the child turned one year, parents completed an online questionnaire (baseline). The parents' mean age was 31.7 (SD: 4.2) and 86.7 % were born in Norway. The associations between five constructs of parents’ motives underlying their choice of food (health, sensory appeal, convenience, price and familiarity) and the child's fruit and vegetables intake, were assessed. In addition, the mediation effects of three health promoting feeding practices (shaping the environment, encourage balance and variety and healthy modeling) on this association were examined.

Results:
The results showed that if parents chose food out of health motives, the children ate more vegetables (p<0.001), but not more fruit (p= 0.473). Other food choice motives (convenience, sensory appeal, price and familiarity) were not associated with fruit or vegetables intake. Single mediation analyses showed that shaping a healthy environment, was the strongest mediator and mediated the relationship between health motives and both vegetables and fruit intake. In addition, the feeding practice to encourage balance and variety was a mediator in the relationship between health motives and vegetables intake and between sensory appeal motives and vegetables intake.

Conclusion:
Parental health motive when choosing food is associated with a higher intake of vegetables among their children. Implications of the Food4toddlers study underpin future promotion of shaping a healthy environment and encourage balance and variety as ways for parents to assist their children in consuming more vegetables and fruit.
Feeding styles and child weight status: A longitudinal study of the direction of effects

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: The parental environment is an important determinant in development of child eating behaviors and subsequent childhood obesity. The aim of this study was to examine the direction of effects between maternal feeding styles and children's weight status among low-income children across a 4-year period beginning in preschool age and extending to middle childhood.

Methods: Low-income Latina mothers and their preschool children (n = 119) participated in the longitudinal study. Families were recruited from Head Start centers in a large urban city in southeast United States. Children were assessed at baseline (4-5 years old; Time 1), 18 months after baseline (Time 2), and 3 years after baseline (Time 3). At each time point, child height and weight were measured by staff and mothers completed the Caregiver's Feeding Styles Questionnaire. A cross-lagged analysis was used to test whether maternal feeding styles were a stronger predictor of later child weight status (child BMI z score), or if child weight status was a stronger predictor of maternal feeding style.

Results: The cross-lagged panel analysis showed good fit once the error terms for indulgent feeding at Times 2 and 3 were allowed to correlate, \( \chi^2(24) = 34.68, p = 0.07, \chi^2/df = 1.44, CFI = 0.99, RMSEA = 0.06. \) High levels of stability in child BMIz existed between time points (Time 1 to Time 2: \( b = 0.91, p < 0.001; \) Time 2 to Time 3: \( b = 0.94, p < 0.001 \)). Indulgent feeding was the only feeding style that predicted child BMIz at the subsequent time points (Time 1 to Time 2: \( b = 0.11, p < 0.05; \) Time 2 to Time 3: \( b = 0.08, p < 0.07 \)). From Time 2 to Time 3 the effect was marginally significant; however, no other feeding style predicted child BMIz over time. Child BMIz did not predict any of the three feeding styles at subsequent time points.

Conclusions: Previous studies have consistently shown associations between indulgent feeding styles and child weight status. Results of the current study extend previous findings by showing the direction of effects between indulgent feeding and child weight status. The information from this study can inform primary care, public health, and prevention efforts to combat childhood obesity.
Exploring school children's knowledge and beliefs about nutrition and health

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Objective: Factors that influence children's knowledge of nutrition and health include marketing, environment, family and friends, social media, and schools. While the factors that may influence children's beliefs are well described, considerably less is known about what New Zealand children know, understand, and believe. The results of this study will be useful for informing the design of nutrition education programmes in primary schools for this age group.

Methods: This qualitative, cross-sectional study used semi-structured focus groups to explore the knowledge and beliefs of 9-11 year old children, in co-educational and state-operated schools in West and South Auckland, NZ. Focus groups were audio recorded and children completed forms detailing their demographic information. Audio recordings were transcribed and uploaded into NVivo 12, which was used to conduct a semi-deductive thematic analysis.

Results: A total of 74 children from six schools participated. Just over half of the participants were female (53 %) and most identified as NZ European/ Other (40 %) or New Zealand Maori (27 %). Five main themes relating to children's beliefs about food's influence on health were revealed: energy, sleep, illness, growth and brain health. Healthy eating and physical activity were thought to be the most important habits for good health and children primarily understood health to mean physical wellbeing. The importance of a 'balanced diet' was frequently discussed, which children interpreted as the consumption of both 'healthy' and processed foods in moderation. The predominant area of confusion for children was around the theme of energy and whether 'healthy' or processed food provided the most energy. Children were often able to identify sources of micronutrients, particularly vitamin C, vitamin D, calcium and iron; some children were able explain the role these micronutrients play in health.

Conclusions: The findings indicate that children often advocate for moderation and a balanced diet. Furthermore, the results suggest that children are capable of critically thinking about food's effect on health. Children in this study believed that nutrition influenced mood, learning, concentration and sleep, beliefs that have not been observed in previous research.
P2, P2.225

Understanding determinants of water consumption behaviors among youth: A comparison between a Caribbean and European context

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: The increase in obesity among youth is an important public health challenge in many countries. One of its contributing factors is the global upward trend of sugar-sweetened beverage (SSB) consumption, with water being the healthy alternative. Different country contexts may influence water and SSB consumption differently. To inform the design of future interventions encouraging water consumption in order to reduce obesity between different countries, this study compared water consumption determinants of youth from different world regions - the Caribbean and Western Europe. The examined determinants are derivatives of prominent behavior theories and include behavioral intentions, social norms, and intrinsic motivation.

Methods: For this cross-country multi-theoretical study, youth (N= 1,584; 52% girls; M= 12.34 years, ±smn; SD= 2.14) in Aruba (n= 792) and the Netherlands (n= 792) filled out a questionnaire assessing their water consumption, intention, attitude, perceived behavioral control, perceived descriptive and injunctive norm of parents and friends, and intrinsic motivation.

Results: Multiple regression analyses showed that the country of residence modified two associations differently and two associations similarly. Intrinsic motivation associated positively to water consumption, but this association was stronger for youth residing in Aruba (B= 0.55, p< .001) than for the Netherlands (B= 0.26, p< .001). The perceived descriptive norm of friends associated positively to water consumption, but was stronger for Aruba (B= 0.30, p< .001) than for the Netherlands (B= 0.12, p= .03). Furthermore, for both countries attitude and perceived behavioral control associated similarly with water consumption.

Conclusions: Considering the importance of intrinsic motivation for this international sample, it is promising for future interventions to focus on strengthening youth's water consumption motivation. The stronger association for intrinsic motivation and water consumption for Aruba may be explained by the influence of the tropical climate of Aruba compared to the influence of the Netherlands's temperate climate on beverage consumption, therefore, future Aruban programs could use this climate element to motivate youth to consume water. Additionally, the strength difference for the social norm may be explained by the difference in community size, therefore, future interventions in small communities, like Aruba, could focus on increasing youth’s perception of water consumption within their social networks (e.g., schools).
Don’t Sugarcoat It: Exploring parent perspectives surrounding child caffeinated sugar-sweetened beverage consumption

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Purpose: Sugar-sweetened beverages (SSBs) contribute to excess energy and sugar intake and account for the majority of pediatric caffeine consumption. This study sought to understand the reasons why children consume caffeinated SSBs (CSSBs) and to explore the extent to which parents believe that removal of CSSBs from the child diet for ~2 weeks would be feasible and acceptable.

Methods: Qualitative one-on-one interviews were conducted with 10 parents (90% female; 60% non-Hispanic-black) of children 8-17 years old who reported child consumption of ≥1 serving CSSBs/day. Participants were asked a series of questions using a semi-structured interview guide, investigating reasons for CSSB consumption and any perceived behavioral changes following ingestion. Parents were also asked how their child would potentially respond to replacement of CSSBs with other beverages for ~2 weeks. Interviews were audio-recorded and transcribed verbatim. Thematic analysis is underway and will be completed using NVivo™.

Results: Child CSSB consumption was primarily driven by modeling behaviors of parents and older siblings, although sweet and/or ‘acidic taste’ and ‘being tired of water’ were also frequently mentioned. Nearly all parents reported child hyperactivity following CSSBs, which parents attributed primarily to their sugar content. Difficulty sleeping, and being jumpy, jittery, loud, or talkative after CSSBs were also mentioned. Three primary themes as to how children may respond to CSSB restriction emerged: 1) restlessness, including counting the days until they could access CSSBs; 2) disobedience, including refusal to do chores, and making disrespectful remarks to parents and 3) CSSB seeking, including sneaking CSSBs into the bedroom and looking for change to purchase CSSBs. Despite the negative child responses anticipated, most parents believed that CSSB restriction would ultimately be acceptable to children after a few days of restricted consumption.

Conclusions: Reported behavior changes following child CSSB intake were noted, several of which may be attributable to effects of caffeine. Parents reported a range of potential child responses to CSSB restriction, but ultimately believed that children would comply. These findings will be integral in designing an acceptable and feasible intervention to understand mechanisms through which caffeine and sugar, in combination, may uniquely reinforce CSSB consumption among children.
A multi-level model for understanding the factors predicting health behaviors: Physical activity and healthy nutrition habits among students in Israel

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: The World Health Organization has defined school systems as the significant framework for health promotion, because they provide a platform that is easily accessible to most children. The goal of the present study is to examine the association between health promotion policies of school principals and student-level factors that predict health behavior patterns: physical activity and proper nutrition.

Methods: This cross-sectional study is based on data from the Health Behavior in School-Aged Children (HBSC) survey that included 7,000 students in grades 6, 8, and 10 in secular and religious public schools and in Arab schools, and about 126 principals.

Results: The findings of the study indicate: at the student level boys perform physical activity more frequently than girls (B=0.80, p<0.01); with increasing age there is a decrease in the frequency of physical activity (B=-0.34, p<0.01); students from a high socio-economic background are more physically active (B=0.10, p<0.01); and students in religious public schools are less physically active compared to students in secular public schools (B=-0.37, p<0.01).

At the multi-level, implementation of a policy that encourages physical activity is a predictor of physical activity habits at the student level (B=0.09, p<0.05). Moreover, findings show that school nutrition policies (OR=0.89, p<0.05) and principals' commitment to health promotion (OR=1.13, p<0.01) predict healthy eating habits among students. Findings also indicate that students in the Arab sector consume less healthy food compared to students in public schools (OR=0.54, p<0.05).

Conclusion: The results of the current study emphasize the importance of implementing health promotion policies in schools by principals to improve students' physical activity and healthy eating habits.
The impact of a parent-focused pilot intervention targeting childhood overweight and obesity on children’s health-related quality of life

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Research suggests that increased weight status among children has a moderate to strong negative influence on health-related quality of life (HRQoL). The purpose of the current study was to evaluate the impact of a group-based, parent-focused pilot intervention targeting childhood overweight and obesity ("C.H.A.M.P. Families") on children's HRQoL up to 6 months post-intervention.

Methods: C.H.A.M.P. Families was a 13-week pilot intervention, consisting of 8 group-based educational sessions, offered to parents of children with overweight or obesity (aged 6-14 years with a body mass index = 85th percentile for age and sex). HRQoL was measured via the PedsQL Inventory 4.0 (Varni, Seid, & Rode, 1999) using both child report and parent-proxy report measures of the child's HRQoL in physical (n = 8), social (n = 5), school (n = 5), and emotional (n = 5) domains (the latter three of which were aggregated to create a psychosocial HRQoL score). HRQoL was assessed at baseline, mid-intervention, post-intervention, and 6 months post-intervention (follow-up). A single-subject analysis method was used to examine the level (i.e., magnitude of change) and trend (i.e., slope) of the data.

Results/Findings: Single-subject analysis of nine children (Mage= 9.7 years, SD = 1.8) and nine parents (Mage= 41.5 years, SD = 6.1) revealed that although the outcomes were not universally positive, six of the nine children reported increases in physical HRQoL from baseline to follow-up (Mtrend = 0.51, SD = 1.93), and seven reported increases in psychosocial HRQoL (Mtrend = 0.85, SD = 0.85). Parent-proxy scores tended to be lower than child-reported scores, although four parents reported increases in their child's physical HRQoL (Mtrend = 0.45, SD = 1.26) and six reported increases in their child's psychosocial HRQoL (Mtrend = 0.25, SD = 0.82) from baseline to follow-up.

Conclusion: Enhanced HRQoL among children has important implications for child and family health and wellbeing. This study sheds light on the potential to target and improve physical and psychosocial HRQoL among children via the implementation of a unique parent-focused intervention. Preliminary knowledge gained will be discussed and used to inform the development of future family-based paediatric overweight and obesity interventions.
Associations between parent and child screen-based sedentary behaviours at home

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Children and families (SIG)

Objective: Parental role modelling is an important influence on children's sedentary behaviour, particularly within the home setting; however, the relationship with new sedentary technologies is poorly understood. This study examined associations between child and parent screen-based sedentary behaviours at home.

Methods: Parents of 8-15 year-old children living in Australia completed an online survey reporting the time they and their child spent engaged in six screen-based sedentary behaviours in the home (computer/laptop for homework/work; computer/laptop for leisure; watching TV/videos/DVDs; tablet/smartphone for homework/work; tablet/smartphone for leisure; and gaming consoles) on an average weekday and weekend day. For each sedentary behaviour, average duration (mins/day) was calculated for parents and for children ([weekday x5]+(weekend day x2))/7 and converted into quintiles. Spearman correlations determined associations between parent and child behaviours.

Results: On average, parents (n=426, mean age 40.5±smn;6.2 years, 94% female) reported spending 80mins per day using a tablet/smartphone for leisure; 62mins watching TV/videos/DVDs; 45mins using computer/laptop for homework/work; 35mins using computer/laptop for leisure; 11mins using tablet/smartphone for homework/work; and 2mins using computer game consoles within the home. On average, parents reported their children (n=426, mean age 11.1±smn;2.6 years, 55% male) spent 70mins per day watching TV/videos/DVDs; 56mins using a tablet/smartphone for leisure; 51mins using computer/laptop for leisure; 25mins using computer/laptop for homework/work; 24mins using computer game consoles; and 6mins using tablet/smartphone for homework/work at home. The relationships between parent and child behaviours were mixed: computer/laptop for leisure rs 0.302, p<0.01; tablet/smartphone for leisure rs 0.290, p<0.01; TV/videos/DVDs rs 0.257, p<0.01; games consoles rs 0.184, p<0.01; computer/laptop for homework/work rs: 0.142, p<0.01; and tablet/smartphone for homework/work rs 0.101, p<0.05.

Discussion and conclusions: The most prevalent screen-based sedentary behaviours performed at home were leisure time tablet/smart phone use and TV/video/DVD use. The associations between parent and child behaviours were modest, varied by sitting behaviour, and the largest correlation was amongst leisure time sedentary behaviours. Future research should consider capturing screen multi-tasking, objective monitoring in situ, and parent and child co-participation versus solo engagement in screen-based sedentary behaviours which may result in different role-modelling relationships.
Content of screen time moderates the effects of exposure on physical health, psychological and educational outcomes in a longitudinal study of 4,013 children

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Purpose
It is widely accepted that excessive engagement with digital screens is harmful to children's health. However, new evidence suggests that the relationship may be curvilinear. That is, moderate levels may not be harmful and may even prove beneficial. Our objective was to investigate this hypothesis using different forms of screen time and a diverse set of outcomes.

Methods
We used data from Growing Up in Australia: The Longitudinal Study of Australian Children. Data were collected from a representative sample of children (N = 4,013; initially aged 10-11) every two years between 2010 and 2014. Screen time was measured using self-reported time-use diaries, and categorised into five types: social (e.g., social media), passive (e.g., TV), interactive (e.g., video games), educational (e.g., computer for homework), or other (e.g., internet shopping). We used measures of children's physical health (BMI, waist circumference, parent-reported overall health), health-related quality of life (Paediatric Quality of Life Inventory), socio-emotional outcomes (Strengths and Difficulties questionnaire and School-Age Temperament Inventory) and school achievement (standardized tests). Our analysis plan was pre-registered prior to any data analysis, and models were adjusted for gender, socio-economic status, ethnicity, number of siblings, and housing factors.

Results
We observed linear associations between total screen time and all outcomes, such that more screen time predicted worse outcomes. However, when the associations were examined by type of screen time, we observed significant variability in outcomes. Passive screen time was associated with consistently worse outcomes, while educational screen time was associated with positive educational outcomes and had no negative relations with other outcomes. Interactive screen time had positive associations with educational outcomes, but negative associations with other outcomes. Overall effect sizes were small, with almost all relationships showing less than 0.05 of a standard deviation difference in the outcome per additional hour of screen time. We found little evidence to support curvilinear relationships.

Conclusions
When considering how much children interact with electronic media, policy makers, educators, and parents should consider the manner in which screens are being used and weigh the likely benefits and harms across diverse outcomes.
Factors predicting trajectories of physical activity and sedentary time in children and adolescents: The UP & DOWN Study

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective
While physical activity typically declines and sedentary behaviour increases during childhood and adolescence, trajectories of these may differ between individuals. Youth are faced with different barriers and enablers (correlates), which can influence their trajectories in these behaviours over time. The aim of this study is to explore the individual, social and environmental correlates that predict activity-related behaviour trajectory membership among children and adolescents.

Methods
This study utilises data from a longitudinal study with three annual timepoints among Spanish children (n=647, mean age=9.1±smn;0.4 years, 50.4% boys) and adolescents (n=1038, mean age=13.6±smn;1.7, 51.6% boys) recruited between 2011 and 2012. Group-based dual trajectory analysis was conducted separately for children and adolescents to identify trajectories based on accelerometer measured moderate-to vigorous physical activity (MVPA) and sedentary time. Potential correlates were self-reported and included 24 individual, social and environmental factors. Multinomial logistic regression analysed the odds of classification in a given trajectory based on each potential correlate (adjusting for significant covariates).

Results
Two trajectories for MVPA and sedentary time for both children and adolescents were found. Among children, there was a 40% increase in likelihood to follow a positive linear trajectory with higher baseline sedentary time for each unit increase in perceived cons of reducing sedentary time compared to lower baseline sedentary time. With each unit increase in co-participation in physical activity with a friend, children were 20% less likely to follow a negative linear trajectory with lower baseline MVPA compared to that of higher baseline MVPA. Adolescents were 16% less likely to follow a positive linear sedentary trajectory with each unit increase in parent co-participation in physical activity compared to following a stable sedentary trajectory. For each unit increase in perceived cons of reducing sedentary time and friend physical activity co-participation, adolescents were 48% more likely and 22% less likely, respectively, to follow a stable MVPA trajectory with lower baseline MVPA compared to one with higher baseline MVPA.

Conclusions
Different factors predicted MVPA and sedentary time trajectories among children and adolescents. Results suggest that intervention strategies need to target both age- and behaviour-specific correlates rather than following a 'one size fits all' approach.
20425

P2, P2.236

The association of parents’ nationality with adolescents’ physical activity, sitting time, and BMI in South Korea

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Purpose: As multicultural families and youth in racial/ethnic minority groups are rapidly increasing in South Korea, the purpose of this study was to examine the association of parents' nationality with physical activity, sitting time, and BMI among adolescents (12-18 years) in that country.

Methods: The 2018 Korea Youth Risk Behavior Wed-Based Survey was used for analysis. Parents' nationality (i.e., South Korean parents or multicultural parents), moderate-to-vigorous-intensity physical activity (MVPA; 0-7 days), vigorous-intensity physical activity (VPA; 0-5 days), muscle and bone strengthening activities (MSA; 0-5 days), recreational sitting time, and BMI were assessed. Analysis of covariance and logistic regression were performed to compare the levels and likelihood of physical activity, sitting time, and BMI according to parents' nationality.

Results: Of 51,376 adolescents (M age = 15.0 years; 49.3 % female), 763 had at least one parent with foreign nationality (i.e., multicultural parents). The average number of days per week engaging in at least 60 minutes of MVPA (1.79 ± smn; 0.07 days/week vs. 1.94 ± smn; 0.01 days/week; p = .041) and 20 minutes of VPA (1.93 ± smn; 0.06 days/week vs. 2.13 ± smn; 0.01 days/week; p = .001) were significantly lower in adolescents with multicultural parents compared to adolescents with South Korean parents. Adolescents with multicultural parents showed significantly higher sitting time (237.01 ± smn; 5.41 min/day; p < .001) and BMI (21.54 ± smn; 0.12 kg/m2; p = .022) than adolescents with South Korean parents (211.10 ± smn; 0.66 min/day; 21.26 ± smn; 0.01 kg/m2). In addition, adolescents with multicultural parents, compared to adolescents with South Korean parents, were associated with a lower likelihood of reporting MVPA = 1 day/week (Odds Ratio[OR]: 0.82, 95%CI: 0.70-0.95), VPA = 1 day/week (Odds Ratio[OR]: 0.79, 95%CI: 0.66-0.93), sitting time = 120 min/day (Odds Ratio[OR]: 0.68, 95%CI: 0.57-0.81), and BMI < 23 kg/m2 (Odds Ratio[OR]: 0.80, 95%CI: 0.68-0.94).

Conclusions: Adolescents with multicultural parents engaged in physical activity less frequently, spent longer in sitting, and had higher BMI compared to those with South Korean families. A differential targeted approach may be needed to promote physical activity, reduce sitting, and improve healthy weight among adolescents from multicultural families.
Family factors and 24-hour movement behaviours: A scoping review of the evidence

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: The Canadian 24-Hour Movement Guidelines for Children and Youth demonstrate that the amount of sleep, sedentary behaviour (SB) and physical activity (PA) children engage in a 24-hour period are collectively related to various health indicators. The structure of a child’s day is typically influenced by individuals within their immediate environment with the most influential group being family. Although there is extensive research on the role of family on children’s health and development, little is known about how family factors relate to 24-hour movement behaviours. Therefore, the purpose of the current study was to conduct a scoping review exploring the published evidence of family factors related to sleep, PA, and SB. Methods: Following a scoping review protocol, literature surrounding family factors related to sleep, PA and SB in children aged 0-18 was reviewed to identify the extent of evidence available. Predetermined key search terms for each movement behavior were entered into PubMed, Scopus, PsychINFO, Google Scholar and SPORTDiscus; as well as hand-searching and reviewing reference lists. Findings: A significant evidence-base supports a relationship between parental factors and sibling factors for movement behaviours; however, limited evidence exists to support the relationship between sibling factors and sleep. Influential parental factors included modelling, and support and enforcement. Siblings were predominantly influential by modelling. Conclusion: Overall, the evidence suggests children's 24-hour movement behaviours are associated with family factors, including independent contributions from parents and siblings. More research is required to look at the family as a whole and its influence over time through longitudinal and intervention studies.
Changing home-based sitting behaviours: what may work for Australian families?

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Objective: This study explored the sitting behaviours parents believe they and their child could change to reduce their home-based sitting; and what messages parents need to initiate change.

Methods: Parents of a child aged 8-15 years (n=553) living in Australia completed an online survey. Parents were asked if they were trying to reduce their own sitting and their child's sitting could they reduce participation in six screen-based sitting behaviours at home (response options were: yes, definitely could, maybe, no). Parents were also asked to report how likely (dichotomised as likely/very likely vs unlikely/very unlikely) they would be to reduce their child's sitting at home if told eight statements about the associated risks.

Results/findings: The behaviours parents indicated they and their child could reduce were in the same hierarchical order. The most common behaviour that could be reduced was tablet/smartphone use for leisure (91% of parents and children) followed by TV/video/DVD use (83% of parents, 87% of children), computer/laptop for leisure (80% of parents, 86% of children), games console use (62% of parents, 81% of children), tablet/smartphone use for homework or work (61% of parents, 43% of children), and computer/laptop use for homework or work (55% of parents, 41% of children).

The statement most parents found compelling enough to try to reduce their child's sitting was that their child's sitting may "increase their risk of poor mental health" (85% of parents), followed by "adversely impact their future health as an adult" (82%), "increase their risk of poor muscle and bone health" (82%), "increase their risk for diabetes and cardiovascular disease" (81%), "adversely impact their social skills" (78%), "increase their risk of overweight and obesity" (78%), "adversely impact their academic outcomes" (78%), and "adversely impact their level of resilience" (77%).

Discussion and conclusions: Parents perceived that they and their child could reduce similar sitting behaviours suggesting family-based strategies may be useful within interventions. Education about the impact of sitting on their child's mental and physical health may help reduce sitting time at home. These findings can inform the development of family-based intervention strategies targeting home-based sitting behaviours amongst parents and children.
Parental and environmental correlates of physical activity and screen time among young children (0-5 years) in Canada and South Korea

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Understanding the correlates of physical activity (PA) and screen time (ST) and how they differ between countries is important for tailored health promotion initiatives. The purpose of this study was to examine parental practice and environmental correlates of PA and ST among samples of young children (0-5 years) from Edmonton, Canada and metro Seoul, South Korea (Korea thereafter).

Methods: Participants included a sub-sample of 123 children from the Parents' Role in Establishing healthy Physical activity and Sedentary behavior habits (PREPS) Canada and 122 children from PREPS South Korea. Data were collected during 2014-2017 in Canada and between 2016-2017 in Korea. Children's PA (organized and non-organized PA) and ST (television viewing and video games), parental role modeling for PA and ST, parental support for PA, parental limits for ST, PA and ST-related equipment at home, suitability of playgrounds, and neighborhood safety were reported by parents using the English and Korean version of the PREPS questionnaire. Children's PA and ST variables were log transformed to achieve normality. Multiple linear regression models that adjusted for age and sex were conducted for each sample.

Results: Samples from both countries were comparable for age (Canada M age =3.4±smn;0.7 years vs. Korea M age=3.4±smn;1.2 years; p= .173) and sex (Canada: 50% of girls vs. Korea: 54% of girls; p= .444). Among Canadians, parental screen time (βa=.309, p< .001) was positively, while parental limits for screen time (βa= -.300, p= .001) was negatively associated with child's screen time but no associations existed among Koreans. Among Canadians, neighborhood safety (βa= -.352, p= .010) was negatively associated with children's organized PA. Among Korean children, parental support for PA (βa=.235, p= .014) was positively, while playground suitability (βa= -.315, p=.003) was negatively associated with children's non-organized PA. No other associations were statistically significant.

Conclusions: Correlates identified for organized/non-organized PA, and/or ST among young children were different between Canadian and Korean samples. The findings may inform researchers and policy makers when developing country-specific interventions and programs that are designed to promote physically active lifestyles among young children. However, the results should be confirmed using larger nationally representative samples.
20522

P2, P2.240

Relationships between cognitive and motor development with adherence to canadian 24-hour movement guidelines for children aged 3-5 years

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective:
To examine the associations between meeting the Canadian 24-Hour Movement Guidelines and motor and cognitive development among children aged 3-5 years.

Methods:
Children (n=94) were recruited in Edmonton, Canada from July to October 2018. Total and moderate-to-vigorous-intensity physical activity (TPA & MVPA) were measured with wGT3x-BT ActiGraph accelerometers. Sleep and screen time were measured with parental questionnaire. Gross motor skills [object (OMS, 0-48 units), locomotor (LMS, 0-48 units), and total motor skills (TMS, 0-96 units)] were measured with the Test of Gross Motor Development-2. Cognitive development (working memory, 0-8 units; response inhibition, 0-1 units; and vocabulary, 0-45 units) was measured with the iPad-based Early Years Toolbox. Guideline adherence was defined as: 1) =180 minutes/day of TPA and =60 minutes/day of MVPA (3-4 years) or =60 minutes/day of MVPA (5 years), 2) =1 hour/day (3-4 years) or =2 hours/day (5 years) of screen time, and 3) 10-13 hours (3-4 years) or 9-11 hours (5 years) of sleep per 24-hour period. Descriptive and multiple regression analyses adjusting for covariates were conducted in R.

Results:
The percent of children meeting individual and multiple recommendations were 90.43% for physical activity, 48.94% for screen time, 86.17% for sleep, 11.70% for any 1/3 recommendations, 51.06% for 2/3 recommendations, and 37.23% for 3/3 recommendations. For individual behaviours, meeting the physical activity recommendation was associated with better LMS (B= 6.92; 95%CI: 0.81, 13.03) and TMS (B= 8.84; 95%CI: 0.21, 17.46). Meeting the screen time recommendation was associated with worse OMS (B= -3.62; 95%CI: -6.37, -0.87) and better response inhibition (B= 0.09; 95%CI: 0.01, 0.18). Lastly, meeting the sleep recommendation was associated with better OMS (B= 4.60; 95%CI: 0.47, 8.72) and TMS (B= 7.63; 95%CI: 0.26, 15.00). For combinations of behaviours, meeting any 2/3 (B= 0.18; 95%CI: 0.04, 0.31) and 3/3 (B= 0.20; 95%CI: 0.07, 0.34) recommendations were associated with better response inhibition.

Conclusions:
A high percent of children met the sleep and physical activity recommendations, but only a third met all recommendations. Apart from the screen time and response inhibition association, meeting recommendations were favourably associated with motor and cognitive development.
A comparison between preschoolers attending forest and nature school and traditional centre-based childcare

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Purpose: Recent research has shown that children attending traditional centre-based childcare (i.e., daycares) have low physical activity levels and spend most of their time indoors. Alternative childcare models that promote outdoor time are available and may improve child development. Forest and Nature School (FNS) is a learning program that fosters child-led, unstructured, play-based learning outside of the classroom, and provides children with the opportunity to connect with nature. The purpose of the current study was to determine if physical activity, sedentary behaviour, sleep, motor skills, inhibition, and psychosocial development (social performance, thoughtfulness, self-assertiveness, emotional stability, task orientation, pleasure in exploring) differed between preschool children enrolled in FNS and those enrolled in traditional daycares. Methods: A total of 13 children (male=8, mean age=3.17, SD=.044) participated in the study. Three children were recruited from a FNS and 10 children were recruited from traditional daycares. Physical activity was measured using activPAL accelerometers worn on the thigh for three consecutive days (72-hours), and was calculated using mean step counts. Screen time and sleep were assessed using a parent/guardian-completed modified WHO STEPS Questionnaire. Motor skills (fine and gross) were assessed using the Ages and Stages Questionnaire (3rd Ed.). Inhibition was assessed using the Go/No-Go task from the Early Years Toolbox. Children's psychosocial development was assessed using the Positive Development and Resilience in Kindergarten Scale completed by childcare educators. Results: Bayesian independent samples t-tests revealed substantial evidence for the null hypothesis (no differences) compared to the alternative hypothesis for all outcome variables, except physical activity: sedentary behaviour (BF10=.52), sleep (BF10=.65), fine motor skills (BF10=.59), gross motor skills (BF10=.67), inhibition (prepotent tendency generated, BF10=.54; prepotent tendency restrained, BF10=.91), social performance (BF10=.56), thoughtfulness (BF10=.66), self-assertiveness (BF10=.80), emotional stability (BF10=.53), task orientation (BF10=.53), and pleasure in exploring (BF10=.70). No evidence for either the null or alternative hypothesis was found for physical activity. Conclusion: No differences were found between children enrolled in FNS and traditional daycares. Randomized controlled trials with large sample sizes are needed to examine potential causal associations between FNS and child development.
Sedentary time and physical activity levels in a sample of pre-school children: amounts and correlates


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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Sedentary behaviours, even at an early age, are associated with potential health risks such as obesity, some cardio metabolic risk factors, poorer mental health, and lower levels physical fitness. The aim of this study was twofold: i) to compare the objectively measured sedentary time and physical activity (PA) levels in its different intensity portions between boys and girls; ii) to analyse associations among the risk of overweight and the moderate-to-vigorous physical activity (MVPA) in pre-school children.

Methods: The present cross-sectional study comprised a sample of 134 children (70 males) aged 3-5 years. Height, weight were measured, and BMI was calculated subsequently. A tri-axial accelerometer was used to obtain seven consecutive days of MVPA, as well as the weekly time being sedentary. The t-test was used to analyse the effect of the sex on body size, sedentary behaviour, and physical activity levels; furthermore, logistic regression analysis was used to examine the afore-mentioned relationship among the risk of obesity and MVPA, controlling for sex, age, and sedentary behaviour.

Results: About 16.0% of the sample is overweight or obese (boys 12.2%, girls 20.0%). Boys spent significantly more minutes in the moderate-to-vigorous portion of PA than their female counterparts on the week days (boys: 90.9±smn;21.8; girls: 77.6±smn;21.7) and in the total measured days (boys: 89.5±smn;20.4; girls: 77.7±smn;21.6). MVPA was inversely associated with the risk of being overweight in pre-school children after adjustment for potential confounders; Children with higher levels of MVPA have less likely to be classified as overweight and/or obese than less active children (95% CI 0.96 to 0.99, p<0.05).

Conclusion: Findings of this study revealed males significantly more active than females. Objectively measured MVPA was independent and inversely associated with increased risk of overweight in preschool children. Future interventions for improving weight health in paediatrics should enhance MVPA at early ages.
Exploring grade and sex influences on movement behaviour during the balanced school Day in Northeastern Ontario

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

**Purpose:** The purpose of this study was to examine primary (grades 1-3) and junior (grades 4-6) students' physical activity (PA) and sedentary time (SED) in the context of the Canadian 24-hour movement guidelines (2016) during the school day; specifically, time spent in light intensity PA (LPA; 'step'), moderate-to-vigorous intensity PA (MVPA; 'sweat') and SED ('sit').

**Methods:** Children (n = 159; 52% girls) from two Northern Ontario schools following the balanced school day schedule (i.e. three 100 minute instructional blocks; two 40 min PA/nutrition breaks) wore an omni-directional accelerometer (Philips Respironics ActiCal; 2 sec epoch) for 5 consecutive school days. Pre-determined cut-points (Colley et al., 2011) were used to calculate time spent in LPA, MVPA, and SED during the school day.

**Results:** A 2 (Sex) x 2 (Grade) MANOVA showed that regardless of grade, boys spent significantly less time in SED and more in LPA and MVPA (ps<0.001; hp2 = 0.0-0.11) than girls. Primary students engaged in less SED and more LPA, than junior students, yet less MVPA (ps <0.007; hp2 = 0.05-0.23). During nutrition/PA breaks, girls spent more time in SED and less time in LPA and MVPA than boys (ps<0.01; hp2 = 0.10-0.72). Primary students had more LPA but less MVPA (ps <0.05; hp2 = 0.03-0.04) compared to juniors. During instructional time, girls spent more time in SED and less in LPA and MVPA (ps<0.05; hp2 = 0.03-0.07) than boys. There was no significant difference in MVPA based on division, but primary students spent less time in SED and more time in LPA (p<0.001; hp2 = 0.11-0.29) than junior students. On average, students were predominantly engaged in SED throughout the school day; girls 82% of the day and boys 79%.

**Conclusions:** Understanding movement patterns by boys and girls within various school day segments can be used to help identify areas where improvements can be made for increasing PA and decreasing SED, especially within unique school contexts. For example, interventions may wish to address our findings that primary grades engage in less MVPA than junior grades, and girls are more SED than boys.
The impact of video blogs on children’s unhealthy eating and drinking

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Viewing video blogs (vlogs) on social media has become a huge part of children's daily media consumption. For many children it has even taken the place of watching television programs. Due to this shift, vlogs have become an attractive platform for food industries to promote their products via so-called social media influencers. Similar to television, unhealthy food advertisements predominate in vlogs. As a consequence, children are often exposed to foods and drinks that are high in sugar and fat. Previous research has already shown that exposure to media depicting energy-dense products such as sugar-sweetened beverages and energy-dense snacks is associated with higher intake of such products among children. The questions remains whether this is also the case for exposure to vlogs. It can be argued that for vlog exposure the association with unhealthy foods is even stronger, because children often perceive social media influencers as similar to themselves, and therefore as a more trusted source of information. Thus, the current study examines the impact of vlog exposure on children's unhealthy eating and drinking.

Methods: In this study, we used three waves of longitudinal data from the MyMovez project, which were obtained during a 3-year period (2016-2018) from 351 children between the ages of 8 and 12 years old. Data collection took place in April 2016 (T1), approximately one year later (T2), and two years later (T3). Self-report questionnaires using a smartphone-based research application assessed children's vlog exposure (i.e., frequency of viewing vlogs) and unhealthy energy intake (i.e., sugar-sweetened beverages and high energy-dense snacks).

Results: The data for this research are currently being analysed by testing causal-correlational models using Mplus. Preliminary analyses suggest that vlog exposure affects children's unhealthy energy intake.

Conclusions: This is the first study that focuses on the impact of vlogs on children's energy intake using causal-correlational data, having several implications. Theoretically, it extends the literature of media exposure by examining a rapidly-evolving form of media with a possible strong impact on dietary intake. Practically, it could provide implications for policies regulating new forms of food marketing to children.
P2, P2.245

Social support in an early life obesity prevention trial: Who do women choose as their study partner?

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Objective. To identify the types of study partners that women choose to participate with them in an early life obesity prevention trial, the stability of partner choice, and associations between partner choice and select sociodemographic characteristics.

Methods. Data are from 430 baseline interviews of non-Hispanic black women participating in M&O, a two-group randomized control trial. M&O began at 28 weeks' gestation (baseline) and included home visits delivered by peer educators at 30 and 34 weeks' gestation and 3, 6, 9, and 12 months postpartum. At baseline, mothers were asked "Who is the person, other than a doctor or healthcare professional, that is most important to your decision-making about infant care or that will be involved in caring for the infant during the first few months after his/her birth?" Women could change partners at 3, 6, and 9 months. Multinomial regression models tested associations between choice of study partner at baseline, sociodemographic variables, and change in study partner. Significance was set at p<.05.

Results. At baseline, 54.6%, 27.5%, 11.5%, and 6.4% of women chose the infant's father, grandmother, other relative, or nonrelative, respectively. There were no differences by treatment group. As compared to women who chose the infant's father, women choosing the grandmother, other relative, or nonrelative were less likely to report the father living in the household (p<.001). Women who chose the grandmother were younger than those who chose the father (p<.001) and those who chose a non-relative reported lower levels of social support from family (p<.01). Eight percent of women changed partners. Among women who changed, 5.7% had initially chosen the father, 5.9% the grandmother, 12.5% another relative, and 35% a non-relative (p<.001).

Conclusions. There is growing emphasis in the literature on the importance of fathers in early life obesity prevention efforts. This focus may be too narrow for some study populations. Nearly half of the women in M&O chose a non-paternal study partner and those who chose fathers were older, reported more social support from family, and were less likely to change partner. Future studies should consider the varied circumstances and preferences of women with young children.
Purpose:
To explore the clustering of different lifestyle behaviors and whether this clustering differs by gender, age, and parental education.

METHODS:
The present cross-sectional study included 7511 Norwegian adolescents aged 13-16. Unhealthy and healthy dietary intake, moderate to vigorous physical activity (PA), and sleep duration were assessed by self-administered questionnaires. Hierarchic cluster analysis was used to identify clusters of different lifestyle behaviors. Multinomial logistic regression assessed association between sociodemographic factors and the clusters.

RESULTS:
Findings suggest that adolescents assigned to different clusters have different eating habits, physical activity patterns, and sleep duration. Three clusters were identified: 1) Low intake of healthy food, high intake of unhealthy food, low level of PA and lower sleep duration (ref) (41%), 2) Higher intake of healthy food, lower intake of unhealthy food, high level of PA and high sleep duration (39%), and 3) Highest intake of healthy food, lowest intake of unhealthy food, low level of PA and high sleep duration (19%). Participants with higher educated father and mother were more likely to be in cluster 2 and 3. Girls (OR=1.9; 95% CI 1.7-2.2) and participants of younger age groups (OR=0.90 (0.85-0.96)) were more likely to be in cluster 3 compared to cluster 1.

CONCLUSION:
Clustering of different lifestyle behaviors was observed. These differences should be considered when developing tailored future intervention studied targeting adolescents.
Parent perspectives on preschool children’s health behaviours in Soweto, South Africa: a qualitative study

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Childhood obesity is of increasing concern in South Africa, and interventions to promote healthy behaviours in children are needed. Our aim was to gain a better understanding of how parents of preschool children in an urban township view childhood obesity and related health behaviours.

Methods: We conducted in-depth interviews in the home setting with 16 parents (14 mothers, 2 fathers) of preschool-aged children (age 3-5 years) in Soweto. The interviews focused on perceptions of childhood obesity, children's health-related behaviours, and social and physical environmental barriers or facilitators to healthy behaviours. Interview transcripts were thematically analysed, using supporting field notes to contextualise findings.

Results: The participants were all biological parents of preschool children, aged between 21 and 47. The socioeconomic situations of participants varied somewhat, and being employed or having family support were highlighted as enabling their choices as parents. In the home setting, many young children had considerable agency around when to go to sleep and what to eat. Access to both what were considered healthy foods and unhealthy foods was described as easy, and both were present in the immediate surroundings. Preschools were considered healthy environments, but snacks children brought with them from home frequently included sugary juices and crisps. Other children's and parents' behaviours were a source of peer pressure, making it more difficult for parents to limit unhealthy snacking, and contributing to aspirations to consume fast food. Children's overweight and obesity were not necessarily seen as linked to behaviours but sometimes accepted as unchangeable and biologically determined traits of individuals. The main changes parents called for were better access to safe parks or playgrounds, and being able to provide for one's children beyond necessities.

Conclusions: Preliminary findings indicate that parents' views on health-related behaviours are complex, and at times inconsistent. Childhood obesity was not a priority or particular concern for parents. Therefore, framing interventions as obesity prevention may not be relevant to parents of preschool children in Soweto but trying to align the promotion of healthy behaviours with parents' other aspirations may be more successful.
Adherence to lifestyle behaviour recommendations and ADHD: A population-based study of Canadian children

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: The importance of lifestyle behaviours for development and physical health among youth is well-established. In contrast, the importance of lifestyle behaviours for cognitive development and mental illness remains understudied and unacknowledged. ADHD is one of the most prevalent mental illnesses in childhood and adolescence. Diet quality, physical activity, sleep, and sedentary behaviour have been linked with ADHD, however this is the first prospective study to examine the independent and combined associations of meeting established recommendations in childhood with ADHD into adolescence. We examined the associations of lifestyle recommendation compliance with incidence and healthcare utilization of ADHD.

Methods: Administrative health data including physician visits for ADHD was linked to responses from a 2011 population-based lifestyle survey among 10/11-year-old students in Nova Scotia (n=3,436). Lifestyle behaviours were measured with self- and parental proxy reports, and expressed as meeting recommendations for vegetables and fruit, grains, milk and alternatives, meat and alternatives, saturated fat, added sugar, sleep, screen-time, and physical activity. Multivariable Cox and Negative Binomial regression models were used to examine associations of meeting lifestyle recommendations with time to incident ADHD diagnosis and volume of physician visits for ADHD until age 14.

Results: For all 9 recommendations, 12%, 67%, and 21% of students respectively met 1-3, 4-6, and 7-9 recommendations and 10.8% had an ADHD diagnosis before age 14. Compared to meeting 1-3 recommendations, meeting 7-9 recommendations was associated with 58% (Hazard Ratio: 0.42 [95%CI: 0.28,0.61]) lower incidence of ADHD and 62% (Incidence Rate Ratio: 0.38 [95%CI: 0.22,0.65]) fewer physician visits related to ADHD. Each additional recommendation met was associated with an 18% (Hazard Ratio: 0.82 [95%CI: 0.76,0.88]) lower incidence of ADHD.

Conclusions: Findings suggest greater reductions in incidence of ADHD as more lifestyle recommendations are met. Health promotion initiatives that target multiple lifestyle behaviours may reduce the risk and burden of ADHD in addition to improving children's physical health.
Understanding determinants of healthy lifestyle behaviours among young adolescents in Singapore – from the perspectives of young adolescents

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Purpose
Early adolescence is a critical period for developing and establishing healthy lifestyle habits that can track into adulthood. An understanding of the determinants that drive lifestyle behaviours from adolescents’ perspective is important for designing effective health promotion interventions, yet there is little local information available. This study aims to understand the contextual factors that influence diet and physical activity behaviours in young adolescents.

Methods
Twenty-three semi-structured focus-group discussions (FGDs) were conducted with young adolescents from two primary schools in Singapore, stratified by age and sex (n= 55, 29 girls, aged 9 to 12 years). The FGD topic guides were based on the social ecological model and designed to elicit information on internal (personal) and external (social, environmental) factors influencing diet and physical activity. FGD were recorded and transcribed. Data were analysed using thematic analysis, with both deductive and inductive strategies.

Results
Preliminary analysis suggests that adolescents generally have a good understanding of the behaviours that constitute a healthy lifestyle. However, these behaviours are dependent on various internal and external barriers and facilitators. Internal barriers include lack of confidence in playing sports, preference for screen-viewing over outdoor play, and taste over nutritional value of food. External barriers include the limited availability of preferred fruits and vegetables sold in school, lack of time leading to meal skipping, and limited opportunities for physical activity (e.g. short recess breaks and physical education lessons; humid and hot weather as a deterrent). In contrast, high self-efficacy in sports and supportive environments (e.g. encouragement from parents, teachers and friends, availability of healthy snacks and positive role models) were facilitators for a healthy lifestyle.

Rules and restrictions (or lack thereof) set by parents were important factors, as they determine the amount of autonomy adolescents have on decisions about food and physical activities. Nevertheless, adolescents reported performing some activities in secrecy when there were conflicts between their desires and parents' restrictions.

Conclusions
While young adolescents have preferences for certain lifestyle behaviours, these are largely modulated by their social (influences of parents, friends, caregivers and teachers) and physical environment (accessibility to healthy foods and opportunities for physical activities).
Physical activity and gestational diabetes mellitus: effect modification by maternal age and BMI

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Purpose: The purpose of this study was to (1) determine if the association between physical activity and gestational diabetes mellitus is modified by BMI and maternal age and (2) determine subpopulations in which physical activity show the greatest decrease in likelihood of developing gestational diabetes mellitus.

Methods: A cross-sectional study was performed using self-reported data from the Pregnancy Risk Assessment and Monitoring System. The study population included 221 self-reported gestational diabetes mellitus (GDM) cases and 3,503 non-GDM controls in women that gave birth. Multivariate logistic regression modeling and stratified OR's were used to assess the interaction between physical activity, BMI and maternal age.

Results: Maternal age over 35 years (OR=8.34, CI=2.53-40.78), BMI over 30 (OR=3.23, CI=1.90-5.86), and sedentary behavior (OR=1.56, CI=1.02-2.43) were all associated with a higher risk of GDM. Final best fit logistic model for GDM included BMI (βa=.05), Age (βa=.06), Sedentary Behavior (βa=.44).

Conclusion: BMI may be a more important risk factor for GDM than sedentary behavior. Pregnant women with a healthy BMI should still incorporate physical activity into their lifestyle. Physical activity may partially attenuate the age-associated risk for GDM.
Can school and home food environments influence food intake and obesity risk among non-Hispanic White and non-Hispanic Black adolescents?

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: This study explores whether school and home neighborhood food environments influence intake frequency of unhealthy foods (fast food, convenience food), fruits and vegetables (FV), and body mass index (BMI) among non-Hispanic white (NHW) and non-Hispanic black (NHB) adolescents.

Methods: We conducted analyses of the 2014 Family Life, Activity, Sun, Health, and Eating (FLASHE) cross-sectional study of parent-adolescent dyads. Linear regression was conducted to compare the main effects of the food environment and race and the interaction effect of these on intake frequencies in adolescents. Odds ratios were obtained to analyze the food environment and race effects on adolescent weight status. Analyses were performed using SPSS Statistics 25, p-values set at p=0.05.

Results: Of the 699 adolescents, between 14-17 years of age, a majority were NHW (79.5%), female (53.5%), normal weight (73.0%), had at least one parent obtaining a 4-year college degree or higher (49.5%), and had an annual family income of less than $100,000 (81.2%). When examining overweight/obese adolescents, NHBs compare to NHWs reported greater prevalence of convenience stores (38.1% vs. 24.9%) and fast food restaurants (34.6 vs. 23.6%) in both home and school environments. There were significant main effects of food establishment presence on convenience and fast food and FV intake. When stratified by race, FV intake and convenience and fast food intake were positively associated with market/CSA presence among NHWs (β=0.209, p<0.001) and NHBs (β=0.141, p=0.002). When stratified by adolescent weight status both FV intake (β=0.147, p=0.001) and convenience and fast food intake (β=0.183, p=0.001) were positively associated with market/CSA presence among normal weight adolescents. No significant associations were found for adolescent weight status by the presence of food establishments stratified by race.

Conclusions: NHBs reported a higher prevalence of obesogenic environments (convenience stores, fast food restaurants); whereas, NHWs reported a higher prevalence of market/CSA presence near their school and home. We found few associations among food environments, race, intake frequencies, and adolescent weight. Research is needed that examines the school and home food environments with other factors that may influence food intake and risk for overweight and obesity.
Recruitment strategies for community-based type 2 diabetes prevention programs

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Objective: More than 30.3 million Americans have diabetes, yet few family-based community prevention programs exist in the United States. The purpose of our study was to explore recruitment preferences of parents with type 2 diabetes (DM2) or a history of gestational diabetes (GDM) in order to inform a future family diabetes prevention trial.

Methods: A cross-sectional study was conducted at the Minnesota State Fair (an annual agricultural and recreational gathering) in August 2018. Participants included 74 female and 31 male parents of youth aged two to 18, with either DM2 (n=44; 41%), a history of GDM (n=57; 5%), or both (n=5; 5%). The mean age was 45.2±smn;7.0 years; the mean body mass index was 32.6±smn;7.6 kg/m²2; and 23% (n=24) self-identified as non-white. Descriptive statistics were used to explore opinions on the likely effectiveness of recruitment strategies, which were measured using a three-point Likert scale (not effective at all, somewhat effective, and very effective).

Results: Most participants reported recruitment methods involving healthcare providers (HCPs) or social media as very effective: direct in-person recommendations from either a physician (n=68; 66%), a nurse (n=61; 59%), a diabetes educator (n=53, 51%), or another HCP (n=53; 51%); or Facebook (n=34; 32%). Some participants reported other methods involving HCPs or systems as very effective: email from a physician (n=24; 23%), a nurse (n=20; 19%), a diabetes educator (n=19; 18%), or another HCP (n=15; 15%); MyChart (online patient portal) (n=25; 24%); or letters from a physician (n=25; 24%), a nurse (n=21; 21%), a diabetes educator (n=12; 12%), or another HCP (n=18; 17%). Few participants reported community-based recruitment methods as very effective: radio (n=21; 20%), flyers in clinics (n=11; 11%), or flyers in the community (n=10; 10%).

Conclusion: These findings suggest that although a comprehensive set of recruitment strategies may be necessary to reach a large sample, most adults preferred direct in-person recommendations from HCPs. Thus, it is essential to familiarize HCPs about possible community-based programs and to facilitate face-to-face recruitment discussions with eligible patients. One potential health informatics-based solution is to create clinical decision support tools, or electronic medical record pop-ups, that alert HCPs to available programs.
Preliminary CBPR outcomes of the east side table make-at-home meal-kit program

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose
In the East Side neighborhood of St. Paul, Minnesota, low dietary quality, lack of affordable, healthy food access, and low food skills are significant concerns. These barriers make purchasing, cooking, and consuming healthy foods challenging and low-cost, energy-dense, low-nutrient foods appealing. Designed with community partner and resident input, the 10-week, East Side Table Make-at-Home Meal-Kit Program aimed to increase food skills, food access and affordability, and healthy food intake. The program provided families with weekly meal kits, which included ingredients to create culturally diverse healthy meals, language-appropriate recipes, step-by-step instructions, and supplemental educational material.

Methods
This pilot, longitudinal community-based participatory research study recruited 60 participants enrolled in the innovative Meal-Kit Program. Baseline, post-program and three month post-program data collection included psychosocial surveys with validated measures and a National Cancer Institute dietary screener. Descriptive statistics were used to describe participant characteristics. T-tests were used to assess for changes in pre- and post-program outcomes of perceived food access (aha;=0.81), cooking self-efficacy (aha;=0.90), and fruit/vegetable intake. Adjusted for socioeconomic status, general linear models (GLMs) were used to assess the association between the pre-post change in each outcome and the number of meal-kits used during the 10-week program. Three month post-program follow-up data are currently being collected.

Preliminary Results/Findings
Participants were mostly female (95%), identified themselves as from diverse or multi-racial/ethnic backgrounds (64%), and reported receiving some form of economic assistance (57%). Meal-kit use was high with 82% using eight or more of the 10 meals-kits. T-test results indicated increases in perceived food access (mean=+1.08, SD=3.25, p=0.02) and cooking self-efficacy (mean=+2.91, SD=10.8, p=0.05), but no significant difference was found in fruit/vegetable intake after the program. Adjusted GLMs did not find significant associations between change in outcome measures and the number of meal-kits used during the program.

Conclusions
Preliminary analyses indicate meal-kit use was high and the program may increase perceived food access and cooking-self efficacy, which may, overtime, influence fruit and vegetable intake; planned longitudinal analyses will shed further light on these relationships. Future research is needed to further and more rigorously evaluate the Meal-Kit Program using a control group.
The South African 24-hour movement guidelines for birth to five years: results from the stakeholder consultation

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective:
Following Canada and Australia, in 2018 South Africa (SA) developed 24-hour movement behaviour guidelines for children from birth to five years. The process of adaption included the distribution of draft guidelines to relevant stakeholders across SA to ensure that the guidelines were important, applicable and equitable for children in SA. Stakeholders included parents, caregivers, early childhood development (ECD) practitioners, health professionals, community health workers (CHWs), government and non-government organisations (NGOs). Results of the stakeholder consultation informed the adaption of the guidelines, launched in December 2018. The aim of this presentation is to report on findings of the stakeholder consultation.

Methods:
An online survey, focus groups (FGs; n=9) and a meeting with government and NGO stakeholders were conducted between June and August 2018. The online survey was available via Survey Monkey, distributed through email, and completed by 197 participants. FGs were conducted across SA, and included parents/caregivers (n=3), ECD practitioners (n=3) and CHWs (n=3). Fifteen government and NGO stakeholders attended the stakeholder meeting.

Results:
In the online survey, stakeholders overwhelmingly agreed with the guidelines (97.0%) and recognised the benefit of putting the guidelines into practice (88.8% respondents). Most online survey respondents (88.3%) reported that the guidelines would benefit all SA children equally. Responses to open-ended questions in the online survey and FG discussions revealed key issues including safety and nutrition of children, perceived parental barriers to using the guidelines (e.g. time constraints, discipline in the home, lack of resources) and education (e.g. perceived benefits of screen time by parents and ECD practitioners, lack of information provided to new parents and CHWs regarding physical activity, sleep and screen time). Training, education and provision of educational material were identified from all stakeholders as key in the dissemination and implementation of the guidelines.

Conclusions:
The stakeholder consultation provided awareness into challenges faced by various stakeholders across SA. The findings informed the development of the SA guidelines and revealed several important factors to address in the dissemination and implementation of the guidelines to ensure that they are applicable and equitable in SA.
The South African 24-hour movement guidelines for birth to five years: an integration of physical activity, sitting behaviour, screen time and sleep

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Children and families, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective:
There has been a recent shift to 24-hour movement guidelines in the early years with Canada and Australia updating their early years guidelines in 2017, and the UK revising their guidelines in 2018. All of these reflect the new 24-hour paradigm. South Africa (SA) followed this example, and developed 24-hour movement behaviour guidelines for 0-5 year-old children in 2018. The aim of this presentation is to describe this development process, the finalised guidelines, and dissemination plans.

Methods:
The Grading of Recommendations Assessment, Development and Evaluation approach (GRADE-ADOLOPMENT) was used to guide the development of these guidelines; the Australian 24-Hour Movement Guidelines for the early years (Birth to Five years) provided a starting point for this process. A Guideline Development Group (GDG) comprising experts and stakeholders in early childhood development in SA was convened as part of this process. Updated systematic reviews and local literature were evaluated by the GDG. A draft of the guidelines was sent out for stakeholder consultation (online survey, focus groups and a meeting with national government and non-government stakeholders; presented elsewhere). Once the guidelines were finalised, media content was developed.

Results:
The GDG agreed to adopt the Australian guidelines, with some adaptions to make these contextually relevant. The GDG gave input on these adaptions at the face-to-face meeting and via email. The finalised guidelines were professionally designed, including an infographic. The infographic will be translated into the 10 other official languages of SA (besides English), and the text version of the guidelines, which includes a preamble, is available in English. The guidelines were launched in early December 2018, with content disseminated on social and online media. Plans are underway for the national distribution of printed materials.

Conclusions:
These are the first of any movement behaviour guidelines in SA, and SA is the first low- and middle-income country to development movement guidelines for the early years. These guidelines will help to inform future surveillance, policy and practice in both home and early childhood development centres, and have particular value as an educational tool in low-income settings where levels of awareness regarding these movement behaviours is low.
Nature relatedness is associated with higher dietary diversity and fruit and vegetable intake

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Purpose: Research suggests that feeling connected to nature, or nature relatedness (NR), can positively impact wellbeing through increases in physical activity and better psychological health; and can positively impact the environment through increases in environmental stewardship. However, the relationship between NR and dietary behaviors has not previously been investigated. The aim of this study was to examine the relationship between NR and two dietary intake behavior variables, dietary diversity and fruit and vegetable intake, in a population of urban-dwelling adults.

Methods: Participants (N=317) were over 18 years old and resided in Philadelphia, PA. They completed an online survey, of socio-demographics, the Nature Relatedness (NR) Scale, a modified Dietary Diversity 24-hour recall (FAO, 2016), and the National Cancer Institute's fruit and vegetable screener. Bivariate and multivariate regression models were used to predict dietary diversity scores and fruit and vegetable intake with NR Total scores and subscale scores. The multivariate models controlled for age, race, gender, and income.

Results: According to bivariate analyses, people with higher NR Total (p<0.001), NR Self (p<0.001), NR Perspective (p=0.002), and NR Experience (p=0.002) were more likely to report greater dietary diversity. Those with higher NR Total (p<0.001), NR Self (p<0.001), and NR Experience (p<0.001) were more likely to report greater fruit and vegetable intake. These associations remained significant at the 0.05 level after adjusting for covariates (gender, age, race, and income).

Conclusions: NR was associated with better dietary intake after accounting for socio-demographic indicators. These findings highlight the need for interventions that enhance NR in public health initiatives, such as urban gardening, increased urban greening, and increased immersion in urban green spaces. Future investigation concerning the degree and intensity of engagement with nature will be required to elucidate best practices and better evaluate public health initiatives. Increasing evidence suggests that school-based education programs that facilitate engagement with nature may result in an increased connection with nature. However, effective approaches to teaching parents how to foster NR among their children, involving comfort and enjoyment of natural settings, is an area for future study.
Changes in BMI and fitness of children attending year-round versus traditional schools over summer break and the school year

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose: Accelerated weight gain and fitness loss during the summer (i.e., June-August) compared to the school year (i.e., August-May) is a public health concern for U.S. children (5-12 years) that may be explained by the lack of structured programming during the summer. Children who attend year-round schools are exposed to more structure during the summer because they have an abbreviated break from school. This study examined differences in BMI and fitness changes during the summer and school year of children attending year-round or traditional schools.

Methods: Height, weight, and fitness (i.e., FITNESSGRAM PACER) were measured in children (5-12yrs) in 3 schools (two traditional, one year-round, N=602 students, age=9.1 years, 52.5% male, 66.6% African American) from one school district. Changes in BMI, zBMI, and fitness (i.e., PACER laps completed) were assessed for summer 2017 (May-August 2017), school year 2017/18 (August 2017-May 2018), and summer 2018 (May-August 2018). Separate multi-level mixed effects regression models with monthly BMI, zBMI, and PACER laps change as the dependent variables and school (traditional vs. year-round), time (summer vs. school), and a time-by-school interaction as the independent variables estimated differences between groups across time. All models controlled for dependent variable baseline scores, age, race, and gender.

Results: Traditional school children gained 0.07 and 0.16 in BMI monthly during school and summer, respectively. Year-round children gained 0.12 and 0.02 in BMI monthly during school and summer, respectively. The time-by-school interaction of -0.19 (95CI=-0.25, -0.13) was statistically significant. Patterns in zBMI were the same as BMI. Traditional school children gained 0.40 pacer laps monthly during the school year and lost 0.13 laps monthly during the summer. Conversely, year-round children lost 0.01 pacer laps monthly during the school year and gained 0.29 pacer laps monthly during the summer. The time-by-school interaction of 0.82 (95CI=0.38, 1.27) was statistically significant.

Conclusions: Year-round school children gained less BMI units and lost less fitness during the summer than traditional school children. However, during the school year the opposite was true. More work is needed to understand why year-round school children experience greater BMI gain and fitness loss during the traditional school year.
System mapping – identifying the key factors driving obesity in adolescents

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: The aim is to explore how adolescents from different European countries view and identify the key factors driving obesity in adolescents. We will seek the views of adolescents themselves by using a group model building workshops to generate system maps in the form of causal loop diagrams of the relevant factors within the parts of the food and physical activity systems of relevance to the adolescent participants.

Methods: We will develop a set of conceptual maps of the obesity system, in different group settings: groups of young people in five European countries (the Netherlands, Norway, Poland, Portugal and the UK). The mapping workshops will be constructed around the participatory group model-building approach that has been developed by Prof Steven Allender from Deakin University, Australia using their STICKE software. We will conduct four mapping workshops in each country to provide a mix of backgrounds, with two workshops held in urban areas and two held in rural areas. Participating schools will be identified through a stratified sampling approach, and pupils within selected schools invited to attend via an online form which will be used to generate a sample of adolescents that gives broad representation by age, gender and socio-economic status. We will place particular emphasis on wide inclusion of groups that are at increased risk of obesity (such as people from groups with low socio-economic status, immigrant groups, and people marginalised for other reasons).

Results: A set of conceptual system maps will be provided, outlining the drivers of energy balance related behaviours from the perspective of European youth.

Conclusions: These system maps based on adolescents' perspectives and views will be used to identify key opportunities for policy interventions to tackle the problem of adolescent obesity, in light of existing policy options and updated overviews of effectiveness of interventions aimed at preventing overweight and obesity in adolescents aged 10 to 19 years.
Physical activity of Czech adolescents in different types of neighborhood environment

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Improvement and support of increase in overall physical activity and consequently physical fitness seem to be related to building supportive environments. Changes in the neighborhood environment in the last decades however promote significantly less active lifestyle and more passive forms, leading to a sedentary behavior. Therefore we aimed with this the study to evaluate the associations of physical activity and built environment in Czech adolescents aged 11, 19 years. The research was conducted from 2013 to 2016 and includes a total of 1,745 participants (850 girls). Physical activity was obtained from self-reported IPEN Adolescent questionnaire and objectively by the Yamax SW-700 pedometer for seven consecutive days, in selected adolescents also by the ActiGraph GT1M or GT3X accelerometer. The neighborhood environment was assessed subjectively by the IPEN Adolescent questionnaire and in selected cities also objectively using geographic information systems. Current results include sample of 217 respondents who met the including criteria (objective measures of both PA and environment). We confirm that adolescents who live in more walkable environments do not reach a significantly higher level of physical activity or physical fitness compared to adolescents who live in a less walkable neighborhoods. The core city locality (city center and surroundings) was a significant factor for meeting 60 min of MVPA guideline (OR = 1.58; p = 0.550; 95% CI [0.99; 2.53]), in other parts of the cities (outskirts and block of flats) PA did not vary in both sexes. However, the research suggests specific associations between the built environment and physical activity or physical fitness in Czech adolescents. The findings identify the specific role of the built environment in Czech adolescents in relation to physical activity. The policy and school intervention programs should reflect these indicators in creation more active friendly environments to influence the level of physical activity in adolescents.
Perceived neighbourhood walkability and different types of physical activity in Canadian men and women

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose:
Few Canadian studies have examined whether associations between neighbourhood walkability and physical activity differ by gender. We estimated associations between perceived neighbourhood walkability and physical activity among urban Canadian men and women. The present study results will be important for informing urban planning policy in Canada.

Methods:
This study included cross-sectional survey data from the 'Alberta's Tomorrow Project' (2008; n=9101), in which the International Physical Activity Questionnaire captured weekly physical activity and the Neighbourhood Environment Walkability Scale abbreviated version (NEWS-A) captured self-reported neighbourhood characteristics. NEWS-A subscale scores were standardized and overall walkability scores computed. Sociodemographic characteristics were also captured. Covariate-adjusted generalized linear models estimated the associations between physical activity participation and minutes (transportation walking: TW, recreational walking: RW, moderate-intensity: MPA, and vigorous-intensity: VPA) and walkability scores. Odds ratios (ORs) were estimated for participation and beta coefficients (Bs) were estimated for minutes of physical activity, with 95% confidence intervals (95CIs).

Results/findings:
Overall walkability was positively associated with participation in TW (OR 1.05; 95CI 1.04, 1.06), RW (OR 1.02; 95CI 1.01, 1.03), MVPA (OR 1.02; 95CI 1.01, 1.03) and VPA (OR 1.02; 95CI 1.01, 1.03) and minutes of TW (B 1.14; 95CI 0.59, 1.69). In men, positive associations were found between lack of parking and MPA participation (OR 1.14; 95CI 1.06, 1.23) and residential density and TW minutes (B 8.31; 95CI 2.85, 13.78). In women, RW participation was associated with land use mix diversity (OR 1.11; 95CI 1.04, 1.17) and infrastructure and safety for walking (OR 1.15; 95CI 1.09, 1.21) and MPA participation associated with traffic safety (OR 0.91; 95CI 0.86, 0.96). Notably, residential density was negatively associated with RW minutes among women only (B -3.69; 95CI -6.62, -0.76).

Conclusions:
Neighbourhood walkability is associated with participation and time spent in different physical activities for men and women. Modifying perceptions, possibly via improving neighbourhood urban design, has the potential to increase physical activity in Canadian adults.
P2, P2.128

Environmental and personal barriers and facilitators impacting the experiences of adults participating in an internet-facilitated pedometer intervention

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Objective: Pedometers are inexpensive and simple-to-use devices for motivating and monitoring physical activity, especially in population and community interventions. The use of pedometers in internet-facilitated physical activity interventions is becoming more common for encouraging physical activity. A better understanding about the barriers and facilitators experienced by participants is needed to improve the delivery and effectiveness of these types of interventions. Our study explored perceived individual and physical environment characteristics that hinder or facilitate physical activity among previously "inactive" adults during a 12-week internet-facilitated pedometer intervention.

Methods: This qualitative description study was undertaken with adults living an urban setting (Calgary, Alberta, Canada). Twenty-three participants (82.6% women; ages 24-68 years) who registered for the 12-week internet-facilitated pedometer intervention (UWALK) were purposefully selected to represent various levels of engagement with UWALK. Participants took part in telephone-administered semi-structured interviews, which included questions that explored perceived barriers and facilitators to physical activity during the UWALK intervention. Interviews were audio-recorded, transcribed verbatim, and analysed using an inductive content analysis approach.

Results: Participants resided in low-to-moderate walkable neighbourhoods (WalkScore® mean=43.7, SD=25.1) and most reported high levels of confidence and intention in achieving 10,000 steps/day prior to starting UWALK. During UWALK participants undertook on average 8,433 steps/day (SD=3,912 steps/day). The experiences shared by participants were represented by four themes including: creating (in)activity awareness; commitment to physical activity; incorporating activity for transportation, and; importance of nature and changing scenery. Wearing the pedometer and recording their daily steps made participants more aware about time being sedentary. Moreover, participants developed strategies to help achieve their step goals. Active transportation was frequently mentioned as an effective way of increasing daily steps, and access to nature or beautiful scenery encouraged more physical activity. Participants reported littered areas, homeless people, and off-leash dogs as hindering their physical activity during UWALK.

Conclusions: Perceived individual and environmental factors contribute to participants' ability to engage in UWALK and physical activity. Providing participants enrolled in internet-facilitated pedometer interventions with strategies for overcoming barriers, instructions for exploring their local environments, and approaches for incorporating active transportation into daily routines, may improve adherence and, ultimately, increase physical activity.
P2, P2.129 Indigenous students’ perceptions of a school nutrition policy

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose
Globally, Indigenous peoples are disproportionately affected by poor nutrition and diet-related health issues. A school nutrition policy (SNP) is one promising strategy to improve Indigenous children's nutrition, but its success is dependent on effective and sustainable implementation. Currently, there are substantial gaps concerning the evaluation of SNP implementation in Indigenous schools and the role of children in SNP evaluation. To fill this gap, this research asked: What are Indigenous students' perceptions of the facilitators and barriers to SNP implementation?

Methods
A community-based participatory research approach ensured that community members worked in equitable collaboration with university researchers. A process evaluation of policy implementation was conducted using a mixed methods design. Students in grades 4-12 (n=94) completed a 17-question survey to capture their perceptions of the SNP. Survey data (response frequencies) informed an 11-question semi-structured interview guide. Transcripts from interviews with students (n=20) were analyzed using content analysis to identify barriers and facilitators to policy implementation.

Results
The main facilitator to SNP implementation was students' support for the policy. Most students (87%) agreed that only healthy foods should be served at school and they expressed an interest in consuming healthy foods in interviews. Barriers included access to unhealthy foods and lack of communication between students and their teachers and parents. Over half (55%) of students reported that their eating habits at school were average or unhealthy; interviews explained that their diets could be improved by consuming more fruit and vegetables. Surveys and interviews found that student engagement with their parents and teachers about nutrition was low.

Conclusions
To our knowledge, this is the first study to involve Indigenous children in evaluating a SNP. The findings provide important information for policy makers to consider when implementing SNPs in Indigenous contexts. SNPs should provide clear guidelines on permissible foods and include specific strategies to promote parent and teacher engagement with students about nutrition. SNPs must also consider local context and environmental barriers to healthy eating to ensure sustainability. We recommend the continued involvement of Indigenous children as important stakeholders at all stages of the policy process to improve school food environments.
16743

P2, P2.131

Influence of nutritional warnings on consumers’ choice of a snack product: Evidence from a real choice and real products


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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Nutritional warnings have been recently proposed as a new front-of-pack (FOP) nutrition labelling scheme to highlight products with excessive content of nutrients associated with non-communicable diseases. However, it remains unclear to what extent and how warnings on food packages may change consumers' food choices in real life situations.

In this context, the present study aimed at evaluating the influence of nutritional warnings on consumers' choice of a snack in a choice experiment involving real products. This is a key contribution and further step, given most studies involving nutritional warnings so far have focused on hypothetical food choices or self-reported behaviors.

A total of 199 people (66% female, ages ranging between 19 and 69 years old) participated in the study. They were asked to in a research study unrelated to the present study (in which they evaluated a series of bread images on a computer screen using eye-tracking glasses). Once they finished the task, they were invited to help themselves to a snack from a shelf (similar to those found in supermarkets) as a compensation for their participation in the experiment. The shelf contained a total of 15 food products that can serve as a snack and which differed in the nutritional composition, including cookies, crackers, cereal bars and fruit. Participants were unobtrusively and randomly divided into groups: one of the groups selected the product from a shelf containing products that featured nutritional warnings, whereas the other completed the task in a control condition without nutritional warnings. Participants invested an average of 14 s to select their snack, regardless of the experimental condition. As result, significant differences between the groups were found in the frequency of selection of the products ($c^2= 15.3$, $p=0.002$). The percentage of participants who fixated their gaze on the nutritional warnings for making their choice was 50%. Participants who observed the warnings actually chose products with fewer warnings and lower average sodium and sugar content ($p<0.001$). Results from the present work confirm the potential of nutritional warnings to discourage selection of products with excessive content of nutrients associated with non-communicable diseases.
Objectively measured movement patterns and cardiometabolic health and fitness across occupational groups: a systematic review and meta-analysis

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 Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: To compare objectively measured movement patterns (sedentary time [ST], light intensity physical activity [LPA], moderate-to-vigorous intensity physical activity [MVPA], and steps) across occupations. The secondary objective was to examine whether cardiometabolic and fitness outcomes differed by occupation.

Methods: A systematic review and meta-analysis was conducted. Five databases were searched to identify published studies and dissertation that included working age, employed adults from high-income countries, and reported on objectively measured movement patterns within occupations. (PROSPERO #CRD42017070448).

Results: The review includes 110 unique studies with data from 11,762 participants. Working adults spent just under 60% of their working and waking time engaged in sedentary behaviour; a very small proportion (~5%) of the day included MVPA. On average, workers fell within 7,000-11,000 steps/day; a range associated with optimal health benefits. Office and call centre workers' steps/day were among the lowest, while postal delivery workers attained the most. Occupations that were desk-based had the greatest ST, achieved the lowest number of steps, and engaged in less LPA and MVPA. Labourers had the lowest ST and spent a significantly greater proportion of their work time engaged in LPA and MVPA. Healthcare and protective services workers engaged in higher levels of LPA at work compared to other workers. Workers in driving-based occupations tended to have higher body mass index and blood pressure.

Conclusions: This review identifies that work-based and daily PA and ST differs between occupations. Future studies are needed to assess whether patterns differ by sex, describe leisure-time movement, and the relationship with cardiometabolic health.
Examining changes to food and beverage availability, pricing, and marketing in a low-income community after the opening of a whole foods market©

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: In September 2016, a Whole Foods Market© opened in the Englewood neighborhood of Chicago, IL, USA, a predominately low-income and African American community. The development of the supermarket was supported by funding from the Healthy Food Financing Initiative (HFFI), a federally-funded initiative to expand access to healthy foods in areas considered a food desert. The objective of this research was to examine changes to food and beverage availability, pricing, and marketing in Englewood's existing food stores after the supermarket opened for business.

Methods: A natural experiment was conducted. All small food stores located within one-square mile of the supermarket were audited before and after the opening. Additionally, all small food stores located within a one-square mile area of North Lawndale, a demographically-matched community that also lacked a supermarket, were audited in comparison. Two rounds of data collection were performed before (2015 & 2016) and after (2017 & 2018) the supermarket opened. Information on availability, pricing, and marketing were collected for staple food items (e.g., fruit, vegetables, bread, meat), snack items (e.g., candy, chips), and beverages (e.g., milk, water, soda). Difference-in-difference (DID) regression models will be used to identify significant changes to the availability, pricing, and marketing of foods and beverages between the Englewood and North Lawndale communities after the supermarket's opening.

Results: At baseline, 87 small food stores were audited: 43 in Englewood and 44 in North Lawndale. Among these stores, 26 were small grocery stores and 71 were limited service stores (i.e., convenience stores, liquor stores, pharmacies, dollar/discount stores). The availability of healthy food options was limited at baseline in both communities. On average, small food stores carried 1.7 and 3.1 fresh varieties and 0.1 and 2.3 frozen varieties, respectively, of fruits and vegetables. Furthermore, stores were less likely to offer healthier varieties to a number of food and beverage items including milk (low vs. high-fat), bread (whole wheat vs. white), cereal (high vs. low-sugar), and ground beef (lean vs. high-fat).

Conclusions: Regression estimates will determine if statistically significant changes in food and beverage availability, pricing, and marketing occurred after the opening of the Whole Foods Market©.
Are individuals with greater financial strain and lower self-control more vulnerable to unhealthy food environments?

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Local food environments are part of the complex web of factors that influence obesity. High accessibility to high-energy and ultra-processed foods and repeated exposure to food cues such as advertisements, smells and promotions represent temptations to indulge in unhealthier dietary behaviours. According to the scarcity theory, experiencing great financial strain or low self-control may limit self-regulatory capacities needed to resist temptations from the food environment. We examined whether associations between the local food environment and weight status differed across levels of self-control and financial strain.

Methods: We used data of Dutch adults (25-75y) participating in the population-based GLOBE study in 2014: height, weight, financial strain, self-control, age, sex, country of birth, employment status, household equivalent income, educational level and length of residency in the neighbourhood. Self-control was measured with the Brief Self-Control Scale and financial strain with two questions on making ends meet and experiencing financial difficulties. Participants' home addresses and the location of food retailers were mapped using a Geographic Information System to calculate the density of fast food retailers and the totality of food retailers in a Euclidean buffer 400m around the home. Linear and multinomial logistic regression analyses weighted by respondent-level sample weights were used to examine main and interaction effects.

Results: One extra fast food outlet per km2 was associated with a 0.04 (-0.07; -0.01) point lower body mass index and a 0.97 (0.94; 1.00) times lower relative risk of obesity. The totality of food outlets was also associated with lower body mass index. These associations were moderated by self-control and financial strain: associations were strongest for those experiencing low self-control or great financial strain. For example, higher density of fast food outlets was more strongly associated with a lower body mass index in individuals experiencing great financial strain (B=-0.17, 95%CI=-0.33; -0.02) than in individuals experiencing no financial strain (B=-0.04; 95%CI=-0.08; 0.00).

Conclusions: We did find support for a moderating role of self-control and financial strain, but associations between the food environment and weight status were not in the expected direction.
Who is responsible for assessing children’s weight: views from primary health care professionals in regional Australia

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Objective

Routine assessment of children's weight status is the first step in identification of overweight and obesity. Many countries do not have a universal program for monitoring children's weight status and it is unclear whose responsibility it is to undertake this check and identify obesity. In Australia, the National Health and Medical Research Council "Obesity Guidelines" recommend for primary health care professionals to assess weight status during consultations yet this does not routinely occur in practice.

This study aimed to determine primary health care professionals' views on responsibility for routine weight status assessment in primary school aged children.

Methods

This study used a case study approach and focused on a regional town in Queensland, Australia. Purposeful sampling was used to represent the key primary health care settings and professional groups. A total of 31 health professionals were interviewed. Data were collected and analysed guided by the COM-B and TDF frameworks.

Results

Eight themes emerged which were relevant to system, setting and individual level influences on the undertaking of routine weight status assessment. General practitioners and nurses were seen as having a role in weight status assessment. A number of barriers to assessing and raising weight related concerns were identified and these led to inconsistent raising of the issue with families. Increasing awareness about the importance of weight status assessment, a systems approach and appropriate referral options were seen as essential for any change to occur.

Conclusion

There is a need for long-term commitment from Governments, primary health care settings, professional groups and health professionals to implement the "Obesity Guidelines" if progress is to be made in addressing this important public health problem. In countries with the lack of formalised and universal system for routine assessment of children's weight clarity must be provided as to who, when and where is responsible for the undertaking of this check and early identification of childhood overweight and obesity.
P2, P2.137

Fostering healthier and sustainable food and physical activity environments for all: Global applications of community-engaged citizen science

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Among the most underutilized "renewable resources" for catalyzing health-enhancing change in local communities is the power of residents themselves. The Our Voice Global Initiative combines cutting-edge mobile technologies with innovative citizen science methods to drive realistic environmental and policy changes that advance health equity. Relevant physical activity and food access projects have been mounted in diverse populations across six continents.

Methods: Our Voice methodology includes a novel mobile app (translated into multiple languages) that is used by residents from diverse socioeconomic and cultural backgrounds to capture local barriers to and enablers of healthy food access and physical activity. Data sources include qualitative (geocoded route, photo, and audio files) and quantitative data (e.g., environmental and psychosocial rating scales; biometric sensing of stress-related response; air quality sensing). Residents are trained in data-centered consensus building, issue prioritization, and facilitated communications with relevant decision-makers to enact practical environmental and policy changes that support healthy living.

Results: Successful behavioral, environmental, and policy outcomes from diverse Our Voice research projects include increased walking/biking to school in elementary school children; local park improvements for increasing physical activity and park utilization; creation of a senior-friendly community garden; identification of strategies for healthier food access in urban and rural communities; creation of age-friendly walking routes; repair of community streetscapes and sidewalks; resident partnerships with waste management authorities to remove items illegally dumped on neighborhood paths and sidewalks; and changes in parking designations to increase pedestrian safety. Several projects also have demonstrated significant increases in ratings of personal and collective self-efficacy for enacting local change; rated social cohesion; and sustained resident activation around environmental and policy changes across extended periods (e.g., three years after the initial project was completed).

Conclusions: Current results underscore that residents, ages 9 to 90, from low-resourced, underserved communities can learn how to gather, analyze and apply their own data to activate local environmental and policy changes in support of healthy lifestyles. This relatively low-cost and scalable citizen science approach, which incorporates mobile technology, web-based data management, an implementation toolkit, and remote technical assistance, is currently being implemented and evaluated in 14 countries worldwide.
Comparing the application of two nutrient profiling systems for Jamaica

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Identifying an appropriate nutrient profiling system (NPS) is an important consideration for countries with coexisting obesity and undernutrition. We apply the Pan American Health Organization (PAHO) and the Chile stage III NPS onto packaged beverage and food products sold in Jamaica to determine: (a) the share of these products considered to have excess nutrients of concern under each NPS; (b) compare what drives differences found between the two NPS, and (c) discuss the pros and cons of each NPS in the Jamaican context.

Methods: Data on 6261 branded multi-ingredient packaged food and beverage items were collected and captured from Kingston in 2018. 4739 products had sufficient information available for applying both NPS, with 3423 foods (from 15 food groups) and 1316 beverages (from 4 beverage groups). We compared the share of products containing excessive amounts of nutrients of concern under the two NPS using tests of proportions and correlation coefficients. We also compared the mean nutrient values among the subset of products exceeding versus not exceeding both NPS using tests of significance.

Results: We found that a larger share of beverages and foods exceed thresholds from the PAHO NPS compared to Chile Stage III. When comparing the three common nutrients in both NPS (sugar, saturated fat, sodium), a significantly larger share of foods to encourage, such as fruits, vegetables, legumes, fish and seafood, would be considered to have excess sugar or sodium under PAHO compared to under Chile. Additionally, the sodium ratio under PAHO may pose challenges for low or non-caloric beverages because the PAHO NPS uses energy as the reference.

Conclusions: This is the first study in the Caribbean region that considers how two existing NPS might compare. Given products in Jamaica, the Chile Stage III NPS appears to more parsimoniously categorize products as having excess nutrients. The combination of different nutrients included under each NPS and the reference units used (total energy for PAHO vs product weight for Chile) partially explain different results, thus careful consideration on whether and how these NPS should be used or adapted for the Jamaican and Caribbean context is needed.
Screen time vs green time: the health impacts of too much screen time

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose: Nature Canada is a national charitable organization that works to connect people to nature and in doing so protect and conserve wildlife and habitats. In recent decades there has been a dramatic shift in habitual free time behaviours of children with less time playing outside and with nature and more time spent indoors, sedentary and using screen-based technology. This study describes Nature Canada's recent initiative to translate research evidence, and provide program support, to overcome nature deficit disorder among Canadian children. Methods: Nature Canada developed its "NatureHood" program in 2012 to engage urban Canadians, particularly children, to connect with nature right where they live, in "nearby nature". In an effort to draw greater attention to, and amplify the impact of, the NatureHood program, Nature Canada, with partners, recently developed and publicly launched a knowledge translation report titled "Screen Time vs Green Time: The Health Impacts of too much Screen Time" (STGT Report). Results: To date the NatureHood program has directly reached >85,000 children. On November 26, 2018 the STGT Report was launched with a national press release and comprehensive distribution, dissemination and diffusion strategy. Media interest was strong and good national exposure was achieved (total reach of 748,522, and initial social media reach of 66,374). "Tips for parents to reduce screen time and get into nature" support document was also developed and made publicly available on the Nature Canada website (www.naturecanada.ca). Conclusions: The launch of the STGT Report has elevated awareness, interest, and discussion regarding the accessibility, affordability and scalability of nearby nature as an antidote to excessive sedentary screen time among Canadian children and youth while amplifying interest in, and impact of, the NatureHood program. International partnerships building off this initiative in Canada are encouraged.
Prevalence of current school-level nutrition policies and practices of secondary schools in NSW, Australia

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Lowering rates of adolescent overweight and obesity due to the increasing prevalence amongst adolescents is a public health priority. Schools are an ideal setting for improving student health, however, there is limited research on the implementation of nutrition policies and practices among secondary schools in Australia. A survey was designed to investigate seven school-level nutrition policies and practices of secondary schools in NSW, Australia, and reported barriers and facilitators to implementation.

Methods: A two-part telephone survey consisting of a section for school principals and a section for school canteen managers was conducted on a cross-sectional sample of secondary schools in NSW, Australia. The survey was designed using the Centers for Disease Control and Prevention (CDC) Framework for Addressing the School Nutrition Environment and Services, adapted to the Australian context. Univariate analyses were used to assess differences in implementation by school sector, SES, and location.

Results: A total of 137 schools (55.2% response rate) and 79 canteen managers (75.2% response rate) were interviewed. School implementation of three of the seven nutrition policies or practices were high (Access to Drinking Water in Class, Healthy Food and Beverage Marketing, and Healthy Eating Learning Opportunities). Implementation of the remaining four policies or practices (School Nutrition Policy, Healthy Canteens, Healthy In-School Fundraisers, and Staff Role Modelling) were poor. Just 59.85% of schools surveyed met at least 50% of the key components for which they were assessed in. The main barriers to implementation were having other priorities and commitments (28.47%), lack of the students’ parents' support (13.87%), lack of support from the staff and student body (13.14%), and lack of resources (10.22%). Reported facilitators included support from stakeholders, the staff, students and their parents (37.23%), providing resources (30.66%), financial aid (24.82%), and better education on the policies and practices (20.44%).

Conclusions: There is considerable opportunity to improve the implementation of nutrition policies and practices in secondary schools, particularly improving the availability of unhealthy options, staff training, and nutrition policy implementation. Strategies to target barriers such as gaining support from school staff, students and their parents, provision of resources and funding, and staff learning are needed.
For children sixty minutes or more of daily physical activity is recommended. Active travel such as walking or cycling to school can make a valuable contribution to everyday physical activity. However, active travel among children is decreasing worldwide, also in the Netherlands (despite its cycling culture). Therefore, the objective of the current study is to provide insights into the determinants of active travel to primary schools in the Netherlands.

The ecological approach has been recommended as a framework to gain insight in the role of various factors at different spatial levels influencing travel behavior, including individual and household socio-demographics, and social and physical environmental characteristics. Based on a literature research a conceptual model was developed including the most important factors assumed to influence children's active travel to school and their overall physical activity.

To test the model, questionnaires were distributed to 1431 children and their parents of 14 primary schools in grades 5, 8 (7, 12 years). In total 660 completed surveys were returned. In the data analyses, first a regression model was estimated to predict weekly physical activity (in minutes) and a multilevel logistic regression model was used to predict participation in active travel to school (active travel > 50% of weekly school trips). Secondly, a path model described the relationships between all statistically validated variables and both active travel to school and physical activity levels.

Findings show that weekly physical activity levels are associated with gender, but also many social environment measures: school size, whether children run into other children on their way to school, and level of contact with other children. Factors significantly predicting active travel showed the influence of many levels within the ecological framework: household type, parents' travel behavior, parental concern, social contacts in the neighborhood, travel party to school, urban density level, and distance to school. Importantly, children that walk or bike to school have a higher overall weekly physical activity level. The findings of this study are used to inform policy makers and school management to develop effective interventions to support higher participation levels in active travel and physical activity of children.
10647 P2, P2.142 A cross-sectional study on the content of products promoted in Dutch supermarket catalogues.

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Supermarket marketing activities have a major influence on consumer food purchases. This study aimed to investigate the content of Dutch supermarket catalogues for compliance with dietary guidelines and to examine differences between types of supermarkets.

Methods: During an eight-week period promoted products in weekly supermarket catalogues of 13 major Dutch supermarket chains were assessed (regular, organic and discount supermarkets). Products were categorized in food groups and evaluated for compliance with the Dutch Wheel of Five criteria and degree of food processing (NOVA classification). Differences in promoted food groups between supermarket types were explored using Chi-square analysis. Associations between supermarket type and products that do (not) reflect dietary guidelines were analysed using (multinomial) logistic regression analyses.

Results: This cross-sectional study analysed 103 online catalogues by content, including 7825 promoted products. The five food groups with the highest proportion of promoted products were the groups 'Meat, meat products and poultry' (12.9%), 'Alcoholic beverages' (11.1%), 'Pastry and biscuits' (7.1%), 'Bread' (6.9%) and 'Vegetables' (6.5%). The majority of all promoted products did not fulfil Wheel of Five criteria (70.7%) and were categorized as ultra-processed (56.6%). Discount supermarkets were less likely to promote products that reflect dietary guidelines compared to traditional supermarkets (Wheel of Five vs. No Wheel of Five OR: 0.76, 95% CI: 0.65 - 0.89, unprocessed/minimally processed vs. ultra-processed OR: 0.68, 95% CI: 0.57 - 0.81). The organic supermarket was more likely to promote products that reflect dietary guidelines compared to traditional supermarkets (Wheel of Five vs. No Wheel of Five OR: 2.19, 95% CI: 1.66 - 2.91, unprocessed/minimally processed vs. ultra-processed OR: 8.59, 95% CI: 5.66 - 13.02).

Conclusions: Dutch supermarket catalogues heavily promote products that do not reflect national dietary guidelines and thereby stimulate unhealthy dietary behaviour. Especially traditional and discount supermarkets need to increase the ratio of healthy-to-unhealthy promoted products to facilitate the healthier choice for consumers.
Do physical activity friendly neighborhoods affect community members equally?

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Purpose: It is unclear whether influences of the built environment on physical activity (PA) and sedentary behavior (SB) are equitably distributed among advantaged and disadvantaged individuals. Therefore, the aim of this study was to examine the associations between personal characteristics, perceived environment and objectively measured PA and SB and to identify possible differences in associations between more and less advantaged individuals in society.

Methods: The data of this cross-sectional study were collected in two cities in the Netherlands. Eligible participants (=18 years, able to walk independently) were reached through social media, advertisements in newspapers and personalized mailing. In total 755 participants were included. SB, light PA (LPA) and moderate-to-vigorous PA (MVPA) were measured using the Actigraph GT3X+. Perceived neighborhood walkability was assessed with the Neighborhood Environment Walkability Scale (NEWS-A). Health-related quality of life (HRQOL) was measured using the EQ-5D questionnaire. Socio-demographic characteristics were assessed using a questionnaire. Six-hundred-twenty-two participants provided valid data (complete questionnaire and =5 days of =10 hours accelerometer wear-time). Multivariate linear regression analyses were performed to investigate associations between perceived environment and PA outcomes. Analyses were controlled for socio-demographic characteristics and HRQOL. Alfonzo's hierarchical model of walking needs was used to interpret the results.

Results/findings: The presence of attractive buildings was associated with less SB (βa = -0.086, p<.01) and more MVPA (βa = 0.118, p<.01). Presence of destinations was also positively associated with MVPA (βa = 0.106, p<.01). Interactions between personal and environmental characteristics showed that the presence of PA facilitating factors, such as attractive buildings, was associated with less SB and more LPA and MVPA, but only for higher educated residents, residents without problems regarding usual activities, residents with a normal weight, and residents living with children. The absence of PA hindering factors, such speeding traffic, was associated with less SB and more MVPA, but only for residents with problems regarding pain and usual activities.

Conclusions: PA-supportive environments can lead to decreased SB and increased PA levels, but differ in potential for advantaged and disadvantaged residents and may unintentionally increase health behavior inequality. Exploration of context-specific associations between environment and PA outcomes might help to clarify the differences between the subgroups.
Exploring associations between the neighborhood environment and physical activity for more and less advantaged individuals in society – a GPS based approach

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Effects of the built environment (BE) on physical activity (PA) and sedentary behavior (SB) might unintentionally increase inequity among subgroups in society. This is in line with the Ecological Model of Active Living (EMAL), which proposes interactions between the environment and the individual. However, the literature is inconclusive due to differences in context, measuring methods, definitions of neighborhoods and exposure to the environment. Therefore, the aim of this study was to identify possible differences in SB and PA behaviors in home- and work-neighborhoods, between lower and higher educated individuals. Further, we explore to what extent the associations between home-neighborhood PA and the perceived environment are different for these subgroups.

Methods: Data of this cross-sectional study were collected in 2016-2017, in two cities in the South-Limburg region of the Netherlands. Eligible participants (=18 years, able to walk independently) were reached through social media, posters, advertisements in newspapers and personalized mailing. In total 755 participants were included. Home- and work-neighborhood SB, light PA (LPA) and moderate-to-vigorous PA (MVPA) were measured using the Actigraph GT3X+ accelerometer and the Qstarz BT-Q1000XT GPS-logger. Home- and work neighborhoods were defined by street network buffers of 0.5 km and 1.0 km around home- and work-addresses. Perceived neighborhood walkability was assessed with the Neighborhood Environment Walkability Scale (NEWS-A) and health-related quality of life (HRQOL) was measured using the EQ-5D-3L. Socio-demographic characteristics were assessed using a questionnaire. Descriptive statistics are used to describe the amount of time spent SB and PA in the home- and work-neighborhood. Multivariate linear regression models are used to study differences in associations between SB and PA behaviors and the perceived neighborhood walkability for higher and lower educated individuals, based on objectively assessed exposure to the environment.

Results/findings: Based on the EMAL, we hypothesize that associations between the perceived environment and PA differ for higher and lower educated individuals, possibly due to the level of exposure to the neighborhood environment.

Conclusions: This study identifies possible differences in neighborhood-based SB and PA behavior for subgroups in society and explores how these potential differences can be explained by exposure to and perceptions of the neighborhood environment.
Gatekeepers to sustainable change: prioritizing the food retailer perspective to Inform a Supplemental Nutrition Assistance Program-Education (SNAP-Ed) state-wide food retail intervention

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Little research exists that uses a place-based approach to inform food environment interventions. This research used a three-pronged exploration of the perspectives and prevalence of food store gatekeepers (retailers) that act as intermediaries to food environment change. Specifically to inform the intervention and research-practice partnership approach for a SNAP-Ed healthy retail state-wide intervention.

Methods: Three distinct studies were conducted: (1) a systematic review exploring social-ecological influencers of United States (US) food store owners' and managers' decision-making; (2) mixed-methods research to determine barriers/facilitators of retailers to use behavioral nudges to prompt healthy consumer purchases, alongside environmental audits of healthy food availability; and (3) a characterization of Virginia SNAP retailers, by examining (a) potential proportional differences in prevalent SNAP formats by urbanity/rurality, (b) formats associated with county-level obesity, and (c) available corporate responsibility indicators of SNAP retailers to reduce obesity. Most data were analyzed using the constant comparison method and multi-author agreement. Chi-Square and a post-hoc analysis tested for differences in SNAP format proportions by rurality. Regression was used to determine the SNAP formats associated with obesity. (P<0.05).

Results: Multiple social-ecological factors (e.g., skills/knowledge, consumers, suppliers) influence US retailers' decision-making. Corporate SNAP retailers in Virginia perceived corporate policies as the largest barrier to implementing behavioral nudges. Independent retailers indicated some nudges may not be effective or profitable. In characterizing the SNAP environment, nontraditional SNAP formats (i.e., non-grocery) were highly prevalent. Rural Virginia counties were identified to have significantly higher proportions of dollar formats (p<0.05). SNAP dollar (p=0.005) and non-food formats (p=0.030) were associated with higher county obesity, accounting for 0.5% and 1.3% of the variance, respectively. In majority, prevalent SNAP retailers lack publicly available commitments to reduce obesity.

Conclusions: Given their prevalence, partnering with nontraditional SNAP stores could improve the food environment for SNAP consumers. The SNAP-Ed healthy retail plan should also include corporate partnership strategies using corporate responsibility information. Partnerships should be approached with feasible strategies to overcome barriers to using behavioral nudges and also focus on those most likely to be adopted by retailers. Investigations are needed to document the public health and gatekeeper outcomes of these partnership approaches.
Dietary sources of energy and nutrients of concern among Canadians: Implications for health and the environment

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Dietary factors are key contributors to morbidity and mortality, as well as climate change. The objective of these analyses was to inform interventions to support healthy and sustainable eating by examining the top sources of calories, sodium, sugars, and saturated fats among Canadians.

Methods: We drew upon data from the 2015 Canadian Community Health Survey (CCHS), which collected interviewer-administered 24-hour recalls from a representative sample of Canadians residing in the ten provinces and aged 1 year and above (n=20,176). Foods and beverages reported in CCHS were grouped into mutually-exclusive categories (e.g., 100% fruit juice, fruit drinks, unflavoured milks). Based on the average proportion of total intake contributed, the top 20 sources of each dietary component were identified for all individuals and by sex-age and income. We also examined the mean amount of each dietary component contributed by each category, and the proportion of persons consuming foods and beverages in each category.

Results: Top sources included consumed-commonly items (e.g., breads and flatbreads as a source of sodium), as well as those that are high in a given dietary component (e.g., soda as a source of sugars). Mixed dishes containing red meat (beef, pork, lamb, and goat), unflavoured milk, and breads and flatbreads were each within the top 20 sources of intake of all four dietary components of interest. Some differences in the rankings of the top sources by sex-age and income were observed.

Conclusions: These novel analyses shed light on the top contributors to Canadians’ intake of energy and nutrients of concern, drawing upon the first nationally-representative dietary intake data collected in over a decade. A number of categories that are top sources of energy and multiple nutrients of concern include commercially-prepared items that are possible priorities for reformulation. The emergence of top contributors that are not targets for reformulation highlights the relevance of other interventions, including updated dietary guidance, front-of-package labelling, and restrictions on marketing, to support the selection of nutrient-dense options. Such interventions could potentially impact both human and planetary health by reducing consumption of packaged processed foods and red meat-based dishes.
OBJECTIVE: Current obesogenic environments make it easy to choose unhealthy over healthy foods. Yet, our understanding of people's interaction with their daily food environment is limited, as previous studies have primarily focused on the residential area. Therefore, the overall aim of the FoodTrack study was to examine individual food environmental exposure (including all visited locations during the day), to assess people's food purchases within this environment, and to examine how individual/contextual determinants (e.g. mood, companion, time) drive food purchase decisions.

METHODS: In a one-week observational study, 141 participants (25-45 years) residing in urban areas in the Netherlands provided data using the FoodTrack smartphone application (app), including GPS-tracking and ecological momentary assessment on food purchases. Via the app, participants uploaded information on all food purchases they made including type of products (fruit/vegetables, sweet- or savoury snacks); moment-of-purchase (e.g. on the go); point of purchase; whether or not the purchase was an act on impulse or meant for immediate consumption.

RESULTS: Preliminary results indicated that 362 products for immediate consumption were purchased, of which 33.7% for consumption in-between meals. Compared to fruit and vegetables, sweet and savory snacks were more frequently purchased for consumption in between meals (83.6% vs. 16.4%), were more often purchased on-the-go (78.9% vs. 21.1%) and were more often bought as an act on impulse (78.4% vs. 21.6%). Savoury snacks were most often purchased when feeling in a hurry opposed to fruit/vegetable or sweet snacks. At the annual meeting, we will present insights from in-depth analyses in the healthfulness of food purchases, food environmental exposure and underlying individual and contextual determinants shaping these food purchases.

CONCLUSION: This study is one of the first to gain extensive understanding of food choices in relation to individual food exposure. Findings provide important directions for future observational studies as well as directions for health promotion interventions. For example, to promote fruit and vegetable intake when on the go or as snack in-between meals, food outlets (e.g. kiosks at train- or petrol stations) may develop strategies to endorse (impulsive) fruit and vegetable purchases among commuting customers.
Through the eyes of youths: Using photovoice to document food insecurities for low-income adolescents

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

**Policies and environments (SIG)**

Objective: Food insecure adolescents have poorer nutrition and health as well as mood, anxiety and behavioral disorders. This study used Photovoice, a community-based participatory approach using photography and written narratives, to engage low-income adolescents in documenting and sharing their perspectives concerning food insecurity in their communities.

Methods: Teens were recruited from 5 communities in a Midwest US state. The group included 61 diverse teens 12 to 17 years-old. Teens participated in 5 sessions which included camera instruction, a food access activity, time to take photos, and leadership development. The structured dialogue technique, SHOWeD, was used to contextualize photos and support discussions. At project end, a visual presentation of images and narratives was presented by the teens to a selected community group. Paired t-tests were used to analyze pre-post differences in the Sociopolitical Control Scale for Youth (SPCS-Y) and the Positive Youth Development Scale (PYDS). Content analysis of photos, narratives, and session recordings was completed independently by researchers to identify themes.

Results: Several themes emerged from the photos taken by the teens. Teens had a strong understanding of healthy versus unhealthy foods, however they felt it was acceptable to eat unhealthy foods frequently. Many teens reported cooking for themselves and siblings due to parents work schedules, generally preparing easy to cook processed foods. Highly processed foods, fast-food options, and empty calorie foods were frequent in the teens' diets while fruits and vegetables were not. Snacks were also unhealthy, particularly those at after school programs. Families were critical to the teens' food-related experiences, with cultural differences noted. A statistically significant increase ($t(38)=-2.225$, $p = .032$) was noted post participation in the SPCS-Y item "most community leaders in my city would listen to me".

Conclusions: Photovoice is an innovative method to effectively engage and empower teens to have a voice in conversations about factors which affect their health. Sharing their stories with community leaders offered teens the opportunity to serve as experts on their lives and the factors affecting them. Interventions can build on participants' understanding of healthy versus unhealthy foods and the critical role families and communities play in addressing food insecurities.
Finding the sweet spot: understanding public’s perceptions towards policies to reduce the consumption of sugary drinks in Singapore

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OBJECTIVE: Amongst poor dietary behaviors, excessive consumption of sugar sweetened beverages (SSB) is of growing concern. Recently several countries have implemented or are actively considering, policies to reduce SSB consumption. Understanding public's receptivity towards SSB policies is vital to prioritize policy actions and to effectively structure public communication efforts. Whilst such information is available from Western settings, data from Asian countries are lacking.

METHODS: In a sample of 754 adult Singaporeans, we examined perceptions towards SSB policies using a cross-sectional survey. Participant's support towards 10 hypothetical policies to reduce SSB consumption was collected using a 5-point Likert scale. Opinions about policies were elicited by asking participants "What other thoughts do you have about this policy?" We used logistic regression to examine determinants of policy support, and thematic analyses to understand opinions about policies.

RESULTS: We observed good awareness of the harmful effects of excessive SSB consumption and good public support for a variety of SSB policies. In general, permissive policies such as traffic light labels (85.0% agreed/strongly agreed) and free access to water at eateries (77.1%) were better supported as compared to restrictive policies such as portion-size restrictions (64.5%) and taxation (55.0%). There was limited variation by age, ethnicity, income, SSB consumption habits, physical activity and BMI. Women were more supportive of policies as compared to men. Parents of younger children (= 18 years) were more likely to support school-centric policies. Concerns about policies were largely centered on loss of personal autonomy and economic implications for businesses. Nevertheless, key features of polices that support healthier beverage consumption, including raising awareness and increasing convenience were also recognized.

CONCLUSIONS: This is one of the few studies to examine public perceptions of SSB polices in an Asian setting. Our results suggest that adult Singaporeans are broadly aware of the health problems related to SSB consumption and are receptive to several SSB policy measures. Addressing concerns related to personal autonomy, economic implications and policy effectiveness may help improve public support. Findings from this study provide insights into consumer's perceptions of SSB policies, and can inform public health advocacy and government action in this area.
17118

P2, P2.153

English local government use of the planning system to regulate hot food takeaway outlets. A mixed-methods analysis of correlates and experiences of planning policy adoption

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Objective: Takeaway food outlets, or 'takeaways' typically provide high energy, low-nutritional-quality food, which may contribute to obesity. English planning guidelines describe the potential for the planning system to promote healthier food environments, through regulation of planning permission for new outlets. Over half of English local government areas use their planning powers to regulate new takeaways. We aimed to explore the correlates and experiences of policy uptake.

Methods: We used data from a previous census to establish the current landscape of English planning practice specifically focused on takeaway regulation, for health (diet and obesity) and non-health reasons. We mapped data for geospatial analysis, and used univariable multinomial logistic regression to explore whether the odds of having a health or non-health focused planning policy varied according to area-level composition (e.g. population-level excess weight) or contextual (e.g. takeaway number) characteristics.

Quantitative results guided qualitative, semi-structured interviews with 25 local government Planning and Public Health stakeholders. We used descriptive, thematic analysis to identify recurring themes.

Results: Significant clusters of areas with specific health-focused planning policies for takeaway regulation were found in the North East, North West, and Greater London. Compared to local government areas with the lowest, those with highest proportions of overweight or obese 10-11 year old children (OR 25.31; 95% CI: 6.74, 94.96) and takeaway numbers (OR 54.00; 95% CI: 6.17, 472.41) were more likely to have adopted a health-focused planning policy, than no planning policy.

Stakeholders considered planning-led approaches to be appropriate for takeaway regulation, but found success difficult to measure. The need for strong local leadership and local evidence to justify adoption emerged as particularly important.

Conclusions: There are clusters of local government areas with similar planning policies in England. These clusters may be underpinned by strong local leadership considered important by stakeholders. Characteristics that may reflect local need were associated with policy adoption. Such evidence of local need was identified as crucial for policy justification by stakeholders. These results may help other local areas identify supporting evidence for their own planning policies and begin to explain why national takeaway planning policy guidelines are taken up differentially across England.
Mediterranean built environment and weather as modulator factors on physical activity: Cross-sectional study

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Background: When promoting physical activity practice, it is important to consider the plausible environmental determinants that may affect this practice. We aimed to explore the impact of objectively measured Public Open Spaces (POS) on objectively measured and self-reported physical activity and the influence of weather on this association, in a Mediterranean sample of senior adults with overweight or obesity and the metabolic syndrome.

Method: Cross-sectional analyses based on 218 PREDIMED-Plus trial participants aged 55-75 years, from Palma de Mallorca (Spain). Indicators of access to POS were assessed in 1·dot;0 km sausage network walkable buffer around each participant's residence address using geographic information systems. Mean daily minutes of self-reported leisure-time brisk walking, and accelerometer measured moderate-to-vigorous physical activity at least in 10 min bouts were measured. In order investigate the association between access to POS and physical activity, generalized additive models with gaussian link function were used.

Results: Better access to POS was no statistically significant associated with self-reported leisure-time brisk walking. Only a positive significant association was observed between distance of healthy routes contained or intersected by buffer and OB-MVPA. This association was only evident on non-rainy days.

Conclusions: In this elderly population living in a Mediterranean city, only healthy routes contained or intersected by 1 km sausage network walkable buffer influenced on accelerometer measured MVPA 10 minutes bouts and rainy conditions during the accelerometer wear period did appear to be an important factor related to active ageing.
A systematic review of the effect of infrastructural interventions to promote cycling: Strengthening causal inference from observational data

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Objective
Previous reviews have suggested that infrastructural interventions can be effective in promoting cycling. Given inherent methodological complexities in the evaluation of such changes, the aims of this systematic review were to study the effects of infrastructural interventions on cycling and physical activity, and to evaluate whether the effects varied by design, methods, or statistical approaches.

Methods
Databases were searched for controlled and uncontrolled before-and-after studies that evaluated infrastructural interventions to promote cycling in adult populations. Examples of interventions include the opening of cycling lanes, or the expansion of city-wide cycling networks. Data was extracted for any outcome presented (e.g. bikes counted on the new infrastructure, making a bike trip, cycling frequency, cycling duration), and for any purpose of cycling (e.g. total cycling, recreational cycling, cycling for commuting). Data on physical activity was extracted, and quality assessment was conducted. Studies were categorized according to the nature of the outcome of interest, i.e. investigating changes in cycling behavior, or usage of the cycling infrastructure. To derive a common outcome, we calculated the relative change by dividing the difference over time by baseline levels. The median relative change across studies was presented to evaluate whether effects differed by methodological aspects, but no statistical tests were performed.

Results
We included 29 studies and all were conducted within urban areas in economically developed countries. Nearly all studies found effects that were in favor of the intervention. Cycling behavior compared to baseline was increased (median relative change: 30%; range: -15% to 179%), and also usage of the infrastructure increased (median relative change: 62%; range: 3.7% to 434%). Studies that did not test for significance, and studies that used objective registration methods (i.e. GPS and accelerometers, and automatic counting stations) found smaller effects on cycling behavior and infrastructure usage. Only 7 studies presented data on physical activity behaviors, and findings were mixed.

Conclusions
Improving cycling infrastructure is likely to attract cyclists to the facilities, and may also result in behavioral changes. Triangulation of methods is warranted to overcome issues that one may encounter when evaluating infrastructural interventions within the built environment, and to strengthen causal inference.
Influence of social deprivation and urbanization on leisure-time physical activity in Canada: A multilevel and spatial analysis

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Objective: Understanding how social and environmental factors interact to influence physical activity is important to identify groups and target regions that are in the greatest need of interventions and policies to support active lifestyles. The purpose of this study was to investigate the influence of interactions between neighborhood urbanization and social deprivation on geographic variations in leisure-time physical activity (LTPA) among Canadian adults (>24 yo).

Methods: Reaching LTPA recommendations were based on responses to questions about the frequency, nature and duration of participation in physical activity over the last three months. The social deprivation index (SDI), assigned to Canadian census dissemination areas, reflects the relationship between individuals in the family, the workplace and the community. The level of urbanization was based on population density and categorized as urban, suburban or rural. Data were pooled from six cycles of the Canadian Community Health Survey (2003 to 2013/14). Multilevel analyses were conducted to examine the interactions between the level of urbanization and quintiles of SDI across Canada stratified by gender.

Results: Meeting LTPA recommendations varied significantly across Canada with the highest rates achieved in British Columbia and the lowest rates in Newfoundland and Labrador. Additionally, LPTA varied significantly between neighborhoods within provinces. In the least socially deprived group (Q1), urban women reported significantly greater LTPA than suburban women but not rural. In the most socially deprived group (Q5), urban women reported significantly greater LTPA than suburban and rural women. Urban men reported greater LTPA than suburban and rural men at every quintile of SDI. Differences in LTPA between urban, suburban and rural areas were more prominent among men than women.

Conclusions: Neighborhood factors such as urbanization and SDI appear to influence LTPA among men, but not women. Interventions targeting women are equally needed across all levels of urbanization and SDI, whereas among men there may be a greater need to target rural and suburban areas. These observations can be used by policy makers and public health practitioners to identify neighborhoods in Canada with the greatest need for physical activity interventions and tailor gender-specific interventions to these regions.
The moderating effects of age and socioeconomic position on associations between parents’ perceived neighbourhood environment and children’s physical activity, outdoor time, and screen time

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose: To examine whether associations between parental perceptions of the physical and social neighbourhood environment and physical activity, outdoor time, and screen time among 2-15-year-olds from Melbourne, Australia are moderated by age and socioeconomic position (SEP).

Methods: Data were collected from parents of children aged 2-4 years (n=244), 5-11 years (n=729), and 12-15 years (n=239) as part of the Recording and Evaluating Activity in a Modified Park (REVAMP) study. Perceived neighbourhood environment (physical: attractiveness, opportunities to be active, parks, playgrounds, play equipment; and social: social norms for walking and exercising, social trust and cohesion, social network, sense of community, neighborhood safety), children's physical activity (meeting guidelines = 5 days/week), outdoor time (weekdays, weekends), and screen time (meeting guidelines = 5 days/week, weekdays, weekend), was parental-reported. SEP (low/medium/high) was based on the Index of Relative Socioeconomic Advantage and Disadvantage and was linked to participant postal codes. Multiple linear and logistic regressions were performed with interaction terms for age and SEP.

Results: For physical activity, more favourable perceptions of the physical (attractiveness: OR=1.81, 95%CI:1.08,3.05) and social (social norms for walking: OR=2.01, 95%CI:1.10,3.45, social norms for exercising: OR=1.74,95%CI:1.09,2.75, sense of community: OR=1.57,95%CI:1.18,2.09, social trust and cohesion: OR=1.67,95%CI:1.28,2.18, and social network: OR=1.56,95%CI:1.32,1.84) environment were associated with a higher likelihood of meeting physical activity guidelines in the high SEP group. Social norms for walking were associated with lower likelihood of meeting physical activity guidelines (OR = 0.22, 95%CI:0.07,0.71) in the low SEP group. Similar patterns were observed for associations between social norms for walking, social trust and cohesion, and social networks for time outdoors on weekdays. For screen time, favorable perceptions of the social (neighborhood attractiveness: B=-117.4,95%CI:-231.9,-2.9; sense of community: B=-119.17,95%CI:-184.21,-54.12) and physical (nearby parks/playgrounds: B=-333.91,95%CI:-506.74, -161.09) environment were associated with less screen time on weekdays among 2-4 year-olds. The opposite association was observed for nearby parks/playgrounds and weekend screen time among 12-15-year-olds. No other clear patterns were observed. Conclusion: Age and SEP moderated some associations between parents' perceived neighbourhood environment and children's behaviors. Differences between demographic groups should be considered in future neighbourhood environment initiatives and interventions aiming to promote active living communities.
17244

P2, P2.159

Design and rationale for evaluating salad bars and students' fruit and vegetable consumption: A cluster randomized factorial trial with objective assessments

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

*Policies and environments (SIG)*

Purpose: Building healthy fruit and vegetable (FV) consumption habits early in life is critical for primary prevention. Though, in many countries, youth fall well short of meeting guidelines for FV intake. In the U.S., school-lunch salad bars are one of the most heavily promoted ways to meet FV intake guidelines. This enthusiasm for school salad bars, however, may be premature, as no rigorous randomized trials have yet examined whether salad bars increase students' FV consumption. The purpose of this presentation is to describe the design, guiding theory, and rationale of a NIH (National Institutes of Health)-funded trial to evaluate whether introducing salad bars in primary and secondary schools in the U.S. affects students' FV consumption and waste during lunch.

Methods: A cluster factorial randomized trial will test new salad bars against waitlist controls, with and without an additional marketing intervention (N=36 schools, N=6804 students: grades 1-5 (n=12), grades 6-8 (n=12) and grades 9-12 (n=12). Objective plate waste measurements of individual student's selection, consumption, and waste of FV will be conducted using digital scales. The study's primary aim is to compare, within grade levels, FV consumption in schools without salad bars to consumption in schools with new salad bars. Secondary aims include assessing: a) whether FV marketing impacts the success of salad bars for FV consumption; b) whether salad bars differentially result in more FV waste compared to traditional serving methods; and c) cost-benefit of using salad bars vs. traditional serving methods for increasing FV consumption. The study is ongoing with 24 out of 36 schools having been recruited to date.

Conclusions: When complete, this study stands to be one of the most definitive on the effectiveness of salad bars and contextual factors impacting their success in the U.S. Findings will provide evidence for how to best spend limited dollars to improve FV intake in schools.
Market to MyPlate: Promoting local produce access for limited-resource families through a cooking and nutrition education intervention

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Objective: The purpose of this study is to determine if an 8 week nutrition and cooking intervention was effective in promoting locally-grown produce purchases and consumption among parents/guardians of limited-resource families in Central Illinois, USA.

Methods: Participants self-selected into workshop cohorts that were randomly assigned to three treatment groups: 1) family cooking classes, plus produce allocation, 2) family cooking classes, and 3) control group, with delayed intervention. Families who received cooking classes alone were given produce gift cards redeemable at the farmers market or farm after the study period ended. During the 8-session cooking classes, participants were encouraged to shop and utilize SNAP benefits at farmers markets. Across the cohorts, a subset of participants was recruited for structured qualitative interviews to identify barriers and facilitators to farmers market use, as well as factors contributing to fruit and vegetable food waste.

Results: Ten participants completed interviews representing all three cohorts. Participants redeemed 50% of the farm produce gift cards; most at the farm. Participants reported feeling welcome at the farmers market, but inconvenient hours and transportation barriers were cited as frequent barriers to use. Increased cooking frequency was a common facilitator of decreased food waste, yet, participants expressed knowledge deficits in proper produce storage techniques. Overall, eggplant was the most commonly reported wasted item from the produce allocation.

Conclusions: Cooking engagement may help mitigate fresh vegetable waste, increasing utilization of fresh produce. Limited-resource families may be more likely to purchase produce at the farm since they are open more frequently than farmers markets.
P2, P2.162

JUS Media?: Promoting healthy eating habits for Jamaican adolescents through the healthy families partnership

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Purpose: This paper presents a case study for utilizing a community-based coalition for dissemination of a healthy eating intervention in an international setting. The J(amaica) U(nited) S(tates) Media? Programme, a food-focused media literacy intervention for Jamaican adolescent-mother dyads to combat the negative impact of US cable TV and advertising on eating habits. Globalization has brought a new cultural determinant of health called remote acculturation: internalizing U.S. cultural identity, values, and lifestyles (Ferguson & Bornstein, 2012). Research in Jamaica has shown that remote acculturation towards U.S. culture is linked to watching more U.S. cable television and, in turn, eating more unhealthy food (Ferguson et al., 2017). Unhealthy eating is a major risk factor for non-communicable diseases (NCDs), and the Caribbean has the highest NCD rate in the Americas. In response, the Pan American Health Organization has targeted healthy eating, especially among youth, as a high priority action (PAHO 2011).

Methods: After completion of the intervention, the transdisciplinary transnational JUS Media? research team facilitated the formation of a Jamaica-based Healthy Families Partnership (HFP). The goal of the partnership was to translate the JUS Media? research findings into existing school-based policy and practice efforts throughout Jamaica. Relevant Jamaican obesity and NCD prevention stakeholders were identified, invited, and convened over three meetings from November 2017-June 2018. Research findings were presented using a data walk approach (Urban Institute, 2015) in the areas of media literacy, media landscape in Jamaica, remote acculturation, and the Jus Media? intervention results. The research team assessed HFP partnership engagement, satisfaction, and strength through member pre-post surveys and stakeholder mapping using a Centers for Disease Control partnership evaluation approach.

Results: Over 40 individuals from multiple sectors (e.g. Ministry of Health, National PTA, Jamaica Cancer Society) participated in the HFP. Stakeholders established working groups that identified opportunities for influencing policy and practice. HFP efforts are currently underway to execute dissemination plans and are working to inform Caribbean-wide policy.

Conclusions: The results of the project indicate that the approach of forming a community-based coalition is a promising approach to the dissemination of transdisciplinary and transnational research results.
Walkability and green space surrounding primary schools is associated with children’s active transport but not weight status in regional Victoria, Australia

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: The physical activity environment surrounding primary schools may have a significant impact on children's physical activity, active transport, and weight status and this may vary significantly by remoteness of location. Limited research on this topic has been conducted outside of metropolitan areas in Australia. This exploratory study set out to investigate whether the physical activity environment surrounding primary schools (green space, recreational facilities and walkability) is associated with students' weight status, physical activity and active transport, in a large regional area of Victoria, Australia.

Methods: This was an exploratory study, with a cross-sectional ecological design. Baseline data from a large-scale systems-based obesity prevention intervention were used to assess measured weight status and self-reported physical activity behaviours. Data on the physical activity environment surrounding schools were extracted from publicly available spatial data (e.g. road networks, land use and features). Ordinary least squared regressions assessed associations between three aspects of the physical activity environment (walkability, green space and recreational facilities) within a 1km walkable buffer of primary schools and weight status and physical activity behaviours in primary school children (summarised at the school level) in a regional area of Victoria, Australia.

Results: Twenty-three primary schools were included in the analysis, representing 1001 students. Significant associations were found between walkability score and students' use of active transport to and from school and between green space and students' use of active transport to and from school. No associations were found between any aspect of the school's physical activity environment and the mean standardised body mass index scores or proportion of students with overweight or obesity.

Conclusions: Higher walkability scores and greater number of green spaces within 1km of regional primary schools were found to increase active transport levels in students. The findings of this exploratory study indicate that further research, with larger sample sizes, is warranted to identify whether the physical activity environment may influence weight status in populations of children outside of metropolitan areas.
Distance to parks and park use for physical activity: The mediation of safety perception

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: To examine whether adolescents' roadsafety perception acts as a mediator on the association between the distance from home to the nearest park and the use of the parks for physical activity.

Methods: This is a cross-sectional study with a random sample of 1130 adolescents (534 male - 47.3%) 14 to 20 years old, from Porto Alegre-Brazil. Road safety perception was assessed through some questions of Neighborhood Environment Walkability Scale for Youth. Park use, socioeconomic status, age and sex were measured by a questionnaire. Distance from home to the nearest park was evaluated through Geographic System Information. Data analysis was performed using Pearson correlation and linear regression models were fitted according to Baron and Kenny procedures for mediation analyses. All analyses were adjusted for sex and socioeconomic status.

Results: RoadSafety perception is independently associated with less distance from home to the nearest park (p=0.04) and use of the parks for physical activity (p=0.02). RoadSafety perception is a mediator and explains 16% of the association between park use and distance from home to the park (Indirect Effect=-40.9966; IC:-119.3733 -2.2455).

Conclusion: Our findings indicated that roadsafety perception is a mediator on the association between the distance from home to the nearest park and the use of the parks for physical activity. Future studies should take this into consideration frequency and intensity of PA, as well as other environmental characteristics, such as crime, aesthetics and neighborhood facilities.
Comparing the nutrient composition of a generic versus a branded Canadian food composition database

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: The development and evaluation of public health initiatives such as reformulation and labeling in part relies on a comprehensive and up-to-date database of the nutrient composition of foods. Limitations with the lack of brand specificity and the currency of nutrient information of foods in the Canadian Nutrient File (CNF), the national food composition database, may have implications for accurate estimates of nutrient composition of foods and population intakes of some nutrients.

To compare differences in nutrient composition of the generic CNF (generic) versus branded Food Label Information Program (FLIP) database of Canadian foods.

Methods: CNF 2015 is the national nutrient composition database of 5,690 common foods and beverages in Canada while FLIP 2017 consists of 18,132 branded pre-packaged foods and beverages. Seven of the 22 categories were analysed, chosen to reflect priority food categories for reformulation. Percent difference between nutrients (energy, saturated fat, sodium, sugar and protein) per 100g for products in each of the categories by database was computed with >20% difference in nutrient content considered as significant, based on the Canadian nutrition labelling tolerance for nutrient values.

Results: Energy for bakery products, cereals and grains, dairy and substitutes, sugars and sweets, combination dishes and snacks were similar between the two databases (% difference range: -20% to +9%), whereas energy for desserts was higher in CNF (+24%). Sugar and sodium were lower for the majority of categories, whereas saturated fat was higher in FLIP in comparison with CNF. Protein was lower in FLIP for desserts but higher in CNF for dairy and substitutes, and similar between databases for the other categories.

Conclusion: Observed differences in some nutrients between the databases are possibly explained by the age of information in CNF 2015, particularly for nutrients undergoing active reformulation. This has potential implications for accurate estimates of dietary intakes in national nutrition surveys. Branded food databases such as FLIP can be a more useful resource for monitoring and surveillance of nutrient composition changes in the food supply.
Examining the relationship between park availability and self-reported vigorous physical activity in a resource-limited community: Data from the Washington DC cardiovascular health and needs assessment

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Health policy recommendations to assist residents with meeting physical activity (PA) guidelines have varied for metropolitan cities. The purpose of this study was to evaluate optimal distances for park availability to promote PA for resource-limited communities within the Washington, DC metropolitan area, as this has not been determined.

Methods: Using cross-sectional data featuring a sample of black adults recruited from the Washington DC Cardiovascular (CV) Health and Needs Assessment (N=37), we examined the relationship between park availability and self-reported vigorous PA (VPA) hours/week (hr/wk). We used geographic information systems to create eight exposure variables of park counts within circular and line-based network buffers around individuals' homes: 1) 400 meters 2) 800 meters, 3) 1200 meters, and 4) 1600 meters (m). We used linear regression models to determine the relationship between park availability and VPA. We adjusted for individual demographics (age, sex and income) and neighborhood factors [neighborhood deprivation index (NDI), neighborhood environment perception (NEP), or walk score (WS)], separately. We compared estimates between different buffer types using R-squared values.

Results: Participants (mean age of 57.7 years) reported a mean of 3.46 VPA hr/wk. In adjusted models, greater park availability for both buffer types within 800m (p<0.001), 1200m (p<0.001) and 1600m (p<0.01) were associated with increased VPA. For example, one additional park with in a 1200m network buffer around individuals' homes was associated with increased VPA by 1.04 hr/wk, adjusting for NDI (p<0.001). Although the standardized beta coefficients varied between buffer types, network buffers consistently had higher R-squared values as compared to circular buffers, suggesting better model fit with network buffers.

Conclusions: Increased availability of parks was significantly related to increased VPA, even when accounting for NDI, NEP or WS, separately. However, relationships were not significant within 400 meters, which could be complicated by a lack of availability, as these buffers had fewer parks available. Model fit was also better with network as compared to circular buffers. Our findings suggest that Washingtonian public health professionals could employ network buffers and prioritize increasing park availability within a minimum 800-meter distance to promote PA and ultimately improve CV outcomes for residents of resource-limited communities.
P2, P2.169

“Everybody drives here” – potentials for walking, in a car-oriented urban environment

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Objective
Identify how to leverage Physical Activity (PA) through walking, in a car-oriented environment, by examining the perceived environmental barriers for those who would like to walk more than they do.

Methods
The New Zealand Transport Household Survey 2015-17 (HTS, N = 12,974) was used to analyse the prevalence of short trips currently not walked, across New Zealand. We further examined qualitative insights of the Built Environment (BE) for Auckland, assessing significant differences between those who want to walk more (N=1,507), those avoiding walking (N=470) and the rest of the population, using Auckland Transport Active Modes survey data (ATAM, N=4,114) and Chi square testing.

Results
We have found that 87% of New Zealand trips were motorised (86% for Auckland), 24% of them were under 1 km, and 13% under 500m (HTS data). In Auckland (ATAM data), 41% of survey respondents declare wanting to walk more (potential walkers). Compared with the other respondents who walk at least occasionally, we found significant differences: (1) potential walkers were less likely to walk 5 or more days per week (39% vs 50, p<1%); (2) they declared feeling more unsafe at night (50% rate it under 4/10, vs 37%, p<1%, feeling further related to traffic and crime); and (3) were slightly more likely to find walking "not quick" to access destinations (42% vs 37, p<1%). Those who wanted to walk less reported more traffic-related unsafety by day time. Other environmental barriers such as the proximity to destinations, the footpaths condition or unattractive walking routes were identified by walkers but without significant differences between rejectors and enthusiasts.

Conclusions
Although walking for transport is recognized as an efficient way to increase overall PA, it can seem difficult to leverage in car-oriented environments. Here, we outlined the scope of a possible modal shift, with a significant proportion of short trips that are currently not walked and identified that addressing perceived unsafety would contribute both to maintain existing walking trips and leverage the potentials.
How multiculturalism as a national policy agenda reflects in sport, physical activity and sedentary behaviour policies in Australia and the Netherlands – a qualitative content analysis

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Purpose and introduction: While 90 percent of the world's countries are considered multicultural, only a few have accepted multiculturalism as their official policy agenda. In the document The People of Australia, Australia has officially declared itself a multicultural state. The Netherlands ratified the Minority Memorandum in 1983 that officially gives recognition to ethnic minorities. This study explores and compares how multiculturalism as an official national policy agenda was reflected in national sport, physical activity (PA), and sedentary behaviour (SB) policies in Australia and the Netherlands.

Methods: We searched for national policy documents issued by government bodies from 1980 until 2018 that focused on sport, PA, and SB in English and Dutch. Three key search methods were used: available documents in the International inventory of documents on physical activity promotion; an Internet-based search of relevant Australian and Dutch ministries; a search with the Google search engine using the relevant keywords. A qualitative content analysis was used to analyse the documents. The content analysis grid was developed based on multiculturalism traits such as: diversity, equity, inclusivity, different strategies for various vulnerable groups, affirmative action, public recognition of minorities and other disadvantaged groups.

Results: In total, we found 37 documents, 16 for Australia and 21 for the Netherlands. Specific population subgroups were acknowledged in the policy documents. However, mostly they were not defined as disadvantaged populations and there was no mention of additional importance to support these groups. Only a quarter of documents contained some traits of multiculturalism and only three documents acknowledged there should be different PA and/or sports promotion strategies for various groups. In Australian policy documents, we found that some practices such as naming the sports organizations are not in line with multicultural agenda. Subgroup specific strategies for SB reduction were not detected in any of the policy documents.

Conclusion: Multiculturalism as a national policy agenda should be reflected more in the sport/PA/SB policies to make sport and PA spaces an inclusive environment. To achieve sustainable change in the social determinants of health, policy makers should advocate for multicultural strategies that promote sport/PA and aim at reducing SB.
A systematic review of influences of product placement in food stores on dietary behaviours and sales (Prospero CRD: 42016048826)

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Purpose: Empirical evidence of the effects of product placement strategies on consumers' dietary and purchasing behaviours is limited. A systematic review was conducted to collate the evidence, both observational and intervention, about how food and beverage product placement (availability and positioning) in food stores, influence dietary behaviours and sales.

Methods: Eleven databases were systematically searched, using both MeSH and free text terms, for articles published between 2005 and October 2018. Titles and abstracts were screened by one reviewer. If eligible, two reviewers performed data extraction and assessed each article for risk of bias in relation to the research question based on predefined criteria according to guidelines from the Centre for Reviews and Dissemination. Results were tallied according to significance level and the direction of the relationship for the placement of healthy or unhealthy food and beverage exposures/interventions and diet or sales outcomes, in the expected direction for health improvement.

Results/finding: After the removal of duplicates, the search yielded 15,835 potential articles, of which 34, 17 observational and 17 intervention articles, met the inclusion criteria. The heterogeneous nature of these studies meant meta-analyses were not possible.

Two observational studies were classified as having a high risk of bias, 5 moderate and 10 as low risk of bias. Two intervention studies were classified as having moderate risk of bias and the remaining 9 had high risk of bias. Eight observational studies presented dietary related outcomes and 7 presented sales outcomes. The majority of intervention studies presented sales outcomes (n=15) and only 2 presented diet related outcomes.

67 outcomes from 14 observational studies and 63 outcomes from 16 intervention studies were tallied. 85% of observational outcomes showed associations with placement strategies in the expected direction for health improvement, with 37% being significant. 81% of intervention outcomes showed expected associations with placement strategies, with 25% being significant.

Conclusions: The evidence suggests placement strategies have the potential to support healthier food-related behaviours. This reviews provides evidence in support of the UK Government's updated Childhood Obesity Plan to restrict prominent placement of unhealthy food in supermarkets.
Can repositioning menu items affect recess orders from an online school canteen ordering system? Secondary outcomes from a cluster randomised controlled trial

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Studies of the physical food environment suggest that the position of an item within an array influences the likelihood of that food being selected. Furthermore, evidence from studies of paper-based menus suggest that the items first and last within a menu grouping are likely to be selected at up to twice the frequency of items in the middle. However, very few studies have investigated whether these findings can be replicated in the online environment, despite the wide-spread and increasing use of online menus and ordering systems. Manipulating the position of food items within an online menu or ordering system may be a simple and low cost public health intervention to prompt the purchase of healthy food.

Objective: This study sought to determine if changing the position of target items within an online menu effects the frequency of purchasing of those items.

Methods: This study analyses secondary outcome data from a cluster randomised control trial of a positioning intervention within an online food ordering system in Australian primary schools canteens. Six NSW schools that were already using online canteens were recruited and randomised to receive either the intervention (whereby key healthy "target" items were re-positioned to be first and last on the online menu) or to the control (no change to the position of online menu items).

Results: Results will be presented from over 1,400 recess orders (representing 478 students) collected over a 4-week baseline period and a 4-week intervention period. Purchasing data are automatically collected via the online ordering system. Linear mixed models will be used to investigate between group differences in the proportion of recess orders that contain at least one target item adjusted for clustering, repeated measures and controlled for baseline values.

Conclusions: The results of this trial are useful in two ways. Firstly, at a conceptual level to advance the science of choice architecture and determine if methods that are effective in the physical world translate to an online environment and 2) to determine the public health benefit of a simple intervention within a real world setting.
Low alcohol wine - Is it a thing? A narrative review on consumer perception and behaviour

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objectives
Alcohol consumption has been identified as a contributor to more than 200 diseases, and the World Health Organisation, therefore, leads a global strategy to reduce the harmful use of alcohol worldwide. This, along with increasing consumer demand for healthier product, drives innovations in the beverage market. Low- and reduced alcohol beverages gained increasing popularity in some countries with different factors driving market success. The aim of the current review was (a) to provide an introduction on low-alcohol wine, and (b) to provide an overview of the literature on research that investigated consumer perception and behaviour related to low-alcohol wine.

Methods
Narrative literature review

Results
A classification of wines with reduced alcohol content and an overview of production methods is provided. Although commercially available since more than 20 years, low alcohol wines have faced a number of technical and marketing challenges in the past. However, research on consumer acceptance conducted at various time points and in different countries suggests increasing acceptance among specific consumer segments, and low alcohol wine innovations recently set foot into some European markets via major supermarket chains. Research on the effect of low alcohol labelling and the use of different descriptors (i.e. low, reduced, light) on overconsumption and product perception (i.e. willingness to pay, perceived alcoholic strength, liking and sensory evaluation), suggest that these factors influence consumer behaviour.

Conclusions
Wines with reduced alcohol content can be an interesting product for a variety of stakeholders and may offer benefits for consumers while having the potential to reduce alcohol consumption and therefore contribute to the reduction of alcohol-related harm on a population level. Strategic marketing and communication efforts are needed to increase awareness of the production and the availability of quality low-alcohol wine products. Additional research in field settings, such as out of home drinking environments is needed to further investigate how the selection of reduced alcohol beverages as an alternative to full strength drinks can be promoted.
Public transport – is it REALLY active transport? Exploring commuting and physical activity among office workers in Brisbane, Australia

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Background
Active commuting (AC: walking/cycling to/from work) has been identified as a strategy for achieving sufficient physical activity (PA). However, assessing commuting mode through "usual mode", or "main mode" on a single day (Census Day), risks underestimating PA achieved through AC and public transport (PT) trips. This research uses more detailed measures, to quantify the PA achieved by office workers in their commuting journeys, and total PA.

Methods
Participants included 74 volunteer adult office workers from five workplaces in Brisbane's central business district. Data were collected using an online survey (assessing recent and usual commuting modes, and attitudinal, situational and demographic predictors of AC), and a 7-day online diary of commuting and PA (measuring mins/day in each commuting mode, and mins/day of non-commuting PA, adapted from a previously validated online travel recall tool and PA log).

Results
Commuters were categorised by their main commuting mode (the mode with most minutes/week): 18 people (24.3%) were Motor Vehicle Users (MVUs), 37 (50%) were PT Users (PTUs), and 19 (25.6%) were Active Mode Users (AMUs). MVUs achieved less PA through commuting (mean=50 min/week) than PTUs (103 min/week, p=0.002), who achieved less than AMUs (188 min/week, p<0.001). AMUs achieved more total PA (391 min/week) than both PTUs (303 min/week) and MVUs (274 min/week) with no significant difference between PTUs and MVUs. 100% of AMUs achieved sufficient PA (=150 min/week, on =5 days/week), higher than PTUs (81%, p=0.04) and MVUs (61%, p=0.002), with no significant difference between PTUs and MVUs. However both AMUs (47%, p=0.002) and PTUs (18%, p=0.048) were more likely than MVUs (0%) to achieve sufficient PA through commuting alone.

Conclusions
These findings question the assumption that commuting by PT leads to an increased likelihood of achieving sufficient PA. However, both AC and PT increase the likelihood of achieving sufficient PA through commuting alone, making them attractive options for time-poor people seeking to meet PA guidelines within their time constraints. Study limitations include the small sample size and overall high levels of PA in the sample. These findings form the baseline data for a workplace-based intervention to increase AC.
Comparison of buffers, activity space and MVPA space in assessing effect of area-level deprivation on physical activity facility availability

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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose:
This study investigates if neighbourhood characteristics, such as area-level deprivation, are associated with innovative methods of assessing adolescent mobility, moderate-to-vigorous physical activity (MVPA) and PA facility availability. This was compared to traditionally used buffer methods of assessment.

Method:
Adolescents from three schools (n=69, age= 16.06±smn;1.29, 65.2% female) provided valid GPS and accelerometer data (seven day period). PA facility availability was determined from the Ordnance Survey Points of Interest Data (PoI). Geographic Information System (GIS) determined an adolescent's mobility through the creation of activity spaces using GPS data. The location of MVPA, assessed using Evenson's cutpoints was determined, and MVPA space created. Five traditionally used buffers (400m, 800m, 1k, 1.6k, 3k), measured both radially and based on street network, were added around the home postcode of each participant. The count of PA facilities was then determined within each buffer, activity space, and MVPA space. Using Index of Multiple Deprivation (IMD) quintiles, one-way ANOVA's assessed differences between area-level deprivation and size of activity space, size of MVPA space, and PA facility availability.

Results:
There was no statistically significant difference for activity space size (p=.23) or MVPA space size (p=.81) between IMD quintiles. There was no statistically significant difference for PA facility availability within activity space (p=.26) or within MVPA space (p=.92) between IMD quintiles. Finally, six of the ten traditional buffers found no statistically significant difference for availability of PA facility between IMD quintiles (p>.05) but four found a statistically significant difference between most deprived and least deprived (p=.01-.05).

Conclusion:
Traditionally used buffers suggest a difference in PA facility availability by area level deprivation quintile, which is consistent with current evidence. However, more innovative objective methods found no difference in terms of adolescent mobility, MVPA space or PA facility availability by area-level deprivation quintile. These current findings extend evidence by using objectively measured activity spaces and MVPA, but contradict previous research which suggests differences in adolescent mobility and PA facility availability by area-level deprivation. This suggests the effect area-level deprivation has
on mobility, MVPA space, and PA facility availability may be overestimated by past methods. This may have future policy implications.
Is the protective effect of cycling helmet against death confounded by the area of the crash?


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Policies and environments, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

**Policies and environments (SIG)**

Objective: Wearing helmet while cycling cannot restore health, but it can prevent injuries. It is important to highlight it because the decision to use it is the result of a modifiable conduct. While its protective effect is widely accepted, the magnitude of its association with death is still a matter of debate. This effect could be modified or confounded by environment-related factors and cyclist behavior. Therefore, our main research question was whether the area in which the cyclist crash occurred (urban/highway) affects the magnitude of the association between helmet use (yes/no) and death (yes/no).

Methods: We designed a case series study comprising all 7957 cyclist crashes recorded by the police between 2014 and 2015 in the Spanish National Registry of Road Crashes. To address missing values, we performed a multiple imputation procedure by the chain equations method. We used a multilevel approach based on the cyclist and the province of the crash as aggregation levels. Environment-related and individual variables were included in multivariate and univariate models. Incidence Density Ratios (IDR) with 95% confidence intervals (95%CI) were calculated with a Poisson Regression on Stata v.14.

Results: We did not observe any association between helmet use and death with the univariate model (IDR 0.79 95%CI 0.52, 1.21). Nevertheless, stratification by the area of the crash showed a different pattern. There was still no association on urban area (IDR 0.35 95%CI 0.11, 1.14), but there was an inverse association on highway (IDR 0.28 95%CI 0.17, 0.45). This inverse association was also shown in the multivariate model once we adjusted by area (IDR 0.29 95%CI 0.18, 0.45) and remained almost with the same values after adjusting by all the rest of the variables (IDR 0.30 95%CI 0.18, 0.48).

Conclusions: Helmet use while cycling shows an inverse association with death after a crash. This protective effect is confounded by the area in which the crash occurred, perhaps due to the difference in the behavior of the urban and highway cyclists, aside of environment-related characteristics. Therefore, stratification based on the area of the crash should be considered as a regular procedure when addressing related research questions.
Association between Sedentary Behavior and Cardiovascular Disease Risk in Adults with Autism Spectrum Disorder

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Other, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Limited research on small samples indicates that adults with autism spectrum disorder (ASD) are highly sedentary, placing them at risk for developing cardiovascular disease (CVD), yet there are no data on the association between sedentary time (ST) and CVD in this population. The purposes of this study were to (1) assess the prevalence of ST and CVD risk factors in a large sample of adults with ASD and (2) examine the association between ST and CVD risk in this population.

Methods: A self-report, online survey addressing autism symptoms (Autism Spectrum Quotient-10; AQ10), ST (Self-report, last 7-day sedentary behavior questionnaire), and CVD physiological (BMI, blood pressure (BP), stroke, diabetes, cholesterol, triglycerides, and heart attack) and mental health (anxiety, depression, bipolar, and obsessive compulsive disorder (OCD)) risk factors was delivered to adults with ASD aged 18-55 years. Subjects were recruited via ASD support groups in social media and direct contact with ASD advocacy organizations in the U.S. and other English-speaking countries. A 15-minute minimum survey completion time and AQ10 score ≥6 were used to verify valid responses and meeting the inclusion criteria. Binary logistic regression analyses were used to explain the impact of ST on CVD risk factors. All analyses were performed using SPSS and significance level was set at p < 0.05.

Results: 802 survey responses were received and 229 were included in the analyses. The seven-day median ST was 9.6 hours/day (IQR = 5.4). Higher ST was significantly associated with higher odds for high BP (OR = 1.13, 95%CI = 1.01-1.24), stroke (OR = 1.27, 95%CI = 1.09-1.49), and other mental health risk factors (depression, anxiety, bipolar, OCD; all p < 0.05). No significant associations were found between ST and BMI, diabetes, cholesterol, triglycerides, and heart attack.

Conclusions: These data on a relatively large sample support previous findings that adults with ASD are highly sedentary and this contributes to an increased risk for certain CVD factors, specifically those related to poor mental health. Interventions that target reducing ST and alleviating mental health symptoms should be recommend to reduce the odds of this unique population segment developing CVD.
Relationships among eHealth Literacy, Health Literacy and Physical Activity: A Literature Review

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e & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

E- & mHealth (SIG)

Purpose
To explore the relationships among health literacy, eHealth literacy and physical activity.

Background
eHealth literacy (EHL) refers to a mixture of capabilities that enable individuals to deal with health information via e-approach, and apply it to solve health problem. Although this term was raised on the ground of health literacy (HL), EHL and HL are known as two closely related yet distinct health-related literacies. Recently, studies increasingly explore HL issues in daily life, linking HL closely to lifestyle behaviors. As one component of lifestyle behaviors, physical activity (PA) was identified as an intermediate health outcome of HL, yet few studies about HL or EHL in conjunction with PA has been conducted.

Method
The review was based on approximately 80 articles published during 2002-2017, analyzed following the method of narrative literature review.

Conclusions
It was found that 1) Differences between EHL and HL were mostly discussed in a conceptual level; only three empirical studies focused on the association between these two concepts, but findings are inconsistent: two studies showed positive relationship, while one claimed it as non-significant; 2) Positive relationship was found between HL and PA by quite a number of studies, yet there is a lack of studies on HL in non-medical settings and apparently-healthy individuals; In addition, PA was mostly considered as one component of health behaviors rather than discussed independently; 3) only three cross-sectional studies explored the relationship between EHL and health behavior (including PA), providing limited knowledge on the relationship of EHL and PA.
Using Instagram Data to Monitor Physical Activity Level and Exercise Identity

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E- & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

E- & mHealth (SIG)

Background: The growing body of social media data is becoming a central part of big data research as these data can be modelled alongside other datasets (e.g. physical activity data) and used to predict outcomes from these datasets. Previous research has shown that social media data could be used to provide real-time monitoring of psychological and behavioural outcomes that inform health behaviours. Currently, it is unclear whether a person's Instagram data can be used to predict a person to physical activity level and exercise identity.

Objective: This study seeks to examine the feasibility of using a person's physical activity related to Instagram posts as a method to monitor physical activity levels and exercise identity.

Methods: Eligible participants were asked to complete questionnaires that assessed their physical activity level, exercise identity and perceived social comparison. Participants' Instagram data (12-month) were downloaded using Instagram's Application Program Interface. Instagram pictures were coded by two research assistants using a set of standardized criteria to determine whether the posts were related to physical activity. The ratio between the physical activity-related posts and the total number of posts were calculated for each participant. Linear regression models were used to evaluate the relationship between a person's physical activity related to Instagram posts as a method to monitor physical activity levels and exercise identity.

Results: 40 participants (age±smn;SD: 19±smn;2.1; female: n=25) completed the study. Participants made on average 29.6 posts (range 5-190) during a one year period before completing the questionnaires. We found that increase in the ratio of the physical activity-related Instagram posts were significantly associated with a person's exercise identity (b=.35; 95%CI=.01, .20; p=0.02) and physical activity levels (b=.20; 95%CI=.01, .22; p=0.03) after controlling for age, sex and sense of social comparison.

Conclusion: Using social media data to monitor physical activity level can be a valuable tool for eHealth researchers to help tailor and target physical activity interventions. Future research needs to examine whether additional Instagram data variables (e.g. number of followers, likes, comments) can also be used to predict physical activity-related outcomes.
Importance of Complete Food Composition Databases and Computer Methods for dealing with Missing Food Composition Data

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e & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

E- & mHealth (SIG)

Objective: Food Composition Databases (FCDBs) are a fundamental information resources for Food science, and their quality is of great importance for the Nutrition domain. A good quality FCDB should aim towards minimizing the amount of missing data, which are a very common problem and introduce an element of ambiguity into the data. Missing data can arise due to different reasons such as mishandling of samples, measurement errors, deleted aberrant values or simply lack of analysis. Complete FCDBs are of great importance because FCD is used widely and many institutions rely their work on their national FCDBs.

Methods: Missing value handling is of great importance when providing an efficient and valid data analysis. In the present study, we focus on missing data imputation techniques which are statistical prediction methods for completing a missing value with plausible value which is an estimate of the true. In this study we focused on methods for imputing missing nutrient values in FCDBs. The data for our experiment was extracted from the national FCDBs of 10 countries, which were collected by EuroFIR (European Food Information Resource Network) and comply with the Food data structure and format standard (BS EN 16104:2012). We compared the following methods: fill-in with mean, fill-in with median, Non-Negative Matrix Factorization (NMF), Multiple Imputations by Chained Equations (MICE), Nonparametric Missing Value Imputation using Random Forest (MissForest), and K-Nearest Neighbors (KNN).

Results: The methods were evaluated on four datasets with selected nutritional values for foods from four food groups: Potassium in Fruits, Sodium in Fruits, Sodium in Vegetables, and Protein in Meat. The evaluation was done as follows: first setting 10%, 20% or 30% of the data as missing (each as separate use case), then calculating the missing values, and evaluating the results by comparing the obtained values with the actual values. The comparison was done using the following evaluation criteria: Mean Absolute Percentage Error, Mean Kullback-Liebler Divergence Error, Root Mean Squared Error, and the execution time.

Conclusions: Out of all six methods, NMF and missForest yield the best results and deserve further consideration in practice for dealing with missing values in FCDBs.
A web-based lifestyle intervention program in Chinese college students: Design and preliminary results of a randomized placebo-controlled trial

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e & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

E- & mHealth (SIG)

Purpose: This study aimed to describe the design and present the preliminary findings of a web-based lifestyle intervention program, which comprises sequentially and simultaneously delivered intervention modules targeting physical activity (PA) and fruit and vegetable consumption (FVC) in Chinese college students.

Methods: The study adopted a randomized placebo-controlled trial, using the Health Action Process Approach (HAPA) as the theoretical backdrop. A total of 556 Chinese college students participated in the web-based lifestyle intervention program. All participants were randomly assigned to one of four groups, including PA-first arm, FVC-first arm, two health behaviours simultaneously delivered arm, and placebo-control arm. Data collection was conducted at the beginning and at the end of the intervention, 3-month and 12-month follow-up after the intervention.

Results: At baseline, 41.7% of participants were female and 58.3% were male. About 41% of the participants did not meet the standard PA-recommendations, while 69.6% did not adhere to the standard FVC-recommendations. In total, only 19.6% of participants met both PA and FVC recommendations. The four groups did not differ significantly in baseline characteristics (all P=.17-.99).

Conclusions: The preliminary results indicate the prevalence of unhealthy lifestyle of college students in China, which implicitly support the significance of implementing such web-based health intervention program. This is also the first study, which will be examining the comparative effectiveness of simultaneously and sequentially delivered lifestyle interventions in the Chinese population, which contributes to the further application of web-based health behaviour change interventions.
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Systematic review of systematic reviews of the efficacy of behavioural interventions for the prevention of harmful weight gain in adolescents.

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E- & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

E- & mHealth (SIG)

Purpose: The adolescent period characterised by increased independence from parents but growing peer pressure is often accompanied by poor food habits and lifestyle choices. Interventions to curb harmful weight gain and instil healthy eating habits in this age group are important to prevent the ever increasing prevalence of adult obesity. The aim of this systematic review of systematic reviews was to investigate the efficacy of weight prevention interventions, with a focus on external validity components, to inform best practice and policy beyond the research setting.

Methods: Systematic searches of ten databases from January 2000 to October 2018 were conducted to identify relevant systematic reviews: Medline, PreMedline, Embase, Web of Science, Cinahl, Scopus, CDSR, DARE, ERIC and PsycINFO. Systematic reviews of randomised controlled trials that included interventions focused on diet, and/or physical activity and/or sleep and/or other behaviours that aimed to prevent harmful weight gain in adolescents aged 10-19 years were included. Systematic reviews of treatments targeting obese participants or employing pharmacological and surgical interventions were excluded. The main outcome measure was change in body weight, BMI or BMI z score post intervention and secondary outcomes were changes in lifestyle behaviours. Data extracted included review year, main aim, setting, population, strategy and databases searched, number of participants, primary outcome and secondary outcomes, external validity components such as attrition and effect modification. A MeaSurement Tool to Assess Systematic Reviews was used to assess quality of reviews.

Results: From the initial search 14060 articles were retrieved but of these only 12 systematic reviews met the selection criteria. The majority of interventions were school-based lifestyle interventions or exercise interventions and external validity components were mostly unreported. Of the six systematic reviews that deemed lifestyle interventions successful, longer study durations and incorporation of aerobic exercise were found to be associated with greater effects on measures of body fat.

Conclusions: The body of evidence suggests that it is possible to favourably influence prevention of harmful weight gain but not with a high degree of certainty.
A review of behavior change techniques, transparency, and quality in Mexico’s top-ranked commercial smartphone apps for weight control, physical activity, and healthy diet

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Purpose: Increasing access to smartphone health apps presents one attractive prospect for countering Mexico's growing non-communicable disease threat. Yet, no comprehensive reviews of commercial apps targeting weight control, physical activity (PA), and healthy diet in low- and middle-income countries, including Mexico, have been conducted. This study evaluated Mexico's top-ranked weight control, PA, and dietary apps for behavior change techniques (BCTs), transparency, and quality.

Methods: Mexico's top-ranked 25 free and paid apps in the "Health and Fitness" category of the iTunes and Google Play stores (100 total apps) were identified from an app analytics website (App Annie) in January 2018. Two reviewers screened the apps' titles and descriptions, excluding ones that (1) were not in English or Spanish, (2) did not target weight control, PA, and/or diet, and/or (3) did not have standalone functionality. Remaining apps were downloaded and evaluated. The presence of BCTs was assessed using Michie et al's BCT taxonomy v1. App transparency and quality were assessed using the Health on the Net Foundation criteria and Mobile Application Rating Scale (MARS; 1[low]-5[high]), respectively. Descriptive statistics were calculated for all variables.

Results: Fifty-six apps were eligible for analysis, with most (n=43; 77%) focusing on PA. Out of 30 possible BCTs, 7 were not present in any app. Each app included at least 2 BCTs. The mean number of BCTs per app was 9.4±smn;3.7. Self-monitored was the most frequently included technique (n=53; 95%). The mean MARS score was 3.8±smn;0.5, with the functionality domain yielding the highest mean rating (4.4±smn;0.6) and information quality yielding the lowest mean rating (3.3±smn;0.4). Two apps did not meet any of the 8 transparency criteria. The mean number of transparency criteria per app was 3.3±smn;1.8. Providing contact information (n=50; 89%) was the most frequently addressed criterion. Only 12 (21%) apps cited sources of information.

Conclusions: Despite high functionality, few of Mexico's popular health apps focused on weight control, proved transparent, and leveraged a high number of BCTs. As the digital health landscape expands against the backdrop of an obesity epidemic, it will be crucial to communicate these limitations and continue to explore potential mobile health solutions.
The impact of step-driven currency generation on physical activity behaviour change

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E & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

E & mHealth (SIG)

Background: Sweatcoin, a UK-based technology company, has developed a digital platform that tracks and verifies physical movement to convert it into virtual currency. The currency can subsequently be exchanged for goods and services on their marketplace, providing a continuous incentive to be active. This study investigates the physical activity behaviour change observed in Sweatcoin users over a 6-month period of app usage.

Objective: To investigate the change in physical activity (measured using daily step-count) of Sweatcoin users following registration with the app, the longevity of the change and whether this change can be predicted through and driven by demographic and other lifestyle variables.

Methods: Activity data from a sample of 5,406 Sweatcoin users was used to analyse daily step count. Activity change was measured in terms of the percentage change in average daily step count for each month after registration, relative to that in the 3 months prior to the app being used. A subset of over 800 users completed a questionnaire capturing demographic and activity information. Users were subsequently grouped according to having no/negative, moderate or high activity change following app usage. Differences between groups in terms of activity and demographic status were investigated using regression analyses.

Results: There was an average increase in daily step count of 19.5% over the 6-months following registration, compared to 3-months prior. Of the questionnaire respondents, 34% had high levels of behaviour change following app registration. A logistic regression identified an obvious impact of seasonality, with those registering the app in winter or spring more likely to show high activity behaviour change than those registering in summer. More striking were the results identifying those classified as overweight (measured through body mass index (BMI) and less active (based on self-report scale of physical activity) being most likely to show high levels of physical activity change following registration with app.

Conclusion: The results highlight that an incentives-based app can induce significant sustainable physical activity behaviour change. Importantly, the results suggest that those typically lacking motivation to exercise (sedentary and high BMI) are most likely to be incentivised to increase their activity levels.
A cluster randomised controlled trial of family-based Zero-time Exercise mobile messages on physical activity, family interaction and happiness in Chinese adults in Hong Kong

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E- & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose: Zero-time Exercise, an integration of simple strength- and stamina-enhancing physical activity into daily life, can be done anytime, anywhere and by anyone. We evaluated whether family-based Zero-time Exercise mobile messaging can further enhance the effect of a brief holistic health intervention on physical activity, family interaction and well-being (perceived health, happiness and harmony) in Chinese adults in Hong Kong.

Methods: In a cluster, randomized controlled trial on 240 participants (83% female, 65% and age <40 years) from 12 institutions (primary schools and units/offices of The Boy's & Girls' Clubs Association of Hong Kong) were randomized into either a Physical activity (PA) group (n=117 from 5 institutions) or Healthy eating control message (Control) group (n=123 from 7 institutions). Both groups received the same holistic health intervention (two 2-hour sessions) including Zero-time Exercise and healthy eating information, but different daily mobile messages for 3 months. The PA group received about 90 family-based Zero-time Exercise messages, guided by the Health Action Process Approach. The messages encouraged participants to (i) use ZTEx to enhance participants' physical activity and well-being and (ii) exercise with family members to enhance family interaction. The Control group received about 90 healthy eating messages.

Results: Both PA and Control groups reported significant increases in physical activity, ZTEx, family interaction and well-being at the 1-month and 3-month follow-up. The PA group showed significantly greater increases in moderate physical activity by 0.8 day in a week (95% confidence interval [CI] = 0.1, 1.4) at 3-month follow-up; and significantly greater increases in ZTEx by 0.3 score (out of 5) (95% CI = 0.1, 0.5), engaging family members in ZTEx by 0.2 score (out of 5) (95% CI = 0.1, 0.4), personal happiness by 0.3 score (out of 10) (95% CI =0.1, 0.5) and family happiness by 0.3 score (out of 10) (95%CI = 0.1, 0.5) during the 3-month study period, compared to the Control group. The effect size was small (Cohen's d: 0.19, 0.40).

Conclusions: We found good evidence that daily Zero-time Exercise messaging enhanced participants' physical activity, family interaction, and personal and family happiness. Further trials on such approach are warranted.
Impact of remote counseling by dietitians on eating behavior and physical activity in overweight and obese adults

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e & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Obesity and related diseases have emerged as an important public health issue. The use of new digital technologies in nutritional counseling is a possible approach to overcoming the problem. These technologies might support the counseling process in a way that is convenient for everyday use and therefore effective in helping patients lose weight sustainably. Oviva has developed an application for this purpose.

Objective: The following research examines the effects of 1-year remote counseling by dietitians on the eating behavior and physical activity of overweight and obese adults.

Methods: The study, conducted in the German-speaking region of Switzerland, started in April 2016 and was completed in May 2018. Initially, 43 overweight and obese individuals were included, 36 completed it. During 1-year intervention participants received individual remote counseling from dietitians through the application Oviva. Interactions focused on feedback on photo-based food logs, motivation and education aligned with the individuals' lifestyle goals. In addition to the primary outcome of weight change, the study examined physical activity (using the Global Physical Activity Questionnaire) and dietary behavior (using a 11-item simplified food frequency questionnaire). The study measured changes between baseline, after three and twelve months.

Results: Over the course of the study, the median weight loss was 4.9kg (range -21.9/7.5). The total moderate-to-vigorous physical activity increased by 320 MET-min/week (range -3860/8880). A detailed analysis of physical activity showed the following results: total value recreational activity increased by 480 MET-min/week (range -1200/3180), median work activity did not change (0 MET-min/week, range -5040/7560), transport activity increased slightly by 60 MET-min/week (range -5040/960) and sedentary behavior decreased by 60 min/day (range -540/300). The total score for dietary consumption (out of 22 points) provides an indication of how healthy the diet is, with a low score indicating a healthy diet. Results showed significant improvement towards a healthier diet over the year -2.5 points (range -8/1).

Conclusion: Further evaluation of photo diaries and physical activity data available on participants' smartphones might lead to additional interesting findings. Overall, the study shows initial promising results and supports the implementation of application like those of Oviva for sustainable weight loss through lifestyle modification.
Young adults’ preferences for using social media in a healthy lifestyle intervention

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e & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Social media is a prominent form of communication among young adults. However, a number of recent healthy lifestyle interventions employing these media have demonstrated poor engagement. The aim of this study was to understand young adults preferred use of social media to support them when trying to adopt healthier lifestyles.

Methods: Focus groups were conducted according to the methods of Kruger and Casey. Participants aged 18 to 25 years from the Greater Sydney Area, Australia, were recruited using on campus flyers and a register of young people interested in participating in research. Inclusion criteria included regular use of social networking media and an interest in changing current diet and/or physical activity behaviours. The exclusion criterion was enrolment in or completion of a health degree in nutrition or physical activity professions. A predetermined set of questions was used to guide discussion on the types of social media they prefer for communication; the people they would like to provide social support; the size of the support group; the content; and their perceived participation and engagement with social media support in a healthy lifestyle intervention. All focus groups were audio-recorded and transcribed. An inductive approach to identify the main themes was used with NVivo 11 software used in the analysis.

Results: Four focus groups consisting of 7 to 11 young adults were conducted (n=33). Facebook™ was seen as an appropriate communication method given it was embedded in their daily lives and a private group could be formed. Strangers with a common goal rather than friends or family were preferred as the source of social support. A smaller support group of around 10 to 20 people was favoured rather than a larger group that included everyone participating in an intervention. Credibility of the information shared and the need for moderation by the health coach was viewed as very important and many suggested an opportunity to meet the group face-to-face would encourage peer-to-peer involvement.

Conclusion: Allocation of lifestyle intervention participants to smaller social media support groups based on common goals may foster better engagement with this media than a whole of intervention-population approach.
eHealth Literacy among Chinese College Student: Qualitative Findings

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e & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

E- & mHealth (SIG)

Background
Currently, development of information technology is challenging the context of eHealth Literacy (EHL). A more diverse range of eHealth skills is required. Yet, there is insufficient knowledge in this field. Research on EHL among Chinese people is also limited.

Objectives
To explore Chinese college students' perception, experience and knowledge on EHL.

Design
Face-to-face semi-structured interviews were conducted for qualitative thematic analysis method.

Methods
Eighteen Chinese college students were deliberately selected for in-depth interviews. Interviewees included nine males and nine females of each sex from sports, medical, and ordinary non-health-related majors.

Results
Six themes were identified based on the qualitative data:
1) e-Information accessing pattern (e.g. "use website for mass selection", "usually passively accepter", etc.);
(2) Motives (e.g. "health-related problem solving", "daily physical activity recording and ranking among peers", "calorie controlling", etc.);
(3) Perceived usefulness (e.g. "problem-driven", "mostly accessible and targeted", "helpless on health management", etc.);
(4) Credibility and related skills (e.g. "profit-oriented websites cannot be trusted", "triangulation", "take online evaluations for reference", etc.);
(5) Awareness of information safety (e.g. "don't submit real name and ID number", "better not to share the location", "selfie posting is fine", etc.);
and (6) Additional competencies of current EHL (e.g. "critical thinking", "skill of filtering", "response to critic", "share opinion cautiously", etc.).

Conclusions
Similarities exist between Chinese and western college students on the positive perception of their EHL level, which might be inflated. Some online communication skills are found to be important new competencies of EHL, for example good mentality in response to online critic, cautiousness before opinion-expressing, and respect of originality.
Using intelligent personal systems to promote behaviour change within the home setting

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e & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Objective: Approximately one quarter of children living in Northern Ireland are overweight or obese. Observed trends in overweight/obesity and physical inactivity have coincided with the rapid integration of technology into contemporary everyday life, particularly within the home setting. Intelligent personal systems (IPS) such as Amazon Echo are examples of this. Although mainly used for entertainment, IPS may also have a role to play in behaviour change intervention delivery, however, to date, little is known about the role that such devices may play in positively influencing health-related behaviours. The aim of this feasibility study is to assess the effect of a home-based technology intervention (delivered using Amazon Echo) on physical activity (PA) and dietary related behaviours in families attending a community-based health promotion programme.

Methods: 12 families (12 adults, 17 children) who attended a 12-week community-based obesity prevention programme (the Safe Wellbeing Eating & Exercise Together (SWEET) project) were recruited. In addition to attending the SWEET project, families were randomly assigned to either receive an IPS (n = 6) or assigned to control (n = 6) and advised to continue with their usual behaviour. The IPS provides families with weekly prompts and reminders in relation to physical activity and dietary habits and allow families to interact with the device by asking for helpful tips. The primary outcome measure is PA, measured objectively using an Actigraph accelerometer. Secondary outcome measures include body mass index, family eating and activity habits, and barriers and motivations to exercise. Process evaluation data, including focus groups and device interaction, will be used to determine the feasibility of using IPS to promote health behaviours within the home setting.

Results: Baseline measurements have been completed. Follow up measurements will be conducted at the end of the intervention (12 weeks) and post-intervention (16 weeks).

Conclusions: The findings from this feasibility study will demonstrate whether the use of an IPS alongside attendance at the SWEET project can increase PA in adults and children, as well as provide novel insights into the feasibility (i.e. usability, device interaction) of using these devices to facilitate behaviour change.
My E-Diary for Activity and Lifestyle (MEDAL): Feasibility and acceptability of a newly developed web-based application for multi-component behavioural assessments among young adolescents

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e & mHealth, Congress Hall Foyer Level 2, June 6, 2019, 10:50 AM - 12:05 PM

Purpose

Web-based approaches to capture information on multiple lifestyle behaviours in young adolescents are limited. We developed a web-based application (MEDAL) which takes participants through completion of a four-day activity diary to collect data on movement behaviours (physical activity, sedentary behaviour, screen time, and sleep), dietary intakes, time spent outdoors, and location of activities. We aim to examine the feasibility and acceptability of MEDAL among young adolescents.

Methods

Formative research and a user-centric design approach were adopted for the development of MEDAL. Children aged 8-9 (n=29, males=23) and 11-12 years (n=30, males=16) were recruited from a primary school in Singapore to complete MEDAL for 3 weekdays and 1 weekend day and a 10-item usability questionnaire. For validation of data collected through the application, school meal photography was conducted (n=21) and devices to capture objective data on activity and sedentary behaviours (accelerometers, n=18) and outdoor time (FitSight watch, n=15) were provided.

Results

A four-day completion of MEDAL for children aged 8-9 and 11-12 were 28% and 70% respectively while the rest completed 1-3 days of MEDAL. When assessing the usability of MEDAL, majority agreed that instructions were clear (100%), it was easy to use (98%), they liked the application (96%), and will want to use it again (87%). About half of the participants reported that MEDAL was lengthy to complete; median (IQR) time to complete a one-day record was 13 (8-23) mins. Comparing MEDAL recordings against school meal photography, food items which were commonly omitted (observed from meal photography but not reported in MEDAL) were drinks and single snack items. Higher match rates (reported in both records) and lower omission rates were observed in females and in older children. Analyses for other validation components are in progress.

Conclusion

Set within an adolescent-friendly graphic interface and incorporating gamification elements, MEDAL appears to be a feasible and acceptable application for assessing multi-component behaviours as its evaluation was mostly positive. Younger children (<9 years) may need more assistance to complete MEDAL independently. Revisions to the application are underway to shorten completion time and will be retested and further validated in another group of students.
THURSDAY JUNE 6 2019

ORAL SESSIONS
A modelled health impact assessment for regulating health and nutrition claims in the UK using a nutrient profile model

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Objectives: Health-related claims (HRCs) are statements found on food packets that convey the nutritional quality of a food (nutrition claims) and/or its impact on a health outcome (health claims). The EU stated that HRCs should be regulated such that they can only appear on foods that meet a specified nutrient profile (NP). We conducted a health impact assessment of this proposed policy.

Methods: To model the impact of HRCs on health impacts in the UK, we built a front-end model to a pre-established non-communicable-disease (NCD) scenario model, the Preventable Risk Integrated ModEl (PRIME) by combining data from a meta-analysis examining the impact of HRCs on dietary choices and a survey of pre-packaged foods examining the prevalence of HRCs and the nutritional quality of foods that carry them. These data are used to model the impact of regulating HRCs on the nutritional quality of the diet and PRIME is used to model the health outcomes associated with these changes. Two scenarios are modelled: regulating HRCs with a NP model (FSANZ NPSC and a draft EU model) so that only foods that pass the model are eligible to carry HRCs, and reformulating HRC-carrying foods that fail the model.

Results: Regulating the use of HRCs with a NP model (the FSANZ NPSC) would have unclear impacts on population health and could potentially lead to less healthy diets. This is because HRCs are currently more likely to be found on products with a better nutritional profile and restricting their use could shift consumers to less healthy diets. 258 additional deaths (95% Uncertainty Intervals [UI] -6509, 8706) were predicted if foods did not change in their nutrient composition. If all foods that currently carry HRCs were reformulated to meet the NP model criteria then there would be a positive impact of using the model: (4374 deaths averted (95%UI -2569, 14009)). The largest contributor to the uncertainty is the underpowered estimates of nutritional quality of foods with and without claims.

Conclusions: Regulating HRCs could result in negative health impacts, however the wide uncertainty intervals from this analysis demonstrate that a larger health impact assessment is necessary.
Deconstructing the effect of the Children’s Healthy Living (CHL) multilevel trial on sugar-sweetened beverage and water intakes in early childhood

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Policies and environments: Methods and interventions (Chair: Maureen Ashe), South Hall 2A, June 6, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Purpose: Little is known about which strategies targeting reductions in sugar-sweetened beverages (SSBs) and increases in water are most effective, especially for young children in the US-Affiliated Pacific (USAP) region. While significantly reducing overweight and obesity, the Children's Healthy Living (CHL) trial of 19 intervention activities across social ecologic model (SEM) levels resulted in a non-significant decrease in SSB consumption and non-significant increase in water consumption. We examined CHL SSB and water activities by SEM to determine if levels had differential effects on SSB and water intakes.

Methods: CHL was a multilevel community-randomized clinical trial from 2013-2015 in 5 USAP region jurisdictions with 9 intervention and 9 control communities. Over 26 months, intervention communities provided detailed monthly reports of activities targeting reduced SSB and increased water consumption (e.g., preschool beverage policies, social marketing). Frequency counts of intervention activities were coded by SEM level (child, caregiver, organization, community, policy). Beverage intakes were assessed by 2-day caregiver-completed diet records. Regression methods were used to examine the effects of activity frequencies overall and by SEM levels on changes in SSB and water intakes.

Results: 5,146 children aged 2-8y (mean 67.1 months) were included in the analysis (48.8% female; 83.6% Native Hawaiians and Pacific Islanders). A total of 667 and 649 activities addressed SSB and water consumption, respectively, with most activities addressing both behaviors (n=617). Activities varied by SEM level: 4.0% child, 15.6% caregiver, 11.8% organization, 60.0% community, 8.0% policy.

Adjusting for age and sex, additional SSB and/or water activities were associated with a significant increase in water intake from baseline to follow-up (0.067 cups/45 activities; 95% CI: 0.006, 0.128) and a non-significant decrease in SSB intake (-0.043 cups/45 activities; 95% CI: -0.096, 0.010). Activities targeting organization- and community-levels were significantly related to changes in water intake (p=0.03 and p=0.018, respectively). Activities targeting child- and policy-levels were significantly related to changes in SSB intake (p=0.00 and p=0.01).

Conclusions: Effective SEM levels of intervention activities differed for child water and SSB intakes. Addressing organization and community environments were most effective for increasing water consumption, while child- and policy-level activities were more effective for SSB reduction.
Impact of Targeted Marketing to Increase Fruit and Vegetable and Reduce Energy Intake in Title I Elementary Schools with Salad Bars

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Purpose: Salad bars are increasingly prevalent in schools as a means to increase fruit and vegetable (FV) intake, yet empirical support is mixed. Further, FVs role in obesity prevention is unclear, as children who consume more FVs do not necessarily displace calories from other sources. The current pilot examined the impact of differential marketing strategies on elementary school students' FV and energy intake in schools with salad bars.

Methods: Three Title I schools (serving predominately African American and Hispanic students; 100% free meals) were randomly assigned to receive: 1) FV tastings only (FVT); 2) FVT+Vegetable marketing (FVT+V; promoting eating more vegetables); or 3) FVT+Energy Displacement marketing (FVT+ED; promoting eating more vegetables instead of chips/sweets). FV tastings were conducted daily for 1 week in all schools. Marketing materials (differing only in messaging) were then displayed for 6 weeks in the cafeteria. At baseline and 6-weeks, digital imagery plate waste assessments were conducted at lunch; reference portions were entered into Nutrition Data Systems for Research using average weights and recipes. Laboratory raters (intrarater reliabilities=.81-.90) documented item selection (including starting portion of salad bar FVs to the nearest ¼ cup) and consumption (20% increments) using validated methods. General linear models, controlling for sex and grade, evaluated baseline to 6-week differences, within group, in: 1) FV selection (number and consumption [g]), 2) energy intake (kcal from FVs and total), and 3) proportion of total energy from FVs.

Results: N=620 trays were rated at baseline; N=668 at post (>90% of eligible students). In FVT, vegetable selection increased, yet consumption decreased (-22.7g; p<.001). Vegetable consumption increased in both the FVT+V (+37.3g) and FVT+ED (+25.4g) marketing conditions (ps<.0001). There were no changes in fruit selection (p>.05) across groups; fruit consumption increased in FVT+ED only (+8.2g; p=.005). The proportion of kcal consumed from FVs decreased in FVT and increased in both marketing conditions (ps<.0001), with evidence of energy displacement observed in both groups.

Conclusions: Low-intensity targeted marketing increased vegetable intake and created energy displacement. Replication with more rating days and schools is needed to further investigate environmental strategies to optimize dietary intake within Title I schools with salad bars.
The Geoscience and Health Cohort Consortium (GECCO): Enriching 20 longstanding Dutch cohorts with geographic data

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Policies and environments: Methods and interventions (Chair: Maureen Ashe), South Hall 2A, June 6, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Purpose: The exposome encompasses the life course exposures from lifestyle behaviours and from the environment, and receives growing attention in medical research with respect to its relationship with lifestyle behaviours and health outcomes. Multidisciplinary and longitudinal research combining high quality individual-level data with environmental-level data is urgently needed to identify and better understand their complex relations with each other and with behaviour/health outcomes across the life course. In the Netherlands, high quality and longitudinal data at the individual as well as the environmental level exist. High quality cohorts across the Netherlands may provide longitudinal individual-level data on lifestyle behaviours (including behavioural nutrition and physical activity) and health outcomes. A great variety of environmental (geo) data is available, but these data are currently scattered and measured at varying spatial scales. The aim of the Geoscience and Health Cohort Consortium (GECCO) is to provide a sustainable platform for streamlined access to combined high quality environmental- and individual-level data from 20 renowned and on-going large-scale Dutch cohorts.

Methods: The stepwise approach to implement GECCO is to: i) Gather, combine and complement existing geographic information system (GIS) data in a repository, building on initial efforts; ii) Use the GIS data to develop a wide variety of workable exposure variables; iii) Enrich 20 longstanding and renowned Dutch cohorts with these GIS data by secure and local linkages; iv) Develop an easily accessible web-portal that facilitates researchers to use the data by informing them about the cohort and GIS meta-data, and provide guidance through data access procedures; v) Organise workshops and develop tutorials to ensure the use of GECCO data.

Results/findings: GECCO supports mapping the exposome of over 500,000 respondents, spread-out over all municipalities in the Netherlands. This provides huge statistical power and potential for (longitudinal) studies on the nuanced interrelationships between environmental characteristics and individual-level outcomes.

Conclusions: GECCO will enable researchers from multiple disciplines to address a wide variety of research questions on environmental determinants of lifestyle behaviours and health.
Retrospective Examination of Campaign Characteristics, Activities, and Policy Outcomes among Voices for Healthy Kids Grantees

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Policies and environments: Methods and interventions (Chair: Maureen Ashe), South Hall 2A, June 6, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Purpose: Voices for Healthy Kids (VFHK) is a national initiative by the Robert Wood Johnson Foundation (RWJF) and American Heart Association (AHA). VFHK provides funding and technical assistance to local- and state-level child nutrition and/or physical activity policy advocacy campaigns. The purpose of this study was to assess characteristics of the campaigns, advocacy activities, and their relationships with campaign outcomes.

Methods: Between August, September 2018, 103 VFHK campaigns (completed <3 years ago, or if ongoing were >6 months old) were invited to participate, with 61 completing web-based surveys. All campaign-representative respondents were asked about characteristics of their campaigns (e.g., campaign budget), completion of 49 potential advocacy activities (e.g., test external messaging for understandability), and campaign outcomes. Three different types of campaign outcomes were assessed: i) policy win; ii) interim policy outcomes; iii) and perceptions of awareness raising and political action promoting. To assess relationships between campaign characteristics, activities, and outcomes we used chi-squared and one-way ANOVA tests. The alpha level for statistical significance was 0.05.

Results: Campaign characteristics associated (p<0.05) with positive campaign outcomes included duration =24 months/completed, more than five partner organizations as part of the campaign/coalition, increased budget, and being an AHA affiliate. For advocacy activities, train campaign staff, develop jargon-free messaging explaining policy objective, test external messaging for understandability, and evaluate adequacy of campaign funding were all significantly associated with campaign policy wins (Phi=0.273-0.287, p<0.05). For accomplishing interim policy outcomes and increasing awareness of the policy objective, train campaign staff, develop plan to formally evaluate campaign efforts, establish S.M.A.R.T. goals for campaign, establish formal system to monitor campaign progress, develop jargon-free messaging explaining policy objective, draft or help draft written policy, and develop non-traditional/social media advocacy plan were all significantly associated with positive campaign outcomes (Phi=0.266-0.335, p<0.05).

Conclusions: Using a survey tool designed based on extensive study of past VFHK campaigns, we have identified characteristics and specific activities of campaigns that are associated with positive policy-related campaign outcomes. These findings can be used to inform future similar initiatives to develop and target technical assistance, training, and funding models to best promote the advocacy effectiveness of their grantees.
Objectively measured share of the MVPA and sedentary time across six spatial domains

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Objective
Identifying where adolescents are physically active may help define relevant domains for effective PA promotion and improved understanding of the relations between PA and the built environment. This study aimed to identify how Czech adolescents allocate their active and sedentary time among different spatial domains.

Methods
171 adolescents (99 girls, mean age = 14.2 years) from two Czech cities, simultaneously wore an Actigraph GT3x accelerometer and a Holux RCV-3000 GPS logger for 7 days. 728 days with a minimum of 8 hours wear time per day (mean = 13 ±smn; 2.5 hours) were analyzed. PALMS software combined data, cleaned errors, and categorized sedentary time, light, moderate and vigorous PA. Using a Geographical Information System, activity was allocated into 6 domains: home, school, playground, greenspace, transport, and leisure.

Results
On average, adolescents gathered 27.4 minutes of MVPA per day at home, 21.9 in school, 2.4 in playgrounds, 1.8 in greenspace, 14.8 in transport, and 16.9 minutes in the leisure domain. MVPA represented 8.9 % of time spent at home, 8.0 % of school, 16.3 % of playground, 10.4 % of greenspace, 8.9 % of transport, and 10.4 % of leisure time. Adolescents were sedentary 55.4 % (190.5 minutes) of the time spent at home, 56.7 % (168.3 minutes) of school, 44.9 % (9.4 minutes) of playground, 42.7 % (7.3 minutes) of greenspace, 55.4 % (67.4 minutes) of transport, and 52.4 % (91.5 minutes) of leisure time. We found no significant difference between domains for proportions of sedentary behavior; however, the share of MVPA was significantly higher at playgrounds than at school (?;2 = 3.940; p = 0.0471).

Conclusions
The absolute contribution of sedentary and MVPA minutes vary across the different spatial domains; however, the share of time spent sedentary and in MVPA was similar across domains. Playgrounds had the highest share of MVPA (16.32 %), an important finding for city planning and PA promotion in adolescents.
Using buffers in activity space and MVPA space research- is it good enough?

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Policies and environments: Methods and interventions (Chair: Maureen Ashe), South Hall 2A, June 6, 2019, 12:05 PM - 1:30 PM

Purpose:
This study investigates how accurately traditional predefined radial and street network buffers, used in environmental health research, reflect adolescent's mobility and moderate-to-vigorous physical activity (MVPA) behaviour when compared to innovative objective measures.

Method:
Adolescents from three schools (age= 16.06±smn;1.29, 65.2% female) provided valid GPS (n=42) and accelerometer data (n=35) (seven day period). Geographic Information System (GIS) determined an adolescent's mobility through the creation of activity spaces using GPS data. The location of MVPA, assessed using Evenson's cutpoints, was then added and MVPA space was created within GIS. Additionally, radial and street network buffers (400m, 800m, 1k, 1.6k, and 3k) were created around the home and school of each participant. Using GIS analysis tools, the percentage of actual activity space and MVPA space within the various buffer sizes, for both home and school, were calculated.

Results:
The mean activity space size was 6.99 km2 (n=42) and mean MVPA space size was 0.95km2 (n=35). On average, home radial buffers captured between 7.71-46.94% of actual activity space while home network buffers captured between 4.6-48.06%. School radial buffers captured, on average, between 6.67-45.84% of actual activity space, however school network buffers captured between 3.85-45.63%. For MVPA space, home radial buffers captured between 20.54-59.43%, while home network buffers captured between 18.5-59.5%. School radial buffers captured between 18.76-59.01%, whereas school network buffers captured between 15.6-59.7%.

Conclusion:
Traditionally used buffers capture, at most, half of adolescent's mobility and 60% of adolescent MVPA behaviour. The current field of research highlights the limitations of using buffers, but no existing study has assessed how inaccurate these methods actually are. Current inconsistencies in the evidence base may stem from using predefined buffers and the present study suggests past research using traditional methods may be drawing incorrect or misleading conclusions of environmental influences on individual health behaviour, as they are not fully capturing an adolescent's actual activity space or MVPA space.
Assessing children’s weight status in Australia – a survey exploring parents’ opinions

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Children and families (SIG)

Objective
Identification of childhood overweight and obesity is the first step parents must take to commence addressing this health issue. Many countries do not have a formalised and universal program for routine weight status assessment of children and it is uncertain where the responsibility for the undertaking of this check and identification of obesity lies. Studies indicate that GPs do not routinely assess weight in standard consultations with children, leaving parents, by default, responsible. However it is common for parents to underestimate their child's weight status and seek help when their child's obesity reaches an extreme level.
This study explored and analysed parental perspectives regarding the responsibility for routine weight status assessment of primary school aged children.

Methods
A case study approach was undertaken. This study focused on parents living in a regional town of Rockhampton, Australia. An online survey, based on COM-B system, was developed and explored parental practices in weight status assessment and opinions about the responsibility for the undertaking of this check.

Results
A total of 219 parents completed the survey. The majority of participants saw parents as responsible for assessing children's weight and height, and wanted to know their child's risk for overweight. Many parents were checking child's weight and height but few calculated BMI or used Growth Charts. Schools were not seen as a setting where this assessment should be undertaken due to concerns of bullying and self-esteem.

Conclusions
Parents must be better supported in identifying and addressing their child's overweight and obesity. Health professionals should use contact with families to educate on the benefits of early identification of overweight, steps involved in weight status assessment, to undertake this check, offer advice and to refer families to weight management services.
Yogurt consumption, body weight control and metabolic health

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PURPOSE: The purpose of this research was to examine the associations among yogurt intakes, body weight and metabolic profiles as a function of susceptibility to obesity in two cohorts.

METHODS: First, youth (n = 198) from the Québec Family Study were first classified based on their family history of obesity (FHO), defined as the presence or absence of at least one obese (BMI=30 kg/m2) parent [with FHO (FHO+) or without FHO (FHO-us;)] and then on their yogurt consumption [yogurt consumers (YC+) or non-consumers (YC- us;)]. Second, using cross-sectional and follow-up data (n=603) over two years from the Québec Adipose and Lifestyle InvesTigation in Youth (QUALITY) study, children were classified based on their risk for obesity (low, medium or high), as assessed by parental obesity (none, at least one or two obese parents), and further into YC+ (=1 servings/d) and YC- (0 servings/d). The impact of yogurt consumption, obesity risk and their interaction on body weight and composition and metabolic profiles was examined.

RESULTS: In the Quebec Family Study, FHO, but not YC had an effect on body weight and composition. However, a significant interaction between YC and FHO was observed for fasting insulin (P=0.02), insulin area under the curve (P=0.02), and homeostatic model assessment of insulin resistance (HOMA-IR; P=0.03) after adjustment for studied covariates. Lower fasting plasma insulin, insulin AUC, and HOMA-IR were observed in FHO+ and YC+ youth compared to YC-us; youth of the same group while no differences were found between the FHO-us; sub-groups. Similarly, in the QUALITY study, after adjustment for age and sex, a main effect of obesity risk, but not YC, was observed for body weight, waist circumference, % body fat, fasting insulin and C-peptide, triglycerides, blood pressure and fasting leptin. However, there was a significant interaction between obesity risk and YC for waist circumference (P=0.04) and fasting leptin (P=0.03) showing lower values in YC+ compared to YC- in the high risk group.

CONCLUSION: These results suggest a beneficial effect of yogurt consumption on selected metabolic health parameters, particularly in youth with a higher risk of obesity.
O21, O21.3

Associations of the modified Yale Food Addiction Scale with overweight/obesity, BMI change, weight perception, and dieting during the transition from adolescence to adulthood

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Research on weight management (Chair: António Palmeira), South Hall 2B, June 6, 2019, 12:05 PM - 1:30 PM

Children and families (SIG)

Purpose: Cross-sectional studies suggest self-reported food addiction is positively associated with BMI and disordered eating behaviors, but this has not been examined longitudinally, and it is unknown whether food addiction relates to more normative weight loss attempts. This study examined relationships of food addiction with weight-related outcomes over time in emerging adults.

Methods: The NEXT Generation Health Study (NEXT) is an observational prospective cohort study of a nationally representative sample of U.S. 10th graders enrolled in 2010, who completed seven annual assessments (waves, W). Participants (n=2785 enrolled, 81% retention at W7) completed the modified Yale Food Addiction Scale (m-YFAS) in W7; the total symptom count (m-YFASt) and meeting food addiction criteria (FA, yes versus no) were calculated. Self-reported height and weight were obtained annually. Participants reported past-year dieting (restricting eating to lose weight), current dieting, and weight perception in W7. Linear regressions estimated relationships of m-YFASt and FA with 1-year (W6 to W7) BMI change (1yBMIΔ) and BMI change from W1 to W7 (6yBMIΔ). Poisson regression with robust error variance estimated relative risk (RR) of W7 overweight/obesity (>=25 kg/m² versus <25 kg/m²), past-year dieting (yes versus no), current dieting, and perceived overweight (versus perceived normal weight or underweight). Models controlled for sex, age, height, race/ethnicity, parent education, and Family Affluence Scale, and accounted for the complex survey design.

Results/findings: 4.2% (95%CI: 3.1%-5.8%) of participants met FA criteria. 1yBMIΔ (βa;±smn;SE=0.91±smn;0.32, p=0.01) and 6yBMIΔ (βa;±smn;SE=1.52±smn;0.67, p=0.03) were higher for participants with FA, but were not associated with m-YFASt. Higher m-YFASt (RR=1.07, 95%CI: 1.02-1.12, p=0.004) and FA (RR=1.55, 95%CI:1.26-1.90, p<0.001) were associated with greater RR of W7 overweight/obesity, controlling for W6 BMI. Both m-YFASt and FA were associated with greater RR of past-year dieting, and with lower RR of current dieting and perceived overweight, controlling for current BMI.

Conclusions: The positive associations of self-reported food addiction with current BMI and weight gain suggest its utility for identifying emerging adults at increased risk of overweight/obesity. Differential associations with current and previous weight loss attempts merit further investigation.
Physical activity interventions for youth with overweight or obesity: a systematic review with meta-analysis of the impact on psychological wellbeing

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Purpose: Children and adolescents with obesity are at increased risk of depression and reduced self-esteem. Physical activity and dietary interventions are first-line treatments for overweight and obesity, however, the impact on psychological wellbeing is not well understood. This review assessed the impact of physical activity interventions, with or without a nutrition component, on depression, self-esteem and body satisfaction in children and adolescents with overweight or obesity.

Methods: MEDLINE, EMBASE, Cochrane Library and PsycINFO were searched up to August 2018. Eligibility criteria included: weight management interventions conducted in free-living children or adolescents with overweight or obesity; minimum weekly supervised physical activity of at least moderate intensity; reporting depression, self-esteem or body satisfaction pre- and post-intervention using validated tools. Studies were grouped according to whether or not the physical activity intervention included a nutrition component.

Results/findings: Of 2468 articles screened, 38 publications describing 36 studies were included for review. Between baseline and post-intervention, physical activity interventions (duration ranging from 6-weeks to 1-year) had a small-to-medium effect of increasing self-esteem (23 studies, standardised mean difference, SMD [SE]: 0.351 [0.032], p<0.0005, I²=75%), maintained at follow-up (9 studies, 0.309 [0.059], p<0.0005, I²=51%). Depression was also reduced post-intervention (12 studies, -0.345 [0.047], p<0.0005, I²=73%), with no change at follow-up. Addition of a nutrition component did not influence effect sizes for depression or self-esteem. Moderator analysis showed a greater effect on self-esteem in the school setting (school: 0.800 [0.085], p<0.0005; community: 0.292 [0.009], p<0.0005; outpatient: 0.253 [0.062], p<0.0005) and in adolescents (<13 years: 0.292 [0.036], p<0.0005; ≥13 years: 0.429 [0.065], p<0.0005). Similarly, studies in adolescents had a larger effect on depression (<13 years: -0.262 [0.045], p<0.0005; ≥13 years: -0.392 [0.085], p<0.0005). Of the 20 studies which measured body satisfaction, nine reported a significant improvement in body satisfaction; 11 reported no effect.

Conclusions: Physical activity interventions, with or without a nutrition component, do not decrease psychological wellbeing, and may lead to mild improvements in depression, self-esteem and body satisfaction in children and adolescents with overweight and obesity. Interventions conducted in schools and with adolescents appear to be particularly beneficial for improving psychological wellbeing.
How do men’s attempts to change diet and physical activity to manage their weight influence cohabiting female partners?

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Children and families (SIG)

Objective: Although some weight loss interventions for men have proved successful, there is still a need to understand how this process influences their family members, especially because changing behaviours such as dietary practices and physical activity take place within a household context. This paper explores how men's attempts to change their behaviours to lose weight and maintain weight-loss influenced their cohabiting female partners, within the context of Football Fans in Training (FFIT), a gender-sensitised weight management and healthy living programme for overweight/obese men. This paper's novelty lies in its exploration of the ripple effect that men's attempts to make changes to dietary practices and physical activity had on their partners.

Methods: Separate semi-structured face-to-face interviews were conducted with 20 men and their cohabiting female partner, 3-12 months after the men had completed FFIT. These explored experiences around the man's participation in FFIT and subsequent attempts to change dietary practices and physical activity. Using a framework approach, data were thematically analysed by combining individual interviews for dyadic analysis. Analysis was guided by Self-Determination, Gender and Interdependence theories.

Results: It was evident that the ripple effect of the dietary and physical activity changes made for and/or by men resulted in mostly positive changes in women's dietary practices, and, to a lesser degree, their physical activity. Changes to dietary practices mostly represented an improvement on what many couples were already doing together. Therefore, changes made by or for the man automatically impacted the woman. However, physical activity for most couples was something they were newly adopting after the man had joined FFIT. The variation in the ripple effects on female partners was influenced also by men's reliance on/receptiveness to partner's involvement for changing each practice.

Conclusions: These findings provide insights into the ripple effect on women's dietary practices and physical activity caused by their male partner's attempts to change these practices as part of a weight management programme. The findings could inform how health interventions aimed at one individual's behaviour changes can maximise their impact by considering the potential benefits, to other family members, of the ripple effect of this process.
Experiences of a weight management intervention for disabled children and their families

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Research on weight management (Chair: António Palmeira), South Hall 2B, June 6, 2019, 12:05 PM - 1:30 PM

Purpose: There is a high prevalence of obesity among children with special educational needs and disabilities, together with an increased risk of developing serious health conditions. A lack of data on effective weight management and lifestyle interventions for this population serves to maintain this health inequality. The purpose of this research is to listen to disabled children and their families about their weight management experiences in order to better understand how more suitable and inclusive interventions can be developed for this population group.

Methods: This qualitative study explores how a group of 11 children aged 10-12 years with special educational needs and disabilities and their families experienced a special school-based weight management intervention in England. Repeat semi-structured interviews captured insights before, during and after the intervention. Thematic analysis enabled the interpretation of their experiences.

Findings: The initial thematic analysis of this data reveals a number of issues and themes concerning the benefits, challenges, relevance and the retention of health behaviour changes post-programme. Findings also point to areas of the programme positively supporting the families, and key components that could be utilised to manage obesity in this population.

Conclusions: This research and the findings may help health services and practitioners in facilitating more inclusive interventions to better meet the needs of disabled children and begin to work towards reducing health inequalities. This research evidences that disabled people, their families and service providers working together can begin to address inequalities and provide a healthier lifestyle for all.
Personal, Social and Environment Factors Associated with Successful Recruitment and Retention of Overweight and Obese Youth in a Voluntary School-Based Fitness Program

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Research on weight management (Chair: António Palmeira), South Hall 2B, June 6, 2019, 12:05 PM - 1:30 PM

Children and families (SIG)

Objective: To identify factors associated with recruitment and retention of overweight and obese adolescents in a voluntary school-based fitness program linked to an obesity treatment trial.

Methods: Data are derived from the IMPACT Study, a behavioral RCT involving 360 overweight/obese (>85th %ile BMI) urban youth (x=12yrs) and one parent/guardian. 72% of participants were obese (>95th %ile). Participants were randomized to 1 of 3 family-based interventions and 183/360 were enrolled in a school offering We Run This City (WRTC), an annual program that encourages middle school urban youth to train in a graduated manner over 12-14 weeks to run or walk a segment of the Cleveland Marathon (1.2 or 6.2 miles). Study provided navigators helped to recruit and retain participants. Successful recruitment is defined as attending at least one training session; successful retention defined as attending 60% of the training and/or completing race day event. Multivariate models included intervention arm and individual (age, gender, race, BMI, fitness levels, weight related QOL, self-efficacy and self-esteem), peer (support for PA and # of friends on WRTC team); family (family support for PA, parent BMI, perceptions of child's weight); team (size, composition [% male, % overwt/obese], training event); and coach and navigator characteristics (age, gender, background, experience and time with program and/or participants).

Results: Of the 183, 52.6% of participants joined their school's team. Factors associated with successful recruitment included: higher fitness levels, having 1+ friend or overweight team members, longer coach's tenure, older navigator age, and navigators with less experience with children (all p<.05). Of those successfully recruited, 58.3% completed the program, with significant factors including supportive home PA environment, lower participation in other fitness programs/teams, larger team size, higher percentage of both male and obese team members, navigators with more experience, and navigator time with participant (all p<.05).

Conclusions: Overweight and obese youth will successfully participate in rigorous fitness programs, although different factors appear important in the two phases of engagement. Having a friend and similar weight peers on the team were crucial to both, supporting the need to develop fitness programs that are fun, social and inclusive. Program leaders cannot be underestimated, playing a significant and unique role.
**O22, O22.1**

One session of ‘The Daily Mile’ increases physical activity levels but does not improve maths fluency or executive function in primary school children (versus control).

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Interventions in behavioral nutrition and physical activity (Chair: Brittany Johnson), North Hall, June 6, 2019, 12:05 PM - 1:30 PM

**Other**

Objective: Despite The Daily Mile's TM (TDM) intuitive appeal and widespread adoption in over 6,400 schools worldwide, evidence regarding the impact on academic performance (AP) and executive function (EF) is limited. Previous research on TDM found an immediate improvement in maths fluency, but not EF. To establish short-term effectiveness, rigorous, high-quality studies are still needed to ascertain the delayed impact of TDM on children's PA levels, EF and AP.

Methods: In a randomised control trial, children from two primary schools already participating in TDM, were individually allocated to either TDM (approximately 15-minutes aerobic exercise) or control (normal academic lessons, excluding mathematics). Children completed four EF tests (Trail-Making Task, Digit Recall, Modified Flanker and Animal Stroop) and a maths fluency test (MASSAT) four times; familiarisation one-week prior, pre (before both conditions), immediately post and delayed (after both conditions). Repeated Measures ANOVAs were conducted to assess any interactions between conditions and time (pre-immediate-delayed) for all EF tests (n=94, age=9.14±smn;0.49, 60% girls, TDM n=50, Control n=44) and the maths fluency test (n=69, age=9.08±smn;0.5, 57% girls, TDM n=36, Control n=33). Moderate-to-Vigorous PA (MVPA) was assessed by GT9 Link waist-worn accelerometers using Evenson cut-points.

Results: Baseline characteristics did not differ between conditions (p>0.05). Participants completing one session of TDM accumulated significantly more minutes of MVPA (M=12.17±smn;1.71) versus control participants (M=0.23±smn;0.52; p=0.000, 95% CI [11.31, 12.55], n2p=0.957). Maths fluency scores were maintained over time in TDM condition (pre M=24.31±smn;14.44, immediate M=24.03±smn;12.83, delayed M=24.83±smn;13.60) versus a small non-significant decline over time in the control (pre M=24.21±smn;14.33, immediate M=23.09±smn;14.97, delayed M=22.91±smn;13.72). There were no significant main interactions between the condition and time for the maths fluency tests or any of the EF tasks (p>0.05).

Conclusions: An average of 9.94 minutes/day additional MVPA was accumulated during TDM. Contradicting previous research, this demonstrated no significant improvements in maths fluency or EF versus control. Whilst TDM may be used strategically to increase PA levels, conclusions cannot be made on the impact on AP or EF. Such findings question the widespread adoption of TDM and warrants future research explore the short-term and long-term effectiveness and implementation of TDM.
Building Activating Schoolyards – a mixed-methods evaluation

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Interventions in behavioral nutrition and physical activity (Chair: Brittany Johnson), North Hall, June 6, 2019, 12:05 PM - 1:30 PM

Purpose
Health related benefits of physical activity (PA) have been well-documented but unfortunately a high percentage of children do not meet the daily PA recommendations. The effect of previous recess and/or schoolyard interventions aiming at increasing PA has been mixed, and it is unclear if and how large-scale renewal increases PA during recess. The Activating Schoolyards Study aimed at evaluating the effect of schoolyard renovations on 10-15yr old children's PA during recess, as well as understanding factors that influence schoolyard behaviour after renovations.

Methods
The Activating Schoolyards Study was a quasi-experimental mixed methods study with a pre-post design. During the study, six Danish schoolyards were renewed for 100,000 to 800,000 Euro per school. Both quantitative and qualitative data were collected between March 2013 and June 2018. To evaluate the effect of the renewal, 554 students (grade 4-8) at baseline (April and June 2014) and 440 students post-renewal (April, June 2016) wore an accelerometer (ActiGraph GT3X) and a GPS (Qstarz BT-Q1000XT) for five school days to determine the changes in recess PA. Participant observation and go-along group interviews were conducted to be able to understand what influenced schoolyard behaviour at the involved schools. A thematic analysis was conducted to assess how students experienced the renewed schoolyards. A multilevel analysis of combined accelerometer and GPS data assessed changes in PA during recess, and time spent and activity levels in the renewed schoolyards.

Results
At follow-up, students increased time spent in MVPA during recess by 60%, which was equivalent to 55 minutes of MVPA on average during recess per week after renewal. However, there were significant differences by school, gender, type of facility and the overall activity level of the students. The qualitative findings revealed larger effects at schools where the students experienced their wishes for renewal had been carried out. Schools that received facilities that brought more variation to the schoolyard, seemed particularly successful, as did schools that supported the new facilities with organisational changes.

Conclusions
These findings support that schoolyard interventions combining multifunctional areas for PA in the schoolyard with organisational changes can promote PA during recess.
Stand Out in Class: The impact of standing desks on learning related outcomes

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Interventions in behavioral nutrition and physical activity (Chair: Brittany Johnson), North Hall, June 6, 2019, 12:05 PM - 1:30 PM

Other

Purpose: Research suggests that the introduction of standing desks in the elementary classroom has potential positive effects on learning-related outcomes. However, these findings are mainly anecdotal and school performance has not yet been examined. This study aimed to investigate the effects of a standing desk intervention in elementary education on school performance, classroom behaviour, and cognitive performance.

Methods: A pilot randomized controlled trial (RCT) was conducted across 8 schools over a 4.5 month period with 176 elementary school children (aged 9, 10 years) enrolled into the study. Six standing desks were installed in the intervention classrooms (n = 4) and teachers rotated children to ensure all were exposed to the desks for an average of one hour/day. School performance was measured as change in meeting expectations for the subjects Maths, Reading, and Writing. Classroom behaviour was measured using the validated Strengths and Difficulties questionnaire. Cognitive performance was measured using objective cognitive tests for attention, inhibition, and working memory.

Results: A favourable effect on school performance was shown for reading. (?;2 [2, N=174]=8.640, p=.013). Cramer's phi coefficient (phi c=.22) indicated a small effect size. Bonferroni-corrected post-hoc comparisons revealed significantly fewer participants in the intervention group (n=4) experienced a decrease in Reading expectation in comparison to the control group (n=16). Classroom behaviour was positively influenced by the intervention as the children in the intervention classes displayed less difficulties overall (F(1, 160)=7.34, p=.01) with a small to medium effect size (?;p2=.044), and specifically less conduct problems (F(1, 160)=11.18, p<.01) with a medium effect size (?;p2=.065), and more prosocial behaviour (F(1, 160)=4.54, p=.04) with a small effect size (?;p2=.028). No significant differences were found between groups for cognitive performance.

Conclusions: These results indicate that standing desks have positive effects on school performance, classroom behaviour, and have no detrimental effects on children's cognitive performance. For educational practice, these results indicate that in addition to the known health benefits, standing desks offer an easy and non-disruptive solution to improve children's behaviour and potentially school performance. These findings should be confirmed in larger-scale cluster RCTs.
Objective:
Sedentary behaviour, such as sitting, is common in desk-based work and is associated with negative health consequences. There is some evidence that sit-stand desks reduce occupational sitting time, however, their cost can limit scalability. The purpose of this study was to assess the impact of providing a low cost ($20CDN) standing desk on workplace sitting, standing, and stepping time.

Methods:
Forty-eight office-based workers (91.7% female, Mage= 39.8±smn;10.1) were recruited for a two-arm randomized controlled trial with a waitlist control (clinical trials gov ID: NCT03375749). Participants were full-time, desk-based (=3 days per week), aged 18-65, and had the capability to stand. At baseline, 3- and 6-months, activity was objectively measured using activPAL3 monitors for one week. The experimental condition received a cardboard, low-cost standing desk converter and recommendations for use. Waitlist control participants were instructed to behave as usual. A series of ANCOVAs adjusting for baseline scores examined intervention effects relative to controls at 3- and 6-months. Per protocol analyses are reported.

Results:
At 3 months, the intervention group had less hours sitting (M adj = -.948, SE=.281; 5.10 ±smn; 1.50hrs), more hours standing (M adj = .987, SE=.262; 2.22 ±smn; 1.60hrs) and less hours in prolonged sitting (M adj = -.558, SE=.173; 1.55 ±smn; 0.87hrs) compared to the control group (M adj = -.035, SE=.253; 5.73 ±smn;1.12hrs, M adj = -.012, SE=.236; 1.50 ±smn; 0.87hrs; M adj = -.001, SE=.156; 1.79 ±smn; 0.98hrs, respectively; p's<.05). There was no difference in total stepping hours between the groups. At 6-months, the intervention group was sitting less (5.13 ±smn; 1.65hrs) and standing more than control (5.55 ±smn; 1.13hrs; 1.62 ±smn; 0.96hrs, respectively) but these differences were no longer significant.

Conclusions:
Low-cost standing desks were effective in reducing workplace sitting, prolonged sitting, and increasing standing. Reductions in sitting time of approximately one hour/day in the treatment group at three months is comparable to findings from studies using costlier alternatives. However, the effects were not maintained at 6-months. There is some potential for low-cost standing desk converters as a scalable workplace health intervention.
Are there any pre-adoption characteristic differences in the men who registered for, but failed to partake in, a community-based physical activity intervention for adult men; aka ‘Men on the Move’

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Interventions in behavioral nutrition and physical activity (Chair: Brittany Johnson), North Hall, June 6, 2019, 12:05 PM - 1:30 PM

Other

Objective: Evidence suggests that gender-specific strategies related to community-engagement are necessary in creating sustainable health-promotion programmes that appeal to men. However, a substantial challenge to the effectiveness of community-based physical activity (CBPA) programmes is overcoming low adherence and high dropout, which negatively impacts cost effectiveness, putting programmes at risk when sourcing future funding. This study reports on the profile differences in men (participants [PT] vs drop-outs [DO]) who registered for a gender-sensitised CBPA intervention in Ireland; aka Men on the Move.

Methods: Inactive males (n=927) were recruited across 8 counties (4 'intervention' [n=501]; 4 'comparison-in-waiting' [n=426]). Self-administered questionnaires combined with recorded outcome measures (weight, BMI, waist circumference (WC) and time-to-complete one mile) were used to gather data on participants' at baseline, 12W, 26W and 52W. Data were computed in accordance with defined protocols, with descriptive and comparative means analysed between the intervention group; PTs (i.e. men who attended baseline and at least one other data collection point) and DOs (i.e. men who attended baseline data collection only). Additional analysis investigating the impact of factors such as education, living and employment status, will also be presented.

Results: Following the 52W data collection results indicated that 315 (63%) men adhered to the intervention, with 186 (37%) classed as drop-outs. Comparative analysis assessing baseline recorded outcome measures found significant differences between groups for Weight (PT: 92.2±smn;14.1kg, DO: 97.3±smn;18.5kg, p=0.05), BMI (PT: 30.1±smn;4.1kg/m2, DO: 32.1±smn;5.3kg/m2, p=0.05), WC (PT: 105.9±smn;10.8cm, DO: 110.7±smn;14.3cm, p=0.05), time-to-complete 1 mile (PT: 13.6±smn;3.1min:dec, DO: 14.5±smn;3.2min:dec, p=0.05) and METS (PT: 5.7±smn;1.8, DO: 5.3±smn;1.7, p=0.05).

Conclusions: Baseline results indicate that the programme succeeded in reaching its target population with the majority presenting as over-weight and of poor physical fitness. However, a high proportion (37%) of those most 'at-risk' did not partake in the intervention, highlighting the challenges facing service providers with CBPA programme adherence. The identification of participant characteristics which may influence dropout could potentially aid service providers with increasing adherence through programme design refinement. Furthermore, the results highlight the importance of investigating 'real world' health-promotion programmes embedded with communities which often have poorer participation adherence when compared with randomised-controlled-trial studies.
Cost effectiveness of an augmented exercise referral scheme with web-based behavioural support versus exercise referral scheme alone: a within-multicentre RCT analysis

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Interventions in behavioral nutrition and physical activity (Chair: Brittany Johnson), North Hall, June 6, 2019, 12:05 PM - 1:30 PM

Other

Purpose: To estimate the cost-effectiveness of an augmented exercise referral scheme compared with usual exercise referral scheme (ERS). This is the first study to report on the value for money of an augmented exercise referral scheme.

Methods: A multicentre parallel two group randomised controlled trial with 1:1 individual allocation to usual ERS alone (control) or augmented exercise referral scheme with web-based behavioural support based on the LifeGuide platform (e-coachER). Participants were inactive adults (18-74 years) with obesity, diabetes, hypertension, osteoarthritis or history of depression, referred to an ERS in UK. A cost utility analysis (from baseline to 12 months) of e-coachER alongside a trial was undertaken using health care provider, personal social services, and patient perspective. The primary outcome measure was cost per quality-adjusted life-year (QALY). Deterministic and probabilistic sensitivity analyses evaluated uncertainty.

Results/Finding: At 12 months, the average cost per participant was £1355 (95% CI £701, £2008) and £1793 (95% CI £1635, £1952) in the control and intervention groups respectively. The ecoacher intervention incurs additional costs of £439 (95% CI £-182, £1060) but generate more quality of life gains (0.030 QALYs; 95% CI 0.022, 0.039). The cost utility ratio shows that compared with ERS, ecoacher cost an additional £14,633 per QALY and is considered cost effective at UK threshold of £20,000- £30,000/QALY. This finding was robust to deterministic sensitivity analyses. At a threshold of £20,000/QALY, ecoacher has 61% chance of being cost effective compared with the control. This increases further to 72% at a £30000/QALY threshold.

Conclusion: Providing web-based behavioural support to participants of ERS offers an efficient strategy to promote physical activity. Further research should examine the long term cost effectiveness of this strategy and ascertain the impact of the trajectory of activity levels on future quality of life and health service use.
Social support, but not perceived food environment, is associated with diet quality in French-speaking Canadians from the PREDISE study

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Interventions in behavioral nutrition and physical activity (Chair: Brittany Johnson), North Hall, June 6, 2019, 12:05 PM - 1:30 PM

Purpose: There is inconsistent evidence regarding associations between social and physical food environment factors and food intake. The objectives of this study were to assess whether social support for healthy eating and perceived food environment are associated with diet quality, and to investigate if sociodemographic characteristics moderate these associations.

Methods: A probability sample of 1138 French-speaking adults (50% female) from the Province of Quebec, Canada, was recruited in the context of the PREDISE study. Participants completed validated questionnaires on an Internet platform, including the Social Support for Healthy Eating Questionnaire, assessing supportive and non-supportive actions related to healthy eating from close others at home (e.g. family members, partner, roommate) and outside of home (e.g. friends, colleagues), and the Perceived Food Environment Questionnaire, assessing the perceived accessibility to healthy foods. Three 24-hour food recalls were completed, from which the Canadian Healthy Eating Index (C-HEI) was calculated as an indicator of diet quality.

Results: Multivariate linear regression analyses showed that supportive (B=1.77 [95% CI 0.63, 2.91]) and non-supportive (B=-3.48 [95% CI -5.62, -1.34]) actions related to healthy eating at home were respectively positively and negatively associated with C-HEI, whereas supportive and non-supportive actions outside of home were not. Age (p interaction=0.0407), education (p interaction=0.0305), and income (p interaction=0.0230) were significant moderators of the association between at-home social support and the C-HEI. Diet quality of younger (vs. older) participants and of those with lower (vs. higher) levels of income or education was more strongly negatively influenced by non-supportive actions at home. The perceived accessibility to healthy foods was not associated with C-HEI (p>0.05) and no sociodemographic characteristics significantly moderated the association (p>0.05).

Conclusions: These results suggest that social environment, more precisely social support at home, may have a stronger influence on healthy eating than perceived physical environment factors. These findings support the added value of healthy eating promotion programs involving entire families, especially for younger and more socioeconomically disadvantaged individuals, whose efforts to eat healthily may be more easily thwarted by non-supportive households.
Examining the efficacy of a social and gamified app-based physical activity intervention: results from a randomised controlled trial

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Gamification, social media, apps and wearables (Chair: Ann de Smet), Terrace 2A, June 6, 2019, 12:05 PM - 1:30 PM

Purpose: Novel and appealing approaches to increasing physical activity levels are needed. This study evaluated the efficacy of a gamified physical activity intervention that connects users via Facebook and is delivered via a smartphone app.

Methods: In this three-group cluster-randomised controlled trial inactive adults who lived anywhere in Australia were recruited in teams of three to eight existing Facebook friends and randomly assigned (1:1:1) to receive either a gamified app, a basic self-monitoring app, or to a waitlist control group. The primary outcome was change in objective daily minutes of moderate-to-vigorous physical activity (MVPA) assessed via accelerometry at baseline, three (end of intervention), and nine months and analysed on an intention-to-treat basis using linear mixed models. Secondary outcomes include self-reported MVPA assessed using the Active Australia survey, and real-time app usage data.

Results: Four hundred and forty-four participants (n=121 teams) were recruited and randomly assigned to the gamified app (n=141, 39 teams), basic app (n=160, 42 teams), or waitlist (n=143, 40 teams). Results of the linear mixed models indicate no significant differences in objective daily minutes of MVPA between the three groups over time (F =.2, p =.9), changes were small at the three-month follow up in all groups (mean change = -1.2, 2.0 mins p/day) but slightly larger from three- to nine-months follow up (mean change = 1.5, 8.5 mins p/day). A significant difference in self-reported weekly minutes of MVPA was found (F=3.1, p=.02) and mean changes ranged from 110.1 to 189.3 mins p/week from baseline to three-months, and from -66.9 to 33.2 mins p/week from the three- to nine-month follow up. Participant engagement with the gamified and basic apps was high, with participants logging steps on an average of 72.1 (SD 34.9) and 67.1 (SD 32.3) days for each app, respectively, over the 100-day intervention. Participants used the gamified features an average of 10 (SD 17) times.

Conclusions: Despite high levels of engagement from participants, use of the Active Team app did not lead to significant changes in objective daily minutes of MVPA over time, although self-reported MVPA increased significantly.
Leveraging a social network approach via gamification and mobile technology to increase physical activity among adults: A cluster randomized controlled trial


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Gamification, social media, apps and wearables (Chair: Ann de Smet), Terrace 2A, June 6, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Objective: Support from existing social ties is a strong physical activity (PA) predictor. However, it remains unclear how to best cultivate natural social ties for enhanced PA behavior. This study examined the efficacy of a technology- and gamification-based PA intervention among teams of members with existing social ties.

Methods: Insufficiently active adults were randomized as self-selected teams of 3-8 participants (n=24 teams) to a 12-week technology-mediated PA treatment (i.e., Fitbit Alta HR; goals; mobile-compatible study website containing behavior change content and real-time PA updates; feedback; TECH, n=59 participants) or TECH plus a real-time PA step competition and gamified challenge characterized by a storyline, levels, and points (TECH+C, n=57 participants). Demographics were collected at baseline. Three-level linear mixed effects models with subjects and teams as grouping factors were fitted to test baseline-to-end-of-treatment changes in accelerometer-measured daily steps, moderate-to-vigorous PA (MVPA), and MVPA bout minutes (MVPA-B), plus social support (SS; Sallis SS Survey for Exercise; score range: 1[low]-5[high]) and group differences in Fitbit-measured daily steps during the treatment.

Results: Participants (M age=40.1±smn;10.3 years; 78% female) in TECH and TECH+C had similar mean baseline daily steps (4827±smn;1466 vs 5027±smn;1301), MVPA (110±smn;72 min/wk vs 105±smn;66 min/wk), MVPA-B (8±smn;18 min/wk vs 15±smn;37 min/wk), and SS (2.2±smn;0.5 vs 2.3±smn;0.6) (ps > 0.05). TECH and TECH+C significantly increased daily steps (844±smn;2030 vs 506±smn;1279) (ps < 0.05), with no between group difference (p=0.171). Conversely, TECH had a significantly higher increase in MVPA (40±smn;125 min/wk vs 20±smn;72 min/wk, p=0.047) and MVPA-B (42±smn;94 min/wk vs 25±smn;48 min/wk, p=0.008) than TECH+C. TECH+C achieved 975±smn;385 more Fitbit-measured steps on average, albeit not significant (p=0.105), than TECH during the treatment, and more mean daily steps week-to-week, with significant differences observed during weeks 3-6 (ps < 0.05) and peaking during week 5 (TECH+C=8406±smn;3208 vs TECH=6794±smn;2232, p=0.001). SS significantly increased (TECH=0.4±smn;0.7; TECH+C=0.6±smn;0.7, ps < 0.001), with no between group difference (p=0.086).

Conclusions: Adding a competition and gamified challenge to a technology-mediated PA intervention among self-selected teams enhanced daily steps initially but failed to facilitate sustained improvements in PA and SS, suggesting a need to explore treatment refinements that will foster maintenance of early PA enhancements.
Using Instagram to increase physical activity in young women: feasibility and preliminary efficacy

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Gamification, social media, apps and wearables (Chair: Ann de Smet), Terrace 2A, June 6, 2019, 12:05 PM - 1:30 PM

**E- & mHealth (SIG)**

**Purpose**

Celebrity-endorsed and commercial fitness programs are popular with young women; however, they can be expensive and have unproven efficacy. Social media appears a promising method for delivering evidence-based, accessible, and socially-supportive physical activity programs. This study aimed to evaluate the feasibility and preliminary efficacy of a novel 12-week evidence-based Instagram-delivered physical activity (PA) intervention for young women.

**Methods**

A 12-week program, developed through focus groups and consultation with sports scientists, prescribed graded running and bodyweight exercises 3 times per week. Daily Instagram posts delivering the exercises, video demonstrations and motivational content were uploaded using scheduling software, Later. Participants enabled notifications for the page which was made private for ethical reasons. This study used a one-group pre- and post-intervention design with 16 inactive young women (M=23 years, SD=3). Participants reported their PA (IPAQ MET mins/week) at baseline, 6 and 12 weeks. Participants additionally reported whether the program increased their motivation to exercise (1=strongly disagree to 5=strongly agree), and their satisfaction with the program (1=not satisfied to 5=very satisfied). Medians (Mdn) and interquartile ranges (IQR) were examined. Wilcoxon sign rank tests assessed change in PA.

**Results**

On average, participants saw 6 posts in their Instagram feed per week. Posts received an average of 6 'likes' but a very low degree of interaction in the form of commenting or tagging was observed. Retention was high at 6 weeks (88%) but dropped at 12 weeks (56%). Participants reported increased motivation to exercise (Mdn=4, IQR=3, 4) and were satisfied with the program (Mdn 4, IQR 3, 4) but changes in PA from baseline (Mdn MET/mins per week=529, IQR=289, 2039) to 6-weeks (Mdn=834, IQR=467, 1434, z=-0.22, p=0.83) and 12-weeks (Mdn=918, IQR=541, 1521, z=0.30, p=0.77) were not significant.

**Conclusion**

Instagram is a promising platform for delivering a low cost, convenient and appealing PA program for young women. Additional research is needed to identify methods of maximising social engagement and retention. For example, participants may be socially interactive in a larger group that includes friends and family members. Improved motivation may result in increased PA if perceived barriers, such as lack of time, are also addressed.
Me or my app? Does a health app supplement or substitute important behavioural change techniques in mobile running apps? A uses and gratifications approach to understand the supplementary and substitutionary value of behaviour change techniques.

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Gamification, social media, apps and wearables (Chair: Ann de Smet), Terrace 2A, June 6, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Purpose: Mobile health (mHealth) apps often include behavioural change techniques (BCTs). While people may perform BCTs themselves, it remains unclear when BCTs are self-performed and when app-included BCTs supplement or substitute users' behaviour. Prior studies inconclusive results regarding mHealth apps' effectiveness to promote physical activity may be due to a mismatch between mHealth apps' features and app-users' expectations. The Uses and Gratifications Theory (UG), stating that people continue using media when their expectations are met, points to mechanisms accounting for supplementary or substitutionary app-use. Thus, mHealth apps may be used more frequently when they gratify users' needs. This study answers literature gaps by focusing on running behaviour rather than general health behaviours, as supplementary or substitutionary to self-performed BCTs, proposing the research question: Applying the UG, how do self-performed BCTs and (gratified) app expectations influence running app-use frequency and intended continued use among app-users, and is the app-use supplementary or substitutionary?

Method: Data were collected among 211 Dutch adults using an online questionnaire, assessing self-performed BCTs (self-monitoring, goal-setting, feedback, social support), app-included BCTs expectations and gratified expectations, running behaviour, app-use frequency, and intended app-use. Average age was 40.23 (SD= 11.78), half were females (52.6%) and the majority high-educated (71.1%) and app-users (65.9%).

Results: App-use was more frequent when participants employed more within-person performance feedback (b*= .20, p= .022), were more gratified with app-included feedback features (b*= .25, p= .021), but less gratified with app-included goal-setting features (b*= -.24, p= .013). Further, intended app-use was stronger when participants set their own goals (b*= .19, p= .030), received more social support (b*= .26, p= .004), and expected app-included behaviour monitoring (b*= .31, p= .001).

Conclusion: Mobile running apps were more frequently used and more intended to use when these apps perform supplementary BCTs to participants' behaviour, giving insights into how app-users use running apps. This study is one of the first to focus on gratified expectations, contributing to the literature by applying the UG to a Dutch running sample and studying supplementary running app usage.
Self-monitoring of physical activity and sedentary behavior within a whole-of-school intervention: Findings from the SWITCH® Feasibility Study

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Gamification, social media, apps and wearables (Chair: Ann de Smet), Terrace 2A, June 6, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Objective: Several whole-of-school interventions have been effective for improving the health-promoting behaviors of children. It is unknown whether web-based behavioral tracking (self-monitoring) can be effectively implemented within such interventions to improve children's physical activity and sedentary behavior. The purpose of this study was to determine the degree to which the physical activity tracking component of the SWITCH® feasibility study was associated with beneficial changes to physical activity and sedentary behavior among participating children.

Methods: SWITCH® provides an evidence-based implementation framework with demonstrated feasibility, designed to increase school leaders' capacity to implement whole-of-school wellness policy programming. Through the SWITCH® training process, school leaders are provided flexible guidance for effective implementation. At pre-test (week 0) and post-test (week 12), students (n = 514) from eight Iowa schools completed the online Youth Activity Profile (YAP), a validated 7-day recall instrument developed to assess moderate-to-vigorous physical activity (MVPA) and sedentary behavior, at the group level. Weekly physical activity tracking was implemented via a customized web-based self-report tool. Tracking level was then dichotomized by median split. Linear mixed models were run to assess differences in MVPA and sedentary behavior, including main and interaction effects for student tracking, time, and gender.

Results: For MVPA, there was a significant student tracking*time interaction (p=0.02), and significant main effects for tracking (p=0.02), time (p=0.02), and gender (p<0.01). MVPA showed greater increases across time among high-tracking students (MD=4.8min/day), as compared to those students tracking less often (MD=1.7min/day). Tracking*time interactions were significant for in-school activity but not out-of-school activity (based on YAP segmentation). For screen-based sedentary behavior, there was a significant student tracking*time interaction (p=0.02) and significant main effects for tracking (p<0.01), time (p<0.01), and gender (p<0.01).

Conclusions: These results indicate that the web-based behavioral tracking component of SWITCH® was associated with improvements in students' physical activity and sedentary behavior. The SWITCH® intervention framework provides a promising whole-of-school approach to school wellness policy programming, and behavioral tracking appears to be an important component of SWITCH® to promote changes in student physical activity levels. Future studies will evaluate the dissemination and implementation of this innovative intervention framework as it goes to scale.
Effect of wearable activity trackers combined with digital behaviour change resources to promote physical activity in adolescents

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Gamification, social media, apps and wearables (Chair: Ann de Smet), Terrace 2A, June 6, 2019, 12:05 PM - 1:30 PM

E- & mHealth (SIG)

Purpose: There has been increasing interest in using wearable activity trackers to promote physical activity in youth. This study examined the short- and longer-term effects of a wearable activity tracker combined with digital behaviour change resources on adolescents' physical activity.

Methods: The Raising Awareness of Physical Activity (RAW-PA) Study was a 12-week, multicomponent intervention that combined a wrist-worn Fitbit Flex (and accompanying app), and online digital behaviour change resources and weekly challenges delivered via Facebook. RAW-PA was evaluated using a cluster-randomised controlled trial with 275 adolescents (50.2% female; 13.7 ±smn; 0.4 years) from 18 Melbourne secondary schools (intervention n=9; wait-list control group n=9). The primary outcome was moderate- to vigorous-intensity physical activity (MVPA), which was measured using hip-worn ActiGraph accelerometers. The secondary outcome was self-reported physical activity. Data were collected at baseline, 12-weeks (immediately post-intervention), and 6-months post-intervention (follow-up). Multilevel models were used to determine the effects of the intervention on daily MVPA over time, adjusting for covariates. Subgroup analyses were conducted for males and females.

Results: At 12-weeks, no significant differences were observed between intervention and wait-list control adolescents' MVPA. At 6-months post-intervention, adolescents in the intervention group engaged in five minutes less MVPA per day than those in the wait-list control group. Males in the intervention group engaged in eleven minutes less MVPA than males in the wait-list control group at 6-months post-intervention. No significant differences were observed for females at either time point. For self-reported physical activity, no significant effects were found at 12-weeks and 6-months post-intervention.

Conclusions: Combining a wearable activity tracker with digital behaviour change resources and weekly challenges did not increase adolescent's accelerometer-derived and self-reported physical activity levels at 12-weeks. This contrasts previous research that has suggested technologies such as these may increase youth physical activity levels in the short-term. As only 7% of males were still wearing the Fitbit at the end of the intervention, it is unclear whether these devices impacted on the lower MVPA engagement at 6-months post-intervention. The results suggest wearable activity trackers, in combination with supporting materials, may not be effective for increasing physical activity levels in adolescents.
The SMART Platform: A digital citizen science approach for active living surveillance, knowledge translation, and environmentally sustainable policy interventions

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Gamification, social media, apps and wearables (Chair: Ann de Smet), Terrace 2A, June 6, 2019, 12:05 PM - 1:30 PM

Objective: To curb the physical inactivity pandemic, it is time to move beyond traditional approaches and engage citizens by repurposing sedentary behavior (SB), enabling ubiquitous tools (e.g. smartphones). The primary purpose of SMART Platform is the development of a digital citizen science methodology for active living surveillance, knowledge translation, and environmentally sustainable policy interventions.

Methods: The SMART Platform is designed to run prospective investigations ranging from observational and quasi-experimental studies to community trials. The Platform’s methodological approach is based on engaging participants as citizen scientists longitudinally across different seasons. Before full implementation, pilot data were collected in April 2017 in Saskatchewan, Canada, where 317 adult citizen scientists (=18 years) were recruited in-person and online. Citizen scientists used a custom-built smartphone app for 8 consecutive days. The smartphone-triggered validated surveys captured physical activity (PA), SB, motivation, perception of outdoor and indoor environment, and mental wellbeing. Ecological momentary assessments (EMAs) were employed to capture not only PA and SB, but also barriers and facilitators of PA, as relayed by citizen scientists using geo-coded pictures and audio files. To obtain a comprehensive objective representation of participant location, motion, and smartphone screen time, 6 types of sensor-based (e.g. global positioning system, accelerometers) data were surveilled for 8 days.

Results: Pilot results showed that geo-coded pictures and audio files could be used to map barriers and facilitators of active living to inform active living interventions that emphasize active transportation and minimize motorized transport. The Platform showed flexibility in identifying and addressing issues ranging from compliance to citizen scientist engagement. Pilot data have also been used to validate objective smartphone screen time accumulation, and daily recall of physical activity through modified EMAs, strengthening future implementation.

Conclusion: Based on initial results, SMART Platform is being adapted to implement studies with varied designs across different jurisdictions: SMART Youth (quasi-experimental study among urban Canadian youth) and SMART Indigenous Youth (community trial among rural and remote Indigenous youth), and SMART India (cross-sectional study among urban and rural Indian youth). All these initiatives are combining mobile technology with citizen science to influence environmentally sustainable active living policies.
Food reward sensitivity and diet quality: do sleep and stress moderate the relationship?

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Objective. Greater food reward sensitivity is hypothesized to promote hedonic (i.e., reward-based) eating, which may lead to greater intake of discretionary foods. Stress and poor sleep increase the desirability of and neural response to highly palatable foods, and thereby may increase reward-based eating. This study examined whether sleep and stress moderate the association of self-reported food reward sensitivity with dietary intake across pregnancy.

Methods. Women were recruited at \(=12\) weeks gestation and completed two measures of food reward sensitivity, the Power of Food Scale (PFS) measuring hedonic hunger and the Modified Yale Food Addiction Scale (MYFAS) assessing addictive-like eating; the Pittsburg Sleep Quality Inventory; and the Perceived Stress Scale. Participants completed 24-hour dietary recalls each trimester, from which the Healthy Eating Index 2015 total score (HEI; indicates overall conformance to US dietary guidelines), and adequacy (HEI-adq; core intake) and moderation (HEI-mod; discretionary intake) subscales, were calculated across pregnancy. Separate linear regression models controlling for age, marital status, education, household size, and income examined associations of each construct with diet quality; interaction terms tested for effect modification by sleep quality and stress.

Results. The sample (\(n=364\)) had a mean BMI of \(26.6\pm6.4\) kg/m\(^2\) and mean HEI of \(57.7\pm1.4\). PFS and MYFAS were correlated with both sleep (\(r=.23, p<.001\) and \(.14, p=.01\), respectively) and stress (\(r=.24\) and \(.21, p<.001\), respectively). Both PFS (\(\beta=-.11, p=.04\)) and MYFAS (\(\beta=-.14, p=.01\)) were inversely associated with HEI. PFS was associated with HEI-mod (\(\beta=-.15, p=.004\)), while MYFAS was associated with HEI-adq (\(\beta=-.12, p=.03\)). Sleep quality was associated with HEI (\(\beta=-.12, p=.03\)) and HEI-adq (\(\beta=-.13, p=.03\)); stress was unassociated with diet quality. Neither sleep nor stress moderated the association of PFS or MYFAS with diet quality.

Conclusions. Findings indicate that food reward sensitivity and poor sleep quality may contribute to poor diet quality during pregnancy. The absence of moderation by stress or sleep suggests may indicate that these constructs are less relevant in a naturalistic versus experimental setting, or may reflect differences unique to the pregnancy state.
Adaptation in a new food environments among North Korean refugees in South Korea

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Objective: Immigrants/refugees have to adjust their diets in new food culture and environments. North Korean refugees (NKR) living in South Korea (SK) is unique having to adapt to very different food environments of SK with shared food culture. This study aimed to understand NKR's perceived differences in food environments between SK and North Korea (NK) and difficulties in adapting into new SK food environments. We also examined differences of NKR's daily diets between SK and NK.

Methods: This qualitative study conducted theory-based, one-to-one, semi-structured interviews. A purposeful sample of 20 adult NKR's born in NK during the severe famine was recruited through diverse organizations specialized in NKR. This age group is important because they are at higher risk for obesity and other chronic diseases from their experience of malnutrition at early stage of life. The interviews were based on four domains (food production, distribution, acquisition, and consumption) of food system. Interview transcripts were analyzed using Framework analysis to understand NKR's perceptions and relationships between food environments and their diets.

Results: NKR described NK food environment as self-production, while SK food environments as market-economy's one. Their diets in SK were more diverse, but relying on comfortable foods. Three theme emerged from the data regarding relationships between food environments and their diets: 1) different meaning of "meal," 2) forgotten difficulties of adaptation into new food environments, and 3) different reasons of food choice. While NKR ate three meals a day in NK, they rarely ate three meals a day in SK. Eating three meals a day in NK were associated with survival/hunger, but no such association existed in in SK. NKR answered no difficulties with SK food environments, but most NKR's recalled language barriers upon prompt. Reasons for food choice appeared to diversify from cost-effectiveness to taste, fun, health, etc.

Conclusions: The findings of this study contribute to the understanding of dietary adaptation among immigrants and refugees as well as among populations in fast-developing countries. Transitioning meaning of "meal" to more enjoyable and healthy events could be a key entry point for better nutrition and health in these populations.
Integrating diet and 24-hours physical behaviours to predict all-cause mortality risk: A Cluster Compositional Data Analysis in the NHANES 2005-2006 cycle

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Disease prevention and management (SIG)

Objective: All-cause mortality risk has been linked in the literature with particular lifestyle behaviours, such as unhealthy diet, inadequate sleep duration, physical inactivity, and recently screen-based activities. However, how these behaviours cluster together and contribute to all-cause mortality risk is currently unknown. The aim of this study was to compare all-cause mortality risk across clusters of adults 50+ (n = 1,079) with common lifestyle behaviours patterns in the NHANES study.

Methods: Isometric physical behaviour log-ratio coordinates (i.e. 24-h self-reported sleep and screen time, and accelerometer-derived light and moderate-to-vigorous physical activity and sedentary time), z-scores of diet quality (i.e. Healthy Eating Index) and z-scores of sleep quality were used as cluster input and a K-means partitioning cluster analysis was implemented. A multivariate Cox regression model was then used to ascertain the all-cause mortality risk at 7 years follow up associated with each of the identified clusters adjusting for a number of relevant covariates and complexity of NHANES survey.

Results: A 3-cluster solution of mutually exclusive groups of distinct behaviours was deemed to be the most optimal. Clusters 1 (Better diet quality, a higher level of light or moderate-vigorous physical activity and lower screen time) was associated the lowest risk of all-cause mortality compared to Cluster 2 and Cluster 3, which had worse diet and activity/screen-time profiles than Cluster 1.

Conclusions: These results suggest that poor diet and 24-h physical behaviours indeed cluster and lead to higher risk of early mortality. It also suggests that physical activity can in part compensate the effect of poor diet.
Energy expenditure associated with posture transitions in preschool children

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Determinants and methods in behavioral nutrition and physical activity (Chair: Nana Lien), Terrace 2B, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Despite growing scientific interest in the benefits of breaking up sedentary time with intermittent standing or walking, few studies have investigated the energy cost of changes in posture. This study aimed to determine whether changes in posture are associated with increased energy expenditure in preschool children.

Methods: Forty children (age 5.3 ± smn; 1.0y) completed a ~150-min room calorimeter protocol involving sedentary, light, and moderate- to vigorous-intensity activities. This study utilised data from ~60-min of the activity protocol, during which children were undertaking sedentary behaviours (TV viewing, drawing/colouring in, and playing with toys on the floor). Direct observation data were coded: change in posture was classified as sit/lie to stand/walk, sit/lie to other, stand/walk to other, or vice versa. Energy expenditure (EE) was calculated using the Weir equation. Individualised metabolic equivalent (MET) values were calculated by dividing measured EE for each child by their predicted basal metabolic rate (BMR). Activity EE (AEE) was calculated by deducting BMR from measured EE. Spearman's rank correlations were used to compare the number of posture transitions with MET and AEE values. Participants were then divided into tertiles based on the number of posture transitions; EE of children in the lowest and highest tertiles of posture transitions were compared using unpaired t-tests. Effect sizes (Cohen's d) were also calculated.

Results: There was a positive correlation between the total number of posture transitions and average METs (rs = 0.42, p = 0.02) and AEE (rs = 0.43, p = 0.02). The mean differences in METs between the lowest and highest tertiles of posture transitions observed for TV viewing and drawing resulted in moderate effect sizes (d = 0.61 and 0.50 respectively). When the three activities were examined in combination, the differences in METs also resulted in a moderate effect size (d = 0.64). Similar results were found for AEE.

Conclusions: Results from this study showed that posture transitions may be associated with increased energy expenditure in preschool children. Findings provide preliminary evidence to suggest that the concept that variation in posture transitions may have meaningful biological or health effects in early childhood is worth investigating further.
Purpose:
To understand community views on overweight and obesity, the contributing factors, and the role of government in supporting healthy eating and physical activity.

Methods:
A mixed methods study was conducted comprising four focus groups (n=26) (August 2017) and an online survey (n=2,006) (April 2018) using market research panels. The sampling aimed to ensure a mix of NSW residents by gender, age, education and residence. Perceptions of the overweight and obesity issue, contributing factors, importance of government action, and acceptability of possible government interventions in different settings were assessed. Focus group data were analysed for recurrent themes and attitudinal and intervention support measures were analysed by socio-demographic and behavioural risk factor indicators. The adjusted association between sociodemographic and behavioural indicators with support for each intervention was modelled using Poisson regression.

Results:
The survey sample over-represented females, tertiary educated and those speaking English at home, compared to the NSW population. The majority of survey respondents reported that overweight and obesity was a large problem in adults (80.3%) and children (69.2%), and mostly attributable to unhealthy individual choices (86.1%), parental influence (80.6%) and widespread availability of unhealthy food and drink (77.7%). Consistent with focus group findings, survey respondents reported government preventive action was important for adults (73.2%) and children (77.6%), with high support for removing sugar-sweetened drinks (SSD) and increasing healthy food and drink in schools (75.5%-81.5%) and hospitals (67.4%-79.2%). Many perceived these interventions as effective and essential to support healthy choices, lead by example and provide consistent messages. Level of support also depended on perceived feasibility, fairness, and restrictions on choice. Significantly more females, those aged =41 and low consumers of SSDs and fast food supported most interventions, in most settings.

Conclusions:
Consistent with other Australian studies, the findings indicate the community understands the influence of environments on healthy eating and active living and support is strong for interventions in particular settings that are perceived to be effective. They increase our understanding about why interventions in specific settings may be supported or opposed by the public.
Objectively measured built environment predictors of walking to/from school in Portuguese adolescents

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Purpose: The aim of our study was to identify the objective built environment predictors of walking to/from school in normal weight and overweight adolescents.

Methods: 211 adolescents (55.5% girls; 50.7% overweight) with a mean age of 16.7±0.07 years old reported the number of days walking to/from school. Objective built environmental features in a 2km buffer around participant's home and school were obtained through geographical information systems following the IPEN GIS templates (Adams et al. 2014) including features such as access to private recreation facilities, parks, public transportation, street connectivity, and land use. The International Obesity Taskforce (IOTF) cut-offs were used to define weight status based on Body mass index (kg/m2). Socioeconomic status (SES) information was gathered from 2011 census and was stratified in low and high based on the median household income. Stepwise linear regression models adjusted for age, gender and SES were created to identify the main predictors of walking to school in overweight and normal weight adolescents.

Results: In the normal weight group, the number of walking days' to/from school was associated with the distance to downtown/center (OR:0.54; IC=0.00,0.001), park area > 202343m2 (OR: -0.28; IC=0.000,0.003), number of intersections (OR:0.73; 0.005,0.02) and distance to a public transportation stop (OR:0.28; IC= 0.000,0.003).

While for the overweight adolescents the number of walking days' to/from school was predicted by number of intersections (OR: 1.13; IC=0.013,0.022), density of tram/streetcar/light rail stops (OR: -0.35; -175493, -35980), number of cul-de-sacs (OR: -0.30; IC=-0.043,-0.002) and network distance to nearest park (sized between 1012m2 to 4047m2) (OR: 0.20; IC=0.00,0.001).

Conclusion: Built environment features can support interventions aiming to increase walking to/from school as a key source of physical activity, however different population groups may have different needs that must be considered.
The longitudinal association between physical activity and frailty among community-dwelling older citizens

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Objective: Maintaining independent living, specifically delaying or preventing frailty is important due to the increasing ageing population (>75 years). Physical activity (PA) may slow down the progression of frailty. Our study questions were: what is the longitudinal association between 1) PA and frailty and 2) the change in PA and frailty?

Methods: A longitudinal study was conducted in primary care and community settings in five European countries (the United Kingdom, Croatia, Greece, the Netherlands and Spain) between 2015 and 2017. Overall, 858 participants completed both baseline and 12-month follow-up questionnaires, and 801 participants (61.5% female; mean age = 79.8; SD = 5.4) were included in the analyses. Socio-demographic characteristics, lifestyle (smoking, alcohol), and multi-morbidity were assessed. PA level was assessed based on the weekly frequency of activities that require a low or moderate level of energy. PA level were classified into three categories: more than once a week, once a week or less and (almost) never. The 15-item Tilburg Frailty Indicator assessed overall frailty as well as physical, psychological and social frailty. Analysis of variance (ANOVA) and multivariate linear regression analyses were performed.

Results: Compared to participants who were physically active >1 per week, participants who were physically active = 1 per week had higher overall (B=0.60; P<0.05) and physical (B=0.47; P<0.01) frailty scores at 12-month follow-up, and participants who were (almost) never physically active had higher overall (B=1.32; P<0.001), physical (B=0.73; P<0.001), psychological (B=0.49; P<0.001) and social (B=0.21; P<0.01) frailty scores at 12-month follow-up. Additionally, compared to participants whose PA level remained stable between baseline and follow-up (n=571), participants whose PA level increased (n=94) had lower overall (B=-1.13;P<0.001) , physical (B=-0.73;P<0.001) and psychological (B=-0.25; P<0.05) frailty scores at 12-month follow-up, and participants whose PA level decreased (n=136) had higher overall (B=1.30;P<0.001), physical (B=0.76;P<0.001) and psychological (B=0.46; P<0.001) frailty scores at 12-month follow-up.

Conclusion: Our results show that a lower level of PA is associated with higher frailty level among older citizens. An improvement over time in PA is associated with a lower frailty level. The results implicate physical activities should be encouraged among older citizens to delay frailty.
Objective: Physical function declines with age and loss of function is associated with decreased independence, disability, and hospitalization. Sedentary behaviour levels are higher among older adults. Thus, we aimed to review the literature to examine whether there are associations of sedentary behaviour with physical function.

Methods: Medline, EMBASE, and CINAHL were searched using medical subject headings and key words related to sedentary behaviour and physical function for articles to October 2018. Information on study characteristics and results were extracted. Random effects meta-analyses using Pearson's correlation coefficients were employed to examine the magnitude of effect for the association between sedentary time (h/day) and physical function (global score and individual physical function tests).

Results: 49 studies were identified for inclusion in a systematic review but only 24 cross-sectional studies (N=8,462) met the inclusion criteria for the meta-analysis. Sedentary behaviour was detrimentally associated with global physical function, r= -0.15 (-0.20, -0.09), lower body function [k=13; N=5,197; r=-0.22 (-0.39, -0.04)], and gait speed [k=6; N=1,167; r=-0.33 (-0.48, -0.16)]. There was no evidence of an association of sedentary time with balance [k=5; N=1,014; r=-0.15 (-0.36, 0.04)]. There was no evidence of an effect of sedentary behaviour measurement (device-measured vs self-report). Meta-regression results indicated that mean age of participants had a significant association whereby the negative correlation of sedentary behaviour with global function was higher with increased age of participants (βa=-0.007, 95%CI =-0.013 to -0.001, p=0.02).

Conclusions: This meta-analysis found consistent associations of sedentary behaviour with global physical function, lower body function and gait speed, with stronger relationships in older people. More work is needed to understand the behavioural and physiological mechanisms underpinning this relationship and the causality of the relationship. Interventions targeting reductions in sedentary behaviour may be useful in addressing declines in physical function, particularly for older people.
Mobility limitations affect the association between physical activity and loneliness

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Ageing and community health (Chair: Seb Chastin), Club A, June 6, 2019, 12:05 PM - 1:30 PM

**Ageing (SIG)**

**Objective:** Of both insufficient physical activity (PA) and loneliness the detrimental effects on physical and mental health are well established. Especially among single older adults (aged over 65 years) insufficient PA and loneliness are highly prevalent. As societies are ageing rapidly worldwide, this poses a major threat to public health. In previous research lower levels of PA have been associated with higher levels of loneliness, but the majority of research concerned the general population of adults. As the majority of older adults are confronted with mobility limitations caused by chronic diseases, research into the association between PA, loneliness and the presence of mobility limitations is called for and therefore subject of this study.

**Methods:** A single group pre-test post-test implementation study was performed among community living single older adults (N=575; mean age = 76±smn;8) participating in the computer tailored Active Plus intervention. Active Plus is primarily designed to increase PA and secondarily to stimulate social contacts while being physically active in order to decrease loneliness. Data was collected by self-reported questionnaires at baseline (T0) and after three months (T1), with a follow up assessment at six months (T2). Multilevel regression analyses were applied to assess whether an increase in PA (T0-T2) is associated with a decrease in loneliness and whether this association is affected by the presence of mobility limitations.

**Results:** MVPA was negatively associated with loneliness (B = -0.09; SE = 0.04; p = 0.020); this association however became non-significant when the presence of mobility limitations was included in the analyses (p=0.824). Having mobility limitations in itself was positively associated with loneliness (B = 0.51; SE = 0.10; p<0.001).

**Conclusions:** The findings suggest that the in previous research often presented higher levels of loneliness among less physically active adults may actually be caused in a large degree by the presence of mobility limitations. This indicates that the mechanisms that predict the relationship between PA and loneliness function differently when mobility limitations are present. In order to maximize the public health impact of interventions targeting physical activity and loneliness, mobility limitations should be addressed adequately when designing such interventions.
Effect of Morning Exercise with or without Breaks in Prolonged Sitting on Blood Pressure in Older Overweight/Obese Adults: Evidence for Sex Differences


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Purpose:
Both acute exercise and frequent active breaks in prolonged sitting can reduce blood pressure (BP) in older overweight/obese adults. We investigated whether there is an additive BP lowering effect when exercise is combined with subsequent active breaks in sitting. Sex differences and concurrent changes in plasma catecholamines as a potential candidate mechanism underlying BP responses were also examined.

Methods:
Sedentary older adults (n=67; 67±smn;7 years; BMI 31.2±smn;4.1 kg/m2), completed three conditions in random order: SIT: uninterrupted sitting (8hr, control); EX+SIT: sitting (1hr), moderate-intensity walking (30min), uninterrupted sitting (6.5hr); EX+BR: sitting (1hr), moderate-intensity walking (30min), sitting interrupted every 30-minutes with 3-minutes of light-intensity walking (6.5hr). Serial BP and plasma epinephrine/norepinephrine measurements occurred over 8-hours.

Results/Findings:
The 8-hour average systolic and diastolic BP (mmHg 95% CI) was lower in EX+SIT -3.4 [-4.5 to -2.3], -0.8 [-1.6 to -0.04] and EX+BR -5.1 [-6.2 to -4.0], -1.1 [-1.8 to -0.3] respectively, relative to SIT (all P<0.05). There was an additional reduction in average systolic BP of -1.7 [-2.8 to -0.6] in EX+BR relative to EX+SIT (P=0.003). This additional reduction in systolic BP was driven by females -3.2 [-4.7 to -1.7; P<0.001 EX+BR vs EX+SIT]. Average epinephrine decreased in EX+SIT and EX+BR in females (-13%, -12%) but increased in males (+12%, +23%) respectively, relative to SIT (P<0.05). No differences in average norepinephrine were observed.

Conclusions:
Morning exercise reduces BP over a period of 8-hours in older overweight/obese adults compared to prolonged sitting. Combining exercise with regular active breaks in sitting may be of more benefit for lowering BP in females than in males.
Change in strength in Flemish adults according to their physical activity level: a 10-year follow-up study.

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Ageing and community health (Chair: Seb Chastin), Club A, June 6, 2019, 12:05 PM - 1:30 PM

Maintaining sufficient strength becomes a major challenge for the continuous growing older population where delaying or preventing frailty may increase quality of life. Resistance exercises are warranted, but these are often neglected in typical physical activity assessment methods. The total physical Activity level (PAL) alone may not give sufficient indications for the maintenance of muscular fitness.

Purpose: This study evaluated the evolution of strength over a 10-year period, in relation to PAL and its different intensity categories (light, moderate, vigorous) and domains (work, occupational, transport).

Methods: Data on 538 adults (9-73 years at baseline, 347 men) were collected in 2002-04 and in 2012-14. Handgrip strength (HGS) (kg) was assessed using a handgrip dynamometer. Biodex Medical System 3®; was used to measure isokinetic strength (IS) (torque (Nm) at 60°/s and IS at 240°/s) and muscular endurance (total work (J) during 25 repetitions at 180°/s) of the knee extensors and flexors. PAL and occupation in different intensity categories in different PA domains were estimated using the International Physical Activity Questionnaire. Per gender, associations between PA parameters and muscle strength were examined using multivariate linear regressions applying an alpha of 0.05.

Results: For the different intensity categories and domains, only 8/55 associations with muscular strength parameters were significant in women, and 2/55 in men. When adjusted for age, an increase in total PAL in women was positively associated with changes in IS-60°/s β = 29.1, R²=0.04, p<0.01, IS-240°/s β = 13.6, R²=0.03, p<0.05) and muscular endurance β = 601, R²=0.04, p<0.01). In contrast, in men there was only a positive association with change in HGS β=5.116, R²=0.01, p<0.05).

Conclusion: Considering the different PA intensity categories or PA domains separately gives no indication for changes in muscle strength. Change in total PA is associated with a change in muscle strength but low R²; values indicate high residual variability. When focussing on PA in preventing strength decline and fragility in the elderly, a holistic approach including resistance type exercises is warranted since general PA is not specific enough and not a strong predictor for muscle strength.
Objectively measured sedentary time before and after transition to retirement: The Finnish Retirement and Aging Study (FIREA)


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Ageing and community health (Chair: Seb Chastin), Club A, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Retirement is associated with increase in self-reported daily sedentary time, but no longitudinal evidence exists on how objectively measured sedentary time changes during the retirement transition. The aim of this study was to compare objectively measured daily and hourly sedentary time before and after retirement and examine whether these changes differ by gender and occupational status.

Methods: The study population consisted of 398 participants (mean age 63 years, 84% women) from the Finnish Retirement and Aging Study (FIREA). Sedentary time was measured using a wrist-worn triaxial ActiGraph accelerometer before and after transition to retirement with one year interval. Pre-retirement occupational status was categorized as manual and non-manual.

Results: Daily sedentary time was 8 hours 23 minutes in women and 10 hours 16 minutes in men before retirement. When all measurement days before and after retirement were considered, daily sedentary time increased in women by 17 minutes (95% CI 7 to 27) and decreased in men by 29 minutes (95% CI -53 to -6) during transition to retirement. Especially women in manual occupations showed marked increase in sedentary time (49 min, 95% CI 32 to 66). When only non-working days before retirement were compared to all days after the retirement transition, daily sedentary time increased in both women (45 min, 95% CI 33 to 56) and men (28 min, 95% CI 2 to 55). Differences in hourly sedentary time before and after retirement by occupational statuses were most evident during the usual working hours (8 am to 4 pm). Evenings were the most sedentary period of the day both before and after retirement in women and men.

Conclusions: Objectively measured sedentary time increases among women and remains at high level among men during the retirement transition. Attention should be paid to reduce daily sedentary time in retiring women and men.
17421

O26, O26.1

Association between meeting the Australian National Quality Standards for Early Childhood Education and Care and children’s physical activity.

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Physical activity and sedentary behavior research in preschoolers (Chair: C Byrd-Bredbenner), Club B, June 6, 2019, 12:05 PM - 1:30 PM

Early care and education (SIG)

Purpose: The impact of national regulatory and operational policy frameworks of the Early Childhood Education and Care (ECEC) setting on children's physical activity whilst attending care has received little research attention in Australia.

This study examined the relationship between the Australian National Quality Standard (NQS) for ECEC services and children's physical activity.

Methods: Participants included 1197 children aged 2-5 years from 74 long day care centres taking part in the Play Spaces & Environments for Children's Physical Activity (PLAYCE) Study in Perth, Western Australia (2015-2017). Physical activity was measured using 7-day accelerometry to derive mean mins/day at childcare of light, moderate and vigorous physical activity (LMVPA), moderate and vigorous physical activity (MVPA) and total physical activity (TPA). Quality ratings of centres were obtained from the 2017 Australian Children's Education and Care Quality Authority National register. Potential confounders were collected via parent and educator surveys.

Results/findings: Children did on average 161.8 (SD 39.7) mins/day of total PA at ECEC. Adjusted multilevel regression models showed that exceeding NQS Quality Area (QA) 2.2 (Healthy eating and physical activity are embedded in the program for children) was associated with 8.1 mins/day less MVPA at ECEC (p<0.1). However, exceeding NQS QA 3.2 (The environment is inclusive, promotes competence, independent exploration and learning through play) was associated with 5.7 mins/day more LPA (p<0.1). Further results will be presented including data from 2028 children and 115 ECEC services in the PLAYCE study.

Conclusion: Centres exceeding NQS QA 3.2 provide environments that promote PA. The negative association observed between NQS QA 2.2 and MVPA may be confounded by the 'healthy eating' component of the standard. More research is needed to better understand compliance with ECEC NQS and the impact on children's physical activity and healthy eating. These findings provide preliminary evidence that meeting ECEC NQS's related to physical activity and supportive physical environments may be important for children's physical activity, however the findings require confirming with the larger PLAYCE data set.
The Relationship Between Meeting the Australian 24-Hour Movement Guidelines for the Early Years, Obesity and Social-Emotional Development.

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Purpose: New Australian 24-hour movement guidelines for the early years provide recommendations on daily physical activity (PA), sedentary screen time (SED), and sleep (SP) for children 2-5 years. This study uses a large representative sample to examine the association between meeting 24-hour movement guidelines, obesity and social-emotional development in young children.

Methods: PLAYCE study data was collected for 1490 children 2-5 years from 122 long daycare centres in metropolitan Perth, Australia. Centres were recruited based on size and SES. PA was assessed using 7 day accelerometry. Parent reported SED and SP was determined using established items. Height and weight were objectively measured and WHO weight status classifications applied. The Strengths and Difficulties Questionnaire was used to measure social-emotional development.

Results/findings: Overall, 30% of children met the 24-hour movement guidelines for PA, 31% for SED and 84% for SP. Only 6.9% of children met guidelines for all three movement behaviours. Children meeting SP guidelines had 47-81% decreased odds of being at risk for emotional symptoms, conduct problems, hyperactivity (all p<0.05) & 53% increased odds of prosocial behaviour (OR 1.53; 95% CI: 1.09-2.15). Meeting PA guidelines was associated with 30% increased odds of prosocial behaviour (OR 1.30; 95% CI: 0.96-1.75). Not meeting any of the movement guidelines was associated with four times the odds of being at risk for conduct problems (OR 4.13; 95% CI: 1.77-9.66).

Conclusion: Less than 7% of young Australian children meet the 24-hour movement guidelines. Meeting sleep guidelines was associated with decreased odds of being at risk social-emotional development delay and meeting PA guidelines was associated with increased odds of prosocial behaviour. Not meeting any of the guidelines was associated with four times the likelihood of being at risk for conduct problems. Findings suggest that effective scalable integrated interventions targeting multiple movement behaviours in preschool-aged children are needed.
Assessing Childcare Physical Activity Environments using CHEERS and activPAL

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Physical activity and sedentary behavior research in preschoolers (Chair: C Byrd-Bredbenner), Club B, June 6, 2019, 12:05 PM - 1:30 PM

Early care and education (SIG)

Purpose: The Creating Healthy Eating and active Environments Survey (CHEERS) has been implemented in the provincial health region to serve the preschool population by providing childcare programs with an online self-administered assessment tool to monitor and enhance their environments. The purpose of this investigation was to assess childcare physical activity environments using CHEERS questions in comparison to objectively measured activity levels of children in the program. Methods: In this mixed-methods study, five childcare programs and 57 preschool children (3, 4.5 years; n=57) were recruited in the province of Alberta, Canada. Quantitative data: Childcare program directors and early childhood educators completed the CHEERS audit tool. Children were fitted with activPAL™ accelerometers and were worn for seven consecutive days during childcare hours to assess sitting, standing, stepping time. A valid day was considered as being worn for more than 300 minutes. Only those participants who provided at least 5 valid days were included in data analyses. Qualitative data: Physical environment factors such as indoor and outdoor physical activity space, play equipment, and proximity to neighborhood park areas were assessed through direct observation. Policy documents regarding physical environment were collected for document review. Results: Children wore accelerometers approximately 7.25 hours daily (435 ±smn; 42 minutes) and accumulated 38% (69 ±smn; 22) of the recommended 180 minutes of movement activity levels recommended with a 5.9 ±smn; 1.2 average CHEERS physical activity score. Children achieved 78% (4686 ±smn; 1632) of the recommended 6000 step count for preschoolers. Active steps (550-750) and CHEERS physical activity domain scores (6.6 ±smn; 0.1) were greater in childcare programs with large outdoor play spaces, that accessed neighborhood park areas, and written policies to exclude screen. The correlation between the CHEERS physical activity domain score and step count (r=.17; p=.23) was not significant. Conclusions: The results indicate that physical activity levels of preschool aged children in childcare fall short of recommended activity levels trending with lower active steps and CHEERS scores. This study highlights the variability of activity levels among children within the same environment.
Are toddlers and preschoolers less sedentary and more active in childcare when their early child educators are less sedentary and more active?

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Physical activity and sedentary behavior research in preschoolers (Chair: C Byrd-Bredbenner), Club B, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Childcare educators are in a unique position to promote minimal sedentary time (ST) and regular physical activity (PA) among multiple children in their care. The importance of educator modeling of these behaviors is unknown. Study objectives were to examine associations between objectively-measured ST and PA among childcare educators and children in their care, and to determine if associations differed between toddlers (19-35 months) and preschoolers (36-60 months).

Methods: Participants were educators and children from nine childcare centres in Edmonton and Ottawa, Canada as part of the supporting Healthy AcTive CHildcare settings (HATCH) study. Data from nine additional centres will be available mid-December, 2018. Light-intensity PA (LPA), moderate- to vigorous-intensity PA (MVPA), total PA (TPA), and ST during childcare were measured with accelerometers. Nap time data were removed for children and educators based on room schedules. Children were matched with the main educator in their room that had the highest TPA, resulting in 19 of 43 educators and 109 of 155 children being included. Multi-level linear regression models that accounted for clustering and included child age and sex were conducted.

Results: Children engaged in 30.4, 22.9, and 6.7 min/hr of ST, LPA, and MVPA, respectively. Educators engaged in 33.3, 23.9, and 2.8 min/hr of ST, LPA, and MVPA, respectively. Each additional five min/hr of educator ST was significantly associated with 1.2 min/hr higher toddler/preschooler ST, 1.2 min/hr lower preschooler MVPA, and 1.2 min/hr lower toddler/preschooler TPA. Each additional five min/hr of educator LPA was significantly associated with 1.3 min/hr lower toddler/preschooler ST, 0.9 min/hr higher preschooler MVPA, and 1.3 min/hr higher toddler/preschooler TPA. Each additional 5 min/hr of educator TPA was significantly associated with 1.2 min/hr lower toddler/preschooler ST, 1.2 min/hr higher preschooler MVPA, and 1.2 min/hr higher toddler/preschooler TPA.

Conclusions: Lower ST and higher PA among childcare educators were associated with lower ST and higher PA among children in their care. Associations were small in magnitude but still may have practical significance when one educator can influence multiple children. Targeting educators' ST and PA may be one strategy to promote healthy behavioural patterns in young children during childcare.
The associations between environmental characteristics of early childhood education and care centres and one-year change in toddlers’ physical activity and sedentary behaviour: a multilevel analysis from the GET UP! Study.

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Physical activity and sedentary behavior research in preschoolers (Chair: C Byrd-Bredbenner), Club B, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Although evidence suggests that young children may become increasingly sedentary while less active within the early child education and care (ECEC) centres when growing older, it is not fully understood which environmental characteristic(s) of the centres are associated with the change in their active levels. This perspective study aimed to examine the associations between ECEC centres and one-year change in toddlers’ physical activity and sedentary behaviour while at the centres.

Methods: Data from 292 children (average age 19.64±smm; 4.05 month at baseline) from the GET-UP! Study was analysed. Environmental characteristics of ECEC centres were rated using the Infant/Toddler Environment Rating Scale-revised edition (ITERS-R) at baseline. Physical activity and sedentary behaviour in the centres were assessed using activPAL devices at baseline and at one-year follow-up. Linear mixed models were performed to examine the associations between the environmental characteristics and the change in the proportion of children's time spent in physical activity and sedentary behaviour while at centres, with adjustment for age, genders, socio-economic status, time sequence and clustering effects.

Results: Children's proportion of time spent in sedentary behaviour (sitting time) while at the centres increased and the proportion of time spent in physical activity (stepping time) and standing decreased over one year follow up. The environmental characteristics "interaction" (play and learning educator supervision; peer interaction; staff-child interaction; discipline), B=-1.39; p=0.06, and "programme structure" (schedule; free play; group play activities; provisions for children with disabilities), B=-1.15; p=0.043, were negatively associated with the change in proportion of time spent stepping.

Conclusions: In conclusion, "interaction" and "programme structure" were negatively associated with the change in proportion of time spent in physical activity. These mean that these environmental characteristics may preclude children's physical activity from decreasing over time and may be considered important targets for future interventions in ECEC centres aiming at promoting active lifestyles.
O26, O26.6

Effects of SuperFIT, a comprehensive multi-component intervention program, on preschool teachers’ activity-related practices and child physical activity outcomes.

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Physical activity and sedentary behavior research in preschoolers (Chair: C Byrd-Bredbenner), Club B, June 6, 2019, 12:05 PM - 1:30 PM

Early care and education (SIG)

Objective: SuperFIT is a comprehensive, multi-component intervention program aimed at improving the energy balance-related behaviours of 2-4-year-old children in the preschool and home setting. Among other changes, attention was given to the preschool teachers' physical activity-related practices in order to change the sociocultural environment at the preschool. Physical activity-related practices are furthermore considered as proximal determinants for children's physical activity behaviour. The aim of this study was to evaluate the effects of SuperFIT on physical activity-related practices and child physical activity outcomes.

Methods: A quasi-experimental pilot study was executed to evaluate the process and effects of SuperFIT. Effect measurements were performed at baseline, 12-months and 18-months follow-up. Data on physical activity-related practices was gathered among preschool teachers (intervention group N=32; control group N=17) using the CFAPQ. Child physical activity outcomes (sedentary behaviour, light physical activity and moderate-to-vigorous physical activity) were measured using Actigraph GT3X+ accelerometers. Children wore the accelerometer for eight consecutive days. Children that provided ≥360 minutes of physical activity data on at least one day in all measurements were included in the analyses (intervention group N=76; control group N=69). Linear regression analyses were used to determine intervention effects, adjusted for background characteristics. All analyses were performed with SPSS 24.

Results: At 12-month follow-up, the intervention group showed improvements in activity-related practices, although no statistically significant differences were found. Compared with the control group, only the practice 'reward children for staying calm' had a statistically significant difference (βa=-0.48, p=0.041), which was in the desired direction. Both groups showed an improvement in physical activity outcomes between baseline and 18-months follow-up. However, no significant differences were seen in the physical activity outcomes between the intervention group and the control group at 12-months follow-up or 18-months follow-up.

Conclusions: There are indications that SuperFIT improved teachers' physical activity-related practices. However, there were no statistically significant differences between the intervention and control group in terms of child physical activity. This may be explained by the lack of power due to the limited study sample size.
Are screen time policies in childcare centres associated with less screen time among toddlers and preschoolers?

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Physical activity and sedentary behavior research in preschoolers (Chair: C Byrd-Bredbenner), Club B, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Screen time is detrimentally associated with a number of health indicators in early childhood. The use of screens and screen time policies in childcare centres is largely unknown. The objectives of this study were to: 1) determine the prevalence of screen time among toddlers and preschoolers at childcare, 2) determine the prevalence of centre-level screen time policies, and 3) examine the association between screen time and screen time policies.

Methods: Findings are based on 238 directors of licensed childcare centres with toddler (19-35 months) and/or preschooler (36-60 months) programming from Alberta, Canada. Directors completed a questionnaire based on the GO Nutrition and Physical Activity Self-Assessment for Child Care (GO NAP SACC) Screen Time tool. Screen time in toddlers and preschoolers was reported separately. Directors also reported on whether they had a written screen time policy and any specific components within the policy. Descriptive statistics and logistic regression models were performed.

Results: For toddlers, 77.6%, 19.2%, 3.2% of centres allowed no screen time, 1-29 minutes/week, and =30 minutes/week, respectively. For preschoolers, 53.6%, 33.3%, 13.1% of centres allowed no screen time, 1-29 minutes/week, and =30 minutes/week, respectively. Approximately a third of centres (31.9%) reported no screen time policy, including 22.3% of centres that indicated they have no policy because they have no screen time. In the remaining 68.1% of centres that had a screen time policy, an average of 3.0 (SD=1.5) policy components were reported, with the most common component being appropriate programming (74.7%). Centres with a screen time policy and more policy components were less likely to have no screen time for toddlers (policy: OR= 0.24, 95% C.I: 0.10-0.60; components: OR= 0.71, 95% C.I.: 0.60-0.84) and preschoolers (policy: OR=0.14, 95% C.I: 0.07-0.27; components: OR=0.59, 95% C.I: 0.50-0.70). The following policy components were associated with a lower likelihood of no screen time in toddlers and preschoolers: appropriate programming, supervision, professional development, education for families, and behavioural management (preschool only).

Conclusions: Childcare centres are not screen free zones for all toddlers and preschoolers. Additionally, a centre-level screen time policy, even if it is comprehensive, may encourage screen time in these settings.
Family Level Assessment of Screen use in the Home (FLASH): Development of an automatic, objective assessment of children’s screen use across platforms

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Assessment of physical activity and sedentary behavior (Chair: Teatske Altenburg), Club C, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Measurement of children's time spent on screen media is limiting. Most assessments rely on self-reports. The gold standard is direct or video observations with human coding. Privacy issues and cost make it prohibitive. Advances in image technology, such as automated face detection; accurate facial verification; and imaging and signal processing algorithms offer novel solutions to objectively and automatically measure people's screen use. This reports the initial steps in development of an automatic, privacy-preserving screen use monitoring system: FLASH.

Methods: We are developing two variants: FLASH-TV will be an embedded computing platform connected to a video camera on large screens; FLASH-Mobile will be a background application on mobile devices. FLASH uses machine learning algorithms to process recorded videos based on convolutional neural networks (CNN) to 1) detect all faces, 2) discriminate between the target face and others, and 3) estimate time the child's gaze is on the screen. A preliminary dataset consisting of high-resolution videos was collected from 12 families in an observational research unit. The target child, parent, and sibling spent time watching and not watching a TV screen and a mobile tablet in different positions in various lighting conditions. Seven human coders were compared to the ground truth of video data, defined by consensus of 3 other researchers. The 7 coders reviewed and coded 100 unrelated video frames sampled equally between lighting condition and task, and randomly selected. A CNN-based face detection algorithm was assessed on a subset of 1403 frames from seven families to automatically detect faces in the videos. Accuracy of face detection was defined as true positive rate, nested within family.

Results: Human coders' accuracy to identified gaze was 97.7% (SD 2.6%). The FLASH face detection system achieved a face detection rate of 94.0% (SD 4.2%) on 1403 video frames across 7 families.

Conclusions: Our short-term goal is to optimize FLASH face detection to reduce error under 5%. Next steps will be to develop machine learning based algorithms for target verification and gaze/no-gaze estimation from the extracted face images and integrate them into a system that can process video data in real time.
The evolution of physical activity and sedentary behaviour guidelines in the Early Years

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Assessment of physical activity and sedentary behavior (Chair: Teatske Altenburg), Club C, June 6, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Purpose: Physical activity and sedentary behaviour guidelines for the early years (birth-school entry) play an important role within a larger system of health promotion. They have the potential to guide the public to optimise child development, and to provide measurable thresholds for surveillance on population level. The objective of this work was to review and synthesise how physical activity and sedentary behaviour guidelines for the early years have evolved over time.

Methods: A combined keyword search for 'guideline', 'physical activity', 'pre-schoolers', and 'early years' was conducted in Google Scholar. Guideline documents and associated scientific journal publications were reviewed and assessed for eligibility. Guidelines for children above pre-school age (>6 years) were excluded for this study. Data on recommendations for different types of behaviours, duration, intensity, frequency, and age groups (infants, toddlers, pre-schoolers) were extracted, compared and synthesised.

Findings: Guidelines from six countries were included in this review. In 2018, globally only six countries have physical activity and sedentary behaviour guidelines for pre-schoolers and five countries for toddlers and infants. The first Early Years guideline was published in 2010 by Australia, followed by the UK in 2011. These included consistent recommendations to promote physical activities and reduce sitting time in infants, toddlers, and pre-schoolers. With more research available, recommendations became evidence-based and more specific in terms of intensity and duration in guidelines from 2012 (Canada) and 2016 (Germany). A substantial shift in Early Years physical activity guidelines occurred from 2017, where physical activity and sedentary behaviour were understood to be two parts of an inter-dependent set of 24-hour movement behaviours. Three countries (Canada, Australia, New Zealand) have published 24-hour movement guidelines and another two are under way (South Africa, WHO), while some countries continue to opt for segmented physical activity guidelines (USA, UK).

Conclusions: Research into the importance of physical activity in young children began well after evidence for other population groups emerged, leading to a delayed, yet rapid, evolution of physical activity guidelines in Early Years. Efforts to harmonise Early Year guidelines globally, utilising the 24-hour movement behaviour approach, may be influenced by other factors outweighing scientific arguments.
Trajectories of physical activity and screen time behavior among adolescents in a metropolitan area in Germany

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Assessment of physical activity and sedentary behavior (Chair: Teatske Altenburg), Club C, June 6, 2019, 12:05 PM - 1:30 PM

Purpose
On average, physical activity (PA) declines with increasing age, while sedentary behavior including screen time (ST) increases. There are adolescents, however, whose PA and ST do not follow this pattern. The aim of this study was a) to examine changes in PA and ST from grade 7-9 among adolescents in Berlin, and b) to investigate the relationship of these trajectories with individual factors and school type.

Methods
The present study was a prospective cohort study, conducted within the context of a cluster randomized-controlled trial of high schools and integrated secondary schools. Changes in students PA and ST across three time points from 7th to 9th grade were assessed via self-report questionnaires. Trajectories were defined as "consistently low", "decreasing", "increasing", and "consistently high" for both PA and ST. For PA, "consistently low" and "decreasing" was defined as negative and for ST as positive trajectory, while "increasing" and "consistently high" was defined as positive for PA and as negative for ST. Logistic regression analyses were performed to identify factors (sex, BMI, family affluence, work status of parents, migration background, and school type) independently associated with positive and negative PA and ST trajectories, respectively.

Results
In total, 1510 students were included (girls:50.9%, age, mean±smn;SD:12.5±smn;0.7 years). Compared to grade 7, 44% of grade 9 students reduced their PA by at least 30 minutes and 49.8% increased their ST by at least 3 hours per week. The negative PA trajectories included 43.5% and 67.3% of boys and girls, respectively. The negative ST trajectories included 87.6% and 71.7% of the boys and girls, respectively. Multivariable analysis confirmed that being a boy was significantly associated with a positive PA trajectory, while being a girl, high school student and student with high socioeconomic status was significantly associated with the positive ST trajectory.

Conclusions
Over a two-year period from grade 7 to grade 9, PA decreased and ST increased in almost half of the adolescents. Associated factors for a positive development of PA were only male sex, while a positive development in ST behavior was predicted by female sex, attending a high school and a higher socioeconomic status.
O27, O27.4
Explaining discrepancy between International Physical Activity Questionnaire and accelerometry in a sample with schizophrenia

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Assessment of physical activity and sedentary behavior (Chair: Teatske Altenburg), Club C, June 6, 2019, 12:05 PM - 1:30 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective:
The IPAQ frequently demonstrates limited agreement with objective accelerometry; thus the objective was to 1) identify demographic correlates of discrepancy between the IPAQ and objective accelerometry in a sample with schizophrenia and 2) identify potential correction factors that can be applied to IPAQ data.

Method
An existing sample of 113 individuals with schizophrenia with accelerometry and IPAQ data covering the same period was analyzed. Available demographic correlates such as age, gender, body mass, and symptom severity were correlated with the discrepancy between the IPAQ and accelerometry to identify possible explanations for error. A hierarchical regression approach was used to maximize the explained variance between IPAQ and accelerometry based on correlational data. Correction factors based on the regression models were applied to the available IPAQ data.

Results
The IPAQ alone explains 8% of the variance in accelerometry derived moderate-to-vigorous physical activity (MVPA) (F(1,95 = 7.73, p=0.007). The best model for MVPA included antipsychotic dose and central obesity status and explained 31% of the variance (F(3,85)=12.5, p<0.001). Similarly, the IPAQ sitting item explained 8% of the variance in accelerometer measured sedentary behaviour (F(1,73) = 6.48, p=0.013). The best model for sedentary behaviour included measures of symptoms: resistance and apathy (R2 =0.20, F(3,72)=12.5, p<0.001). For MVPA, applying the resultant IPAQ only correction reduces the 95% limits of agreement range between measures by 22%, while adding correction factors for central obesity status and antipsychotic dose reduces the range by 34%. For sedentary behaviour the IPAQ only correction reduces the range by 46%, while adding both symptom measures reduces the range by 49.8%.

Discussion
As the IPAQ has previously shown limited agreement with an objective measure of activity its utility as a measurement tool may be limited. Understanding possible sources of discrepancy may help create better tools. Through this study researchers should consider whether antipsychotic dose, central obesity, and certain symptoms of schizophrenia may be influencing self-reported MVPA and sedentary behavior. When objective measures are not feasible, applying a correction factor to IPAQ data improve the validity of inferences.
O27, O27.5

Specific physical activities, sedentary behaviours and sleep as long-term predictors of objectively measured physical activity in 91,653 adults: A prospective cohort study.

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Assessment of physical activity and sedentary behavior (Chair: Teatske Altenburg), Club C, June 6, 2019, 12:05 PM - 1:30 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: The evidence for the prospective relationships between specific physical activities (PA), sedentary behaviours (SB) and sleep on subsequent total PA levels is scarce. The purpose of this study was to examine prospective associations between self-reported PA, SB and sleep, and changes in these with subsequent objectively measured PA.

Methods: A sub-sample of 91,653 UK Biobank participants reported moderate-to-vigorous PA (MVPA), lifestyle activities, TV viewing, computer use and sleep through screen-based questionnaires at baseline (2006-2010), and provided valid accelerometry data (dominant wrist-worn for 7 days between 2013 and 2015). A further sub-sample of 7,709 participants repeated the screen-based questionnaires between 2012 and 2013.

Results: In both women (n=51,548) and men (n=40,105), positive associations were observed between all self-reported measures of PA at baseline (MVPA, lifestyle/job-related activities, active transporting modes) and objectively measured PA levels at follow-up (median 5.7 years); an exception was 'walking/standing at work' in women. Sedentary time at work, TV viewing and computer use were inversely associated with PA at follow-up. Sleeping either more or less than 7 hours/day at baseline was associated with lower PA at follow-up (except for £6 hours/day in men). In the repeat self-report sub-sample (median 4.3 years), relatively higher physical activity at follow-up was observed in those who maintained or achieved favourable levels of MVPA, walking for pleasure, strenuous sports, other exercises, heavy DIY (in women), heavy physical work, and walking/standing at work (in women), sedentary time at work, getting about methods, commuting methods (in women), TV viewing, computer use or sleep.

Conclusions: Initial levels of PA, SB and sleep, and changes in these variables were generally associated with subsequent objectively measured PA in the expected directions, suggesting these specific behaviours all contribute to total volume of physical activity over time and could thus be targets for intervention.
Is a causal association between TV viewing and heart disease plausible? An observational study using negative control outcomes

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Assessment of physical activity and sedentary behavior (Chair: Teatske Altenburg), Club C, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Numerous studies suggest television viewing (a marker of sedentary behaviour) is associated with increased risk of heart disease although the causal plausibility remains unclear. Negative control comparisons are increasingly recognised as a means of strengthening causal inference in observational study settings. A negative control reproduces a condition that cannot involve the hypothesized causal mechanism but does involve the same sources of confounding that may bias the relevant association. The aim was to employ a negative control outcome to explore if the association between TV viewing and heart disease mortality is explained by confounding.

Methods: The sample was drawn from UK Biobank and comprised 479,658 participants (aged 56.5 ± 8.0 yrs; 45.7% male) followed up over a mean 10.4 years. TV viewing was measured from self-report. Accidental death was employed as the negative control outcome.

Results: There were 1,437 ischemic heart disease (IHD) deaths, and 214 accidental deaths. TV viewing was related to the following confounding variables: age, smoking, alcohol, diet, obesity, physical inactivity, cardiovascular disease and education. There was similarity between the confounding structures of IHD and accidental death (both outcome related to age, male sex, smoking, education and prevalent cardiovascular disease), suggesting that our choice of negative control outcome was appropriate. TV viewing (per hr/d) was associated with IHD (Hazard Ratio = 1.30, 95% CI, 1.27, 1.33) and accidental death (1.15; 1.07, 1.24) in unadjusted models. Associations were attenuated for both outcomes and were considerably converged after adjustment for confounders; IHD (1.09; 1.06, 1.12) and accidental death (1.06; 0.98, 1.15). Similar results were obtained after removal of deaths occurring in the first 2 years of follow up.

Conclusions: The pattern of results for TV with an implausible outcome mirrored that of IHD, suggesting that observed associations between TV and heart disease are likely to be largely driven by confounding. Negative control studies have potential to improve causal inference within the sedentary behaviour field.
O27, O27.7

Needs assessment to explore requirements for a tool to enforce exercise as medicine in hospital care


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Assessment of physical activity and sedentary behavior (Chair: Teatske Altenburg), Club C, June 6, 2019, 12:05 PM - 1:30 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: The prescription of exercise as a form of treatment in clinical care has been advocated worldwide through the 'exercise is medicine' (E=M) paradigm. However, E=M currently has no position in general routine hospital care. To enforce E=M in hospital care, clinicians should be provided with a tool which provides an objective and systematic screening of eligible patients for referral to active lifestyle interventions and an individually tailored E=M advice. This study aims to explore requirements for an E=M tool among hospital clinicians.

Methods: Functional and technical requirements of an E=M tool were explored with a newly developed survey and face-to-face interviews among 22 hospital clinicians (medical specialists, residents, physician assistants, nursing practitioners, lifestyle coaches and hospital managers) in seven clinical departments in two Dutch academic hospitals.

Results: Outcomes gave detailed insight in the requirements for an E=M tool in hospital care, where upon an E=M tool can be developed. Results indicated that the tool should be a digital instrument for hospital clinicians that is linked to hospitals' electronic medical patient records. Its function should be to recruit eligible adult patients for referral to active lifestyle interventions. Patient characteristics, such as: age, gender, diagnose, co-morbidity, current exercise behavior, motivation to change exercise behavior and health related quality of life should be the input to indicate the urgency to be more physically active and the need to be coached in changing lifestyle. The tool should generate a 'customized' exercise advice for patients. A calculation model should predict, on the basis of local big data, how urgent it is to increase the level of exercise for health within each patient and how individual patients will benefit from more exercise. The tool should also generate referral options for clinicians.

Conclusions: This study presents requirements on a tool to support mutual decision making in referral to active lifestyle interventions and to individually advice patients in physical activity and exercise. An extensive continuation of research on the implementation of E=M, supports the mutual decision making process of lifestyle referral by clinicians and provides insights about implementing physically active lifestyle prescription in medical care.
The Supporting MuMS study: A pilot randomised controlled trial of an SMS-delivered intervention for weight loss and maintenance of weight loss in the postpartum period

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Trials and programs in behavior change, Chair: Inês Santos and Steph Chappel), Club D, June 6, 2019, 12:05 PM - 1:30 PM

**Motivation and behavior change (SIG)**

Purpose: Pregnancy and postpartum are risky periods for the development of obesity. Postpartum behaviour change is challenging due to the demands of parenthood. Mobile technologies could offer a low intensity, flexible and individualised approach to behaviour change during this time, for women across the socioeconomic spectrum. This study examined the feasibility of a 12 month, theory-based, tailored, SMS-delivered intervention supporting weight loss and maintenance of weight loss in women with overweight and obesity in the postpartum period versus an active control delivering child development messages. An active control was used to help avoid dissatisfaction with randomisation and encourage retention.

**Methods:** Two-arm pilot RCT which recruited UK women, within two years of giving birth, with a BMI =25 kg/m2, through community groups. The intervention was delivered by automated text messages. Study endpoints, including weight measured using calibrated scales, were assessed at 0, 3, 6, 9 and 12 months at home visits. Women received a voucher at each time point for completion of the study outcomes. Formal hypothesis testing was not conducted as this is a pilot trial, mean change in weight and 95% confidence intervals were calculated from ANCOVA.

**Results:** Across a five month recruitment period, the target sample size (n=100) was achieved; 46% were overweight (BMI 25.0-29.9 kg/m2), 54% obese (BMI =30 kg/m2), 99% white ethnicity and 28% household income <£29,999. Retention was 85.7% for the intervention group and 90.7% for the control group, with 15 women excluded due to pregnancy occurring during the intervention period. Between baseline and 12 months the intervention group lost on average 1.75kg whereas the control group gained 0.19kg, corresponding to a mean difference at 12 months, adjusting for baseline, of -1.67kg (95% CI -4.88 -1.55). The proportion of women gaining =5kg of weight between 0 and 12 months was 8.3% in the intervention group and 20.5% in the control group.

**Conclusions:** High study retention and some evidence of positive effects of the intervention on weight loss and prevention of weight gain during the postpartum period support the decision to proceed to testing this intervention in a full trial with adaptation for different cultural groups.
Competency-Based Approaches to Community Health (COACH): A randomized trial for childhood obesity among underserved Latino children.

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Trials and programs in behavior change, Chair: Inês Santos and Steph Chappel, Club D, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Health behavior change interventions that target childhood obesity in minority populations have led to inconsistent and short-lived results. The purpose of this study was to test a novel intervention that was personalized and family-based in a Latino population to address the persistent health disparity in childhood obesity.

Methods: COACH was a parallel-group, randomized controlled trial. Latino parent-child pairs were recruited from community settings in Nashville, TN. Child eligibility criteria included age 3-5 years and BMI ≥50th percentile. The intervention provided 15 weekly, 90-minute sessions followed by 3 months of twice-monthly health coaching calls. The control group received a twice-monthly school readiness curriculum for 3 months. Sessions were conducted by a health coach in local community centers, with groups of 8-11 parent-child pairs. The primary outcome was child BMI trajectory across 12 months, measured at 4 times by trained and blinded research assistants using research-grade scales and stadiometers. The intervention's effect was assessed using a linear mixed-effects growth model, adjusting for child gender, baseline child and parent age, and baseline parent BMI and education. The intervention was based in self-determination theory and supported parent-child agency, defined as engaging in healthy behaviors by identifying and pursuing means to overcome social and structural barriers. This unique personalized intervention built agency through 1) guided assessment of competency in seven health behaviors, 2) individualized learning plans, and 3) participant choice about health goals. Sessions focused on diet, physical activity, sleep, engaged parenting, and media use.

Results: Of 305 parent-child pairs assessed for eligibility, 117 were randomized (59 intervention, 58 control). Child BMI was available for 91% at 1-year follow-up (no differential attrition). Mean baseline child age was 4.2 (SD 0.8) years, and 54% of children were female. Mean baseline child BMI was 18.1 (SD 2.6) kg/m2. After adjusting for covariates, the intervention's effect on linear child BMI growth rate was -0.41 kg/m2 per year (95% CI -0.82, 0.01; p=0.05).

Conclusions: Over 1-year follow-up, the intervention caused slower linear BMI growth for underserved Latino preschoolers. A personalized approach to overcoming barriers in the environment may be an important component to improve effectiveness of behavioral interventions.
Effectiveness of a classroom-based physical activity intervention on activity and cognitive outcomes in children

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Trials and programs in behavior change, Chair: Inês Santos and Steph Chappel), Club D, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Although classroom time represents one of the most uninterrupted sedentary periods in a child's day, no evidence of effective classroom-based physical activity is available from low-to-middle income countries. This trial aimed to analyze the impact of a physical activity intervention in the classroom setting on activity outcomes and cognitive function in Brazilian children. Methods: This was a cluster controlled trial conducted with four classes of second grade from a large school in Aracaju, Sergipe, Brazil. Two classes were assigned to receive the intervention (IG: n = 32 [19 boys]; 7.7 ±smn; 0.5 years) and the other two classes composed the comparison group (CG: n = 26 [12 boys]; 8.0 ±smn; 0.7 years). The intervention was conducted for 12 weeks, in which a set of activities was provided to the teacher with the aim of involving physical activity in the learning process. The set of learning activities was created by a group of professionals specialized in pedagogy and adjusted to the age and grade of the children. Assessments were carried out before and after the intervention period. Activity outcomes were objectively assessed using an activPAL inclinometer (sitting time) and GT3X accelerometer (physical activity intensities by Evenson cut-points). Children wore the devices during school time (between 7am and 11am) for 4 days. Cognitive function was assessed using three computerized tests for reaction time/inhibition (go/no-go), visual discrimination (visual search), and spatial reasoning (mental rotation). Generalized estimating equation models were used for comparisons within and between groups. Results: Adjusting by time of use, stationary behavior was reduced in the intervention group compared to the comparison group (IG: -9.6 min/4h; CG: + 4.8 min/4h; p = 0.001). No group vs time interactions were observed for sitting time (p = 0.774), light physical activity (p = 0.551), or moderate to vigorous physical activity (p = 0.798). The intervention group improved reaction time in time/inhibition (IG: -136.5 ms; CG: +23.1ms; p = 0.009) and spatial reasoning (IG: - 633.5 ms; CG: - 13.1 ms; p = 0.047) tasks, when compared with the comparison group. Conclusions: A classroom-based physical activity intervention reduces stationary behaviors and improves cognitive functions in children.
Barrier-belief lifestyle counseling in primary care: a randomized controlled trial of efficacy

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Objective: Intervening on barrier beliefs (BBs) may inhibit the role of barriers as mediating factors in lifestyle behavior. The aim of this study was to analyze the effects of a barrier-belief counseling intervention (BBCI) on physical activity (PA), healthy food intake, body composition, quality of life (QOL), expressing BBs, and the impact of a change in BBs on PA and QOL.

Methods: A multicenter RCT was conducted in thirteen general practitioner practices within primary care patients (aged 18-70), self-determined as 'inactive' and willing to sign up for a PA intervention. The individual 6-month BBCI (n=123) included four BB behavior change strategies, aimed at coping with inhibiting BBs. The 6-month 'standard lifestyle intervention' (SLI) (n=122), based on the Trans Theoretical Model, included motivational and goal setting strategies, using PA-standards to accomplish PA-goals. A non-treated hanging control group (n=36) received no intervention. Changes in PA (accelerometer and SQUASH questionnaire), fruit and vegetable intake (self-report), body composition (BMI, body fat, waist), QOL (EORTC QLQ-C30, LASA, Cantril's Ladder), BBs (62-item BB survey) were measured at baseline with follow-ups at 6, 12 and 18 months. Intervention effects were analyzed using multiple regression analyses. The impact of changes in BBs on changes in PA and QOL were assessed with multilevel analyses.

Results: The BBCI was more effective on PA and QOL compared with the SLI (p<.01): in the short term all PA outcomes improved (p<.05), in the long term moderate-to-vigorous PA outcomes improved (p<.05), all with small effect sizes. In the short and long term QOL outcomes improved (p<.05), all with moderate effect sizes. Additionally, the BBCI significantly improved body composition outcomes in the short and the long term with small effect sizes. No differences between interventions were found on healthy food intake. None of the outcomes in the control group changed over time. Finally, the BBCI was more effective than the SLI in decreasing BBs, as mediating factors in PA and QOL (p<.01).

Conclusions: BBCI in primary care improves PA and QOL compared with SLI and decreases BBs to PA, and a change in BBs supports PA and QOL in the longer term.
Blood sugar regulation for cardiovascular health promotion and disease prevention: A state of the art review.


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Trials and programs in behavior change, Chair: Inês Santos and Steph Chappel), Club D, June 6, 2019, 12:05 PM - 1:30 PM

Objective: This study aimed to analyze the most up-to-date evidence regarding a) whether and how blood sugar regulation influences cardiovascular health and b) what interventions are effective for managing elevated blood sugar.

Methods: To inform our "umbrella review", we conducted three separate, systematic literature searches of published systematic reviews. We summarised evidence published between January 1, 2016, and December 31, 2017 (as well as pre-existing guidance) on a) pathophysiological mechanisms linking cardiovascular disease to blood sugar (including evidence from pharmacological interventions) b) intervention components associated with effectiveness for reducing blood sugar and c) community/population level and care-pathway interventions for reducing blood sugar. Studies were quality-assessed using the Overview Quality Assessment Questionnaire and only high quality reviews were included. Evidence was extracted using a pre-defined template and narratively synthesized by intervention type and outcomes.

Results: The searches identified 2,343 papers and 44 studies were included. The included systematic reviews were of good to very good quality (median OQAQ score = 17). The identified evidence suggested that regulation of blood glucose is a key mediator in the development of cardiovascular disease. We identified 95 analyses relating intervention components to effectiveness and 19 effectiveness analyses. Our findings reinforce existing guidance on diabetes prevention through changes in diet and physical activity and generated new evidence based recommendations. Interventions including theory, direct meal-provision, including a dietitian and the use of digital platforms (especially 'blended care' interventions) as an optional or additional delivery mode were associated with increased effectiveness. There is also a need for high quality delivery of complex behavioural interventions. Community/population based interventions were more effective when they involved multidisciplinary teams and some workplace based interventions were effective. However, more evidence is needed on community/population based and care pathway interventions for reducing blood glucose.

Conclusions: Cardiovascular disease prevention services should consider blood glucose regulation as a key intervention target. Recommendations for effective intervention and service development/training described here should be adopted into evidence-based practice guidelines for the prevention of cardiovascular disease. Multidisciplinary teams should deliver interventions in community-based settings. It may be possible to integrate cardiovascular and diabetes prevention services.
What strategies do desk-based workers choose to ‘stand up, sit less, and move more’, and how well do they work?

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Trials and programs in behavior change, (Chair: Inês Santos and Steph Chappel), Club D, June 6, 2019, 12:05 PM - 1:30 PM

**Motivation and behavior change (SIG)**

Objective: Intervention trials aim to reduce sitting in the workplace, an emerging occupational health risk, however, few have specifically reported how workers achieve this. This study reports, in detail, on the strategies workers used in a successful workplace-delivered intervention, and is one of the first to examine how these relate to behaviour change.

Methods: Stand Up Victoria was a cluster-randomised controlled trial that used organisational, environmental (e.g., sit-stand workstations), and individual-level behaviour change strategies to reduce sitting time in desk-based workers (control n=95; intervention n=134). Baseline to three-month changes in how often (1[never], 5[very often]) participants used the 19 pre-defined strategies to 'Stand Up', 'Sit Less', and 'Move More' (SUSLMM) were examined. Additionally, intervention participants nominated strategies (with health coach guidance) to SUSLMM. These were described and tested in relation to three-month workplace activity changes (activPAL3-assessed prolonged sitting (=30 minutes continuous), total sitting and purposeful walking). Regression analyses considered the number of strategies and decision-tree analyses evaluated strategy type.

Results: Use of pre-identified strategies increased substantially relative to controls. Intervention participants nominated 82 strategies to SUSLMM. Of the 13 types of strategies, the most commonly-nominated were phone-based strategies to 'Stand Up' (55.9%), regular interruptions to 'Sit Less' (28.7%), and capitalising on the work environment to 'Move More' (67.9%). The number of nominated strategies was significantly associated only with prolonged sitting time, with a 27.6 min/8-h workday reduction per additional strategy (95% CI: -53.1, -2.1, p=0.034). Decision trees, which explained limited variation in outcomes (0-13%), retained four strategy types predicting total sitting ('Sit Less'), three predicting purposeful walking ('Move More'), and none predicting prolonged sitting ('Stand Up'). The uppermost nodes were nominating high workstation use ('Sit Less') and task-based moving strategies ('Move More').

Conclusions: The intervention improved usage of the pre-defined strategies. Intervention participants devised a wide variety of strategies, some of which were captured by the pre-defined list. Both strategy quantity and type appeared relevant to behavioural improvement. This study highlights options that may prove feasible and effective in other desk-based workplace environments. However, the high variability suggests that successful strategies should likely be individualised, pragmatic, and context-specific.
Promoting weight loss among overweight and obese men in the context of professional Australian Football League settings: Findings from the Aussie-FIT pilot trial

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Trials and programs in behavior change, Chair: Inês Santos and Steph Chappel, Club D, June 6, 2019, 12:05 PM - 1:30 PM

Motivation and behavior change (SIG)

Objective: Dominant cultural constructions of masculinity create barriers to men's engagement in weight loss programs; systematic reviews show that men are severely underrepresented in weight loss trials. The success of the UK's Football Fans in Training (FFIT) programme showed that professional sport settings can act as a powerful 'hook' to engage men in health behaviour changes. Building on FFIT and adding several innovations (e.g., use of social media, emphasis on habit development and self-determined motivation), we tested the effects of the 12-week Aussie Fans in Training (Aussie-FIT) program on men's body weight, PA, and indices of health and well-being. The programme was delivered in two professional Australian Football League clubs.

Methods: Randomised control trial with waitlist comparison arm, with 130 overweight/obese men (Agemean=45.78[+8.01]; weightmean=111.42kg[+18.23kg]; BMImean=34.48[+SD:4.87]), randomised to the intervention or wait-list control group. Participants attended 90-minute Aussie-FIT group sessions once per week for 12 weeks. Each session included an educational and physical activity component. The intervention was delivered by coaches trained in programme content and delivery, motivation strategies, and behaviour change techniques. At baseline, men attended assessment sessions where objective measures (by blinded assessors) were taken for body weight (primary outcome), physical activity, waist circumference, and blood pressure. Men also completed questionnaires on motivation and psychological well-being variables. Follow-up assessments were scheduled for three and six months. Changes within and between groups, adjusting for clustering, will be assessed using mixed linear modelling (MLM).

Results: Preliminary findings show that the mean difference in weight loss between groups at 3 months was 3.35kg (95% CI:2.47-5.26) in favour of the intervention group (p<0.0001). Data collection for body weight at the 6 month follow-up will be completed by end of December 2018 and MLM findings will be presented at the conference.

Conclusions: Preliminary findings suggest the Aussie-FIT programme to be effective in terms of weight loss, highlighting its potential in addressing obesity in Australian men. The programme is unique in that it delivers gender-customised PA and nutrition advice by supporting self-determined motivation among the participants. Aussie-FIT has the potential to be tailored for different sport settings and segments of the population (e.g., indigenous Australians).
Using combined accelerometer and Global Positioning Systems data to validate a neighbourhood-adapted version of the International Physical Activity Questionnaire (IPAQ)

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Objective: The objective of this study was to adapt an existing validated, and widely used self-report physical activity questionnaire (the International Physical Activity Questionnaire; IPAQ) to measure self-reported neighbourhood-based physical activity (i.e., the Neighbourhood-IPAQ; N-IPAQ), and to evaluate the concurrent validity of these modifications.

Methods: A convenience sample of 75 adults from four Calgary neighbourhoods (Canada), wore an accelerometer (Actigraph®: wGT3X-BT) and GPS (Qstarz: BT-Q1000XT®) monitor for seven-consecutive days. Following the monitoring period, participants self-reported their physical activity from the last seven-days using the N-IPAQ. Bland and Altman plots and Spearman correlations estimated the concurrent validity between N-IPAQ captured neighbourhood physical activity and accelerometer/GPS captured physical activity (estimated for an administrative boundary, 400m and 800m radial buffers, and no neighbourhood definition).

Results: The mean (95% Confidence Interval (CI)) difference between the N-IPAQ and accelerometer/GPS estimated total daily minutes of physical activity was 1.9min (-26.2 to 29.9) for the 400m buffer, 10.6min (-16.0 to 37.1) for the 800m buffer, 14.7min (-11.5 to 41.0) for the administrative boundary buffers, and -81.0min (-109.5 to -52.6) for no neighbourhood definition. Spearman correlations ranged from -.10 for the N-IPAQ and no neighbourhood definition accelerometer-captured moderate-intensity physical activity (excluding walking) to .43 (95%CI: .20 to .62) for the N-IPAQ and administrative boundary accelerometer-captured vigorous-intensity physical activity.

Conclusions: The N-IPAQ can provide valid estimates of neighbourhood-based physical activity, but these estimates are sensitive to the operational definition of neighbourhood. Our findings suggest that the N-IPAQ may better capture physical activity undertaken within 400m of home. The N-IPAQ can be used to investigate neighbourhood correlates of physical activity among adults.
Is older adults’ physical activity during transport compensated during other activities? Comparing 4 study cohorts using GPS and accelerometer data

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Analytic approaches to physical activity assessment (Chair: Scott Duncan), Club E, June 6, 2019, 12:05 PM - 1:30 PM

Purpose: Promoting active transport offers the potential to increase population physical activity levels. Compensation theories state that above-average physical activity in one activity is compensated in later activities; a mechanism that results in stable levels of total physical activity. Little is known about possible compensation of transport physical activity among older adults.

Methods: GPS and accelerometer data (hip-worn) from four study cohorts with older adults (65+ years old) living in three countries (Canada, Luxembourg and France) was pooled for this study. 636 participants provided valid data, with a median of six valid days (10+ hours of wear time) per participant. Physical activity was measured as total volume of physical activity (counts per day) for trips and non-trip activities. Transportation episodes were extracted from GPS data using a kernel-based algorithm. Robust linear regressions on person-centered data were used to test within-person associations between transport and total physical activity.

Results: Participants had a median age of 76 years and 49% were women. The median total volume of physical activity during valid days was 401,779 counts per day; corresponding to 65 minutes of older adults' moderate-to-vigorous physical activity. From the total volume of physical activity, 18% was related to transport. A positive association was found between physical activity during a trip and the physical activity during the next hour, among those with lower levels of regular physical activity. Negative associations - indicating partial compensation - were found between transport physical activity during a day, and both total physical activity during the next day and non-transport physical activity during the same day. No differences were found between the four study cohorts.

Conclusions: This study is the first to investigate the compensation/generalization hypotheses, using objective physical activity data for a large study population of older adults. Transport physical activity is compensated partially by older adults during non-transport physical activity. Given the presence of compensation, we strongly recommend evaluations of transport interventions to measure and analyze both non-transport and transport physical activity.
Evaluation of free-living and laboratory-based machine learning algorithms to predict physical activity intensity in preschool-aged children under free-living conditions

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Analytic approaches to physical activity assessment (Chair: Scott Duncan), Club E, June 6, 2019, 12:05 PM - 1:30 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Machine learning (ML) methods have emerged as a potentially more accurate alternative to cut-point based approaches to classify activity intensity for both hip and wrist accelerometer data. However, the performance of models trained on laboratory-based data is attenuated when deployed in free-living scenarios. No studies have compared the performance of ML models trained on free-living and laboratory-based activity trials in preschool-aged children.

PURPOSE: To compare the performance of Random Forrest (RF) classifiers for hip and wrist accelerometer data trained on free-living (FL) and laboratory (Lab) data in an independent sample of preschool children completing a free-living active play session. The performance of each classifier relative to conventional cut-point (CP) approaches (hip: Pate; wrist: Johansson) was also examined.

METHODS: Sixteen children were video recorded using a GoPro during a 30-minute unstructured active play session in a park while wearing an ActiGraph GT3X+ accelerometer on their right hip and non-dominant wrist. Direct observation was used to continuously code ground truth activity intensity using the Noldus Observer XT. Performance was assessed using overall accuracy and confusion matrices were generated to summarize classification accuracy of sedentary, light, and moderate-vigorous physical activity.

RESULTS: The overall accuracy for the hip RFFL, RFlab, and Pate cut-points was 83.2% (95%CI: 80.1-85.3%), 76.3% (95%CI: 73.3-78.8%), and 52.4% (95%CI: 49.5-55.3%), respectively. Overall accuracy for the wrist RFFL, RFlab, and Johansson cut-points was 80.1% (95%CI: 77.8-82.4%), 68.7% (95%CI: 66.0-71.3%), and 59.8% (95%CI: 58.2-61.5%), respectively. For both the hip and wrist placements, the FL and Lab models outperformed the cut-points for sedentary activity (FL: 79.7-83.2%, Lab: 73.7-82.3%, cut-point: 48-64%). and light physical activity (FL: 84.5-86.0%, Lab: 62.7-79.6%, CP: 49-59%). Classification accuracy for moderate-vigorous physical activity was comparable for the free-living, laboratory, and cut-point approaches (FL: 56.7-68.1%, Lab: 63.1-75.6%, CP: 51-74%).

CONCLUSIONS: When tested in new data under free living conditions, ML models trained on free living data outperformed models trained on simulated or laboratory-based data. Whether trained on free living or lab-based data, ML models, were more accurate than cut-point methods. Future studies should evaluate the performance of ML models trained on free-living data using data from more extended periods of observation.
Simulated Social Network Interventions to Promote Physical Activity: Who Should Be the Influence Agents?

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Analytic approaches to physical activity assessment (Chair: Scott Duncan), Club E, June 6, 2019, 12:05 PM - 1:30 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Background: Social network interventions targeted at adolescents can have a substantial effect on their physical activity. However, designing successful social network interventions is a considerable research challenge. For example, it is unclear which criteria should be used to select influence agents that serve as promoters of the health behaviour. Investigating this through field experiments is an infeasible process. Fortunately, advancements in computer science enable us to simulate these complex processes.

Objective: In this study, we investigate which criteria for selecting influence agents can be expected to produce the most successful social network interventions. The aim is to use a computational model to simulate different selection criteria for social network interventions and to observe the intervention's effect on the physical activity of primary and secondary school children.

Methods: Based on the observed data of 460 participants collected in 26 school classes, we simulated multiple social network interventions ranging in selection criteria for the influence agents (i.e. in-degree, betweenness and closeness centrality and random influence agents) and a control condition (i.e. no intervention condition). Subsequently, we investigated whether the detected variation of an intervention's success within school classes could be explained by structural characteristics of the social networks (i.e. network density and network centralization).

Results: The one-year simulations showed that the social network interventions were more effective compared to the control condition, $\beta_a = .30, t(100) = 3.23, P = .001$. In addition, the social network interventions that used a measure of centrality to select influence agents outperformed the random influence agent intervention, $\beta_a = .46, t(100) = 3.86, P < .001$. Also, the closeness centrality condition outperformed the betweenness centrality condition, $\beta_a = .59, t(100) = 2.02, P = .046$. The anticipated interaction effects of the network characteristics were not observed.

Conclusions: Social network interventions can be considered as a viable and promising intervention method to promote physical activity. We demonstrated the usefulness of applying social network analysis and agent-based modelling as part of the social network interventions’ design process. We emphasize the importance of selecting the most successful influence agents and the role of network characteristics in social network interventions.
Can 24-hour heart rate be an underlying mechanism of the occupational and leisure time physical activity paradox?

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Introduction
Leisure time physical activity (LTPA) is associated with higher physical fitness and a decreased risk of cardiovascular diseases, while occupational physical activity (OPA) increases the risk of cardiovascular diseases. The differential health effects of OPA and LTPA, i.e. the health paradox, might be explained by dissimilar effects on the autonomic nervous system, such as prolonged and elevated heart rate (HR) during long bouts of OPA. This study aims to investigate one of the potential underlying mechanisms of the OPA-LTPA health paradox, i.e. mean 24-hour HR, based on objective measurements.

Methods
A total of 342 workers participated in the Flemish Employees' Physical Activity (FEPA) study across seven companies in the service and production sector in Belgium. The group comprised 152 men and 190 women, aged 20 to 65 years. OPA and LTPA were assessed by using two Axivity AX3 accelerometers on the thigh and upper back. Ambulatory 24-hour registrations of HR were obtained by using the Faros eMotion 90° monitor. Both devices were worn during 2 to 4 consecutive work days. Physical fitness level was measured by the Harvard Step Test. Multiple regression analyses were used with OPA and LTPA as predictors and mean 24-hour HR and physical fitness score as outcome variables, adjusting for possible confounding variables.

Results
After adjustment for sex, age and educational level, OPA was significantly associated with higher mean 24-hour HR levels (p<0.05). No association was found between LTPA and 24-hour HR. OPA and LTPA were positively correlated (r=0.132; p<0.05). Furthermore, the results showed that OPA was associated with a lower physical fitness level (p<0.01), whereas LTPA was associated with a higher level of physical fitness (p<0.01).

Conclusion
The findings of this study, based on technical measurements, contribute to the understanding of 24-hour HR as a potential underlying mechanism of the health paradox. Additionally, the study showed that OPA and LTPA were associated with the level of physical fitness, which is an indication of the contrasting effects of OPA and LTPA on physical fitness. Further research on the relation between LTPA, OPA, and cardiovascular disease is recommended.
With great (statistical) power comes great responsibility: Impact of follow-up time and analytical approaches to account for reverse causality on the association between physical activity and health outcomes in UK Biobank

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Purpose: Very large cohort studies such as the Million Women Study and the UK and China Kadoorie Biobanks can undertake prospective analyses of health outcomes after short (<4 years) follow-up periods as the number of events is rarely a limiting factor. However, these studies are potentially at risk of reverse causality bias. We investigated differences in the associations between self-reported physical activity and all-cause mortality and incident CVD, using different follow-up time cut-offs and methods to account for reverse causality bias.

Methods: Data were from n=452,933 UK Biobank participants, aged 38-73. Daily minutes (+1 minute) of self-reported physical activity were log-transformed and standardised. Median available follow-up time was 7 years for all-cause mortality and 6.1 years for incident CVD. We additionally analysed associations at 1-, 2-, and 4-year cut-offs after baseline. We fit up to four models: (1) adjusting for prevalent CVD and cancer, (2) excluding prevalent disease, (3) and (4) Model 2 excluding incident cases in the first 12 and 24 months. All analyses were adjusted for demographic and lifestyle factors.

Results: The strength of the hazard ratios decreased as follow-up time cut-off increased. The hazard ratio for all-cause mortality Model 1 was 0.73(0.69-0.78) at 1-year, 0.79(0.76-0.82) at 2-years, 0.84(0.82-0.86) at 4-years and 0.86(0.84-0.87) at 7-years post-baseline. The respective hazard ratios for incident CVD at 1-year and 6.1-years were 0.86(0.84-0.88) and 0.91(0.90-0.92). These were 51% and 36% attenuations in strength between the shortest and longest follow-ups on the log-scale. The associations were weaker with increasing control for reverse causality. For all-cause mortality, the hazard ratio was 0.86(0.84-0.87) for Model 1 and 0.88(0.86-0.90) for Model 4. For incident CVD, the 6.1-year hazard ratios for Models 1 to 4 were 0.91(0.90-0.92), 0.92(0.90-0.93), 0.93(0.91-0.94) and 0.94(0.92-0.95). These were 13% and 31% attenuations between Models 1 and 4 on the log-scale.

Conclusions: Longer follow-up times and increased control for reverse causality showed weaker associations between self-reported physical activity and all-cause mortality and incident CVD. There are implications for the decision about when to analyse a cohort study with ongoing data collection, the interpretation of study results, and their contribution to meta-analyses.
Objective: Exercise during pregnancy has shown to reduce prenatal depression, however previous literature has included women both not at risk and at risk for depression in the same group and the potential treatment effects for only those at risk have not been explored. Furthermore, no study has examined this issue using both aggregate mean statistical significant change and individual reliable and clinical significant change criteria. Hence, we wanted to determine if prenatal exercise can have both a statistically and clinically significant impact on the treatment of depression among women who enter pregnancy at risk for prenatal depression.

Methods: This is a secondary analysis of two randomized controlled trials that followed the same exercise protocol. Pregnant women were allocated to an exercise group (EG) or standard care control group (CG). The EG participated in moderate intensity group fitness classes three times per week. At baseline (9-12 gestational weeks) and at the end of the intervention (36-38 gestational weeks), both groups completed the Centre for Epidemiological Depression (CES-D) scale. Women with a baseline score =16 (at risk for depression) were included. A clinically reliable change index was calculated at 7 points using the formula provided by Jacobson and Truax, 1991.

Results: Thirty-six women in the EG and 25 women in the CG scored =16 on the CES-D at baseline. Post-intervention, the EG had a statistically significant lower mean CES-D score (Baseline: 23.2 ±smn; 5.2; Post-Intervention: 14.4±smn;8.6) than the CG (Baseline: 22.0 ±smn; 5.0; Post-Intervention: 19.4±smn;11.1; p=0.03). Twenty-two women in the EG (61%) had a clinically reliable decrease in their score post-intervention compared to eight women in the CG (32%; p<0.05). Of the 22 women in the IG who met the reliable change criteria, 18 (81%) had a score <16 post-intervention. Of the 8 women in the CG who met the reliable change criteria, 7 (88%) had a score <16 with no difference (p>0.05) between both groups.

Conclusion: Both statistical significance and reliable and clinical significance provide unique and complementary information into the effectiveness of structured exercise as a treatment option for prenatal depression.
Exposure to food brands in TV advertising and online advergames drives children’s brand recognition and attitudes, and leads to an energy imbalance capable of leading to excess weight gain

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Policies and environments (SIG)

Purpose: Policies to protect children from unhealthy food marketing have been impeded by the lack of evidence demonstrating a direct link between advertising exposures and children's energy intake and body weight. Food advertising exposure increases children's immediate food intake, but whether this increased consumption is compensated for at later eating occasions is unknown. We conducted a randomized, within-subject, counterbalanced, cross-over trial across four, six-day holiday camps to investigate the direct impact of food advertising on children's dietary intake, and also children's brand awareness and attitudes. Main findings and key study design elements will be discussed.

Methods: 160 children (7-12 years, n=40/camp) were randomized to either a multiple- or single-media condition and exposed to three days of food advertising and three days of non-food advertising in an online advergame and/or a TV cartoon. Novel brands were used to isolate the effects of the study advertising. Children's food consumption (kilocalories or kcal) was measured directly after exposure and at a later lunchtime meal. Children completed a brand recognition and attitude survey pre- and post-intervention. Relationships between advertising exposure and dietary intake, taking into account weight status and parental feeding practice, were investigated. Pre- and post- brand recognitions were compared and associations between brand recognition and attitudes by media condition were examined.

Results: All children in the multiple-media condition ate more at a snack after food advertising exposure compared with non-food advertising regardless of their self-regulatory capacity; this was not compensated for at lunch, leading to additional daily food intake of 46 kcal (p=0.001). There was an increase in the recognition of all food brands post-exposure (p<0.0001). The highest brand consumer ratings were for the brand featured in the advergame by children in the multiple-media condition.

Conclusions: Brief exposure to unfamiliar food advertising stimulated children's brand recognition and positive affect and resulted in an energy imbalance of a magnitude that could lead to the development of overweight among all children in the multiple-media condition. These findings strongly warrant a review of current regulatory schemes.
Can spillover effects of nutrition assistance programs be amplified?

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Purpose: Nutrition assistance programs are designed to promote healthy dietary behaviors in specific populations. Given the broader context in which individuals are embedded, these programs have the potential to produce "spillover effects", i.e. to affect the behaviors of other individuals (parents, siblings, peers, etc.), beyond program participants, as well as to influence other untargeted health related behaviors. Using data from two distinct observational studies, we examine spillover effects of the Fresh Fruit and Vegetable Program (FFVP) -- Study 1, and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) -- Study 2.

Methods: Study 1 included 4th grade students (n=246) attending six low-income high-minority enrollment elementary schools in Phoenix, Arizona. Schools were matched on key school-level factors, except that three schools participated in the FFVP and the other three did not. Self-reported measures of consumption and shopping behaviors were collected for students using validated measures, and compared using multivariate analysis among 4th graders from FFVP and non-FFVP participating schools. In Study 2, dietary data were collected for 570 age ineligible children (5-18 year olds) living in WIC eligible households in four low-income high-minority cities in New Jersey. Multivariate analysis compared differences in eating behaviors of age-ineligible children in WIC (n=365) vs. age-ineligible children in Non-WIC households (n=205).

Results: In Study 1, FFVP children reported higher consumption of fruits (p<.05) and vegetables (p=.056), and more than twice as many requests for purchasing vegetables (p<.001) at the store than did non-FFVP children. In Study 2, in WIC households, age ineligible 12-18 year old boys consumed more vegetables (p<.01), 5-11 year old girls consumed more 100% juice (p<.05), and Hispanic boys (p<.05) and girls (p = .065) drank about 35% less soda, compared to their peers in non-WIC households.

Conclusions: Positive spillover effects were observed in both programs investigated. Children's FFVP participation may result in households purchasing more fruits and vegetables, thereby having the potential to influence consumption patterns of the entire family. Household WIC participation may positively affect the diets of age-ineligible children. Implications of policy changes for spillover effects and strategies for amplifying spillover effects will be discussed.
O30, O30.3

Impacts of bicycle share schemes on bicycle use, walking, physical activity levels and body mass index in a multi-ethnic Asian population: A natural experiment

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Corporation strategies and government policies (Chair: Elizabeth Ablah), Club H, June 6, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Objective
Reviews of bicycle share schemes (BSS) identified data for the impact of BSS on health is lacking. The introduction of the island-wide BSS in Singapore in January 2017 provided an opportunity to fill this evidence gap and investigate the impact of BSS on overall bicycling.

Methods
The multi-ethnic cohort (MEC) is a large prospective cohort with regular, ongoing participant re-visits, including health screenings and completion of interviewer-administered questionnaires on socio-demographics and health behaviours, including physical activity and bicycling. Since January 2018 assessments of BSS use were added to facilitate this natural experiment. For the purpose of the present study, eligible participants were Singapore residents aged 18-65 years who did not have physical limitations that preclude bicycling, who had also completed the MEC re-visit between January and August 2018. The primary outcome was bicycle use in the previous week. Secondary outcomes included walking activity in the previous week, moderate-to-vigorous physical activity (MVPA) and body mass index (BMI, kg/m2) calculated from measured height and weight. Regression models were developed to assess impacts of the increase in bicycle use since the introduction of BSS on outcomes including walking activity.

Results
A sub-sample of 3,734 participants from the MEC study provided data for this study, and 371 (9.9%) of these participants were BSS users. A higher proportion of BSS users were male (51.5%, p=0.004) than non-BSS users (43.6%) and BSS users were significantly younger (p<0.001). The primary outcome, bicycle use in the previous week, increased from n=343 (9.2%) pre to n=441 (11.8%) post-BSS implementation (p<0.001). Increases in bicycle activity were not associated with a decrease in walking activity and BSS utilisation had a positive relationship with increased bicycle activity (p<0.001). Overall physical activity and BMI outcomes will also be reported.

Conclusion
The introduction of BSS in Singapore has coincided with a significant increase in bicycle use and BSS use is strongly related. The increase in bicycle use was not associated with a decrease in walking activity. Within two years of the introduction of BSS to Singapore, 9.9% of a sub-sample from a large multi-ethnic cohort reported using the scheme.
Frequency and magnitude of price promotions on food in a major Australian supermarket chain according to food category and product healthiness

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Corporation strategies and government policies (Chair: Elizabeth Ablah), Club H, June 6, 2019, 12:05 PM - 1:30 PM

Objective: The purpose of this study was to examine the prevalence and magnitude of price promotions in a major Australian supermarket, and how they differ between core (healthy) and discretionary (less healthy) food categories.

Methods: Price promotion data (including; regular retail price, temporary discount and price promotion type; price discount or multi-buy offer) was collected weekly for 12 months (April 2017-April 2018) from the website of the largest Australian supermarket chain. Products assessed were from 12 retailer-defined categories that clearly aligned with the Australian Dietary Guidelines definition of core or discretionary foods. Categories included: Core = low-sugar breakfast cereals, packaged bread, muesli/oats, canned beans/legumes/tomatoes, frozen fruit and frozen vegetables; and Discretionary = high-sugar breakfast cereals, crisps, chocolate, ice-cream and confectionery. Products were also classified according to their Health Star Rating, an Australian Industry-Government nutrient profiling system. Multi-buy promotions were defined as the discounted price only being available when more than one unit is purchased. Analysis included the average prevalence and magnitude of price promotions for each food category. Statistical differences were calculated using independent samples 2-tailed t-tests assuming equal variance with p<0.05 considered statistically significant.

Results: On average, 15% of core food products and 29% of discretionary food products was price promoted per week. Categories with the highest proportion of products on price promotion each week were chocolate (40%), crisps (33%) and high-sugar breakfast cereals (24%). The mean magnitude of discount was -15% for core food, and -26% for discretionary food. Categories with the largest magnitude of discount were chocolate (-31%), high-sugar breakfast cereals (-28%), ice-cream (-27%), and crisps (-24%). A strong inverse linear association was observed between product Health Star Rating and both the proportion of products price promoted and the magnitude of discount (both p<0.05).

Conclusions: Price promotions, including multi-buys, were both more prevalent and greater in magnitude for discretionary food categories compared to core food categories. As a key marketing technique to drive purchasing decisions, policies to restrict or reduce the influence of price promotions on discretionary food items should be considered as a means of improving the healthiness of food purchased from supermarkets.
Policies and commitments of major Canadian food manufacturing companies to improve the food environment

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Corporation strategies and government policies (Chair: Elizabeth Ablah), Club H, June 6, 2019, 12:05 PM - 1:30 PM

Objective
The food industry plays a critical role in establishing a healthy food environment, with important implications for diet and health. This research aimed to evaluate company policies and commitments related to the food environment in Canada.

Methods
The study employed the Business Impact Assessment on Obesity and Population-level Nutrition (BIA-Obesity) tool, developed as part of the INFORMAS collaboration, to examine policies and commitments related to obesity and population nutrition among major packaged food and beverage manufacturing companies in Canada. Publicly available information was collated for the 22 largest companies according to market share, and was validated with company representatives (n=12 companies provided feedback). Scores were developed for six policy domains (corporate population nutrition strategy, product reformulation, nutrition labelling, promotion to children, product availability, and relationships with external groups) based on the transparency, comprehensiveness, specificity and national-level applicability of commitments, reported as average score out of 100. Scores for each domain were weighted to establish an overall summary score for each company and the industry sector as a whole.

Results
The average weighted overall score among Canadian food and beverage manufacturers was 27 out of 100 points, ranging from 4 to 61 points. Within domains, companies scored highest for their corporate nutrition strategies (score 47 out of 100). Scores were lower for transparency in external relationships (score 37), reformulation commitments (score 27), restricting promotion to children (score 26), and comprehensive nutrition labelling (score 23). Few commitments regarding the availability and price of healthy foods were identified (score of 5). Overall, multinational companies score significantly higher than national companies, as did those who participated in the research process. Targeted recommendations for companies in this industry sector based on this analysis will be discussed.

Conclusions
While some companies are showing leadership across several domains, there is considerable room for improvement in the food manufacturing sector as a whole in Canada. Monitoring the fulfillment of company commitments is essential. In the absence of strong and comprehensive commitments and actions, government policy interventions play a critical role to ensure that food manufacturers are contributing to a healthier food environment in Canada.
An evaluation and comparison of the nutritional quality of packaged food and beverage products offered by major food companies in Canada according to the Health Star Rating system


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Corporation strategies and government policies (Chair: Elizabeth Ablah), Club H, June 6, 2019, 12:05 PM - 1:30 PM

Policies and environments (SIG)

Objective: A food supply abundant in energy-dense products high in saturated fat, sodium and sugars contributes to poor diet quality, increasing obesity and non-communicable disease risk. Food companies strongly influence the food supply; however, few studies have examined differences in the nutritional quality of products between companies. This study aimed to evaluate and compare the nutritional quality of products offered by major packaged food and beverage companies in Canada.

Methods: The top 23 packaged food and beverage manufacturers (including 18 multinational companies) were selected for analysis, representing >50% of the Canadian market share. Nutritional information for products was sourced from the University of Toronto Food Label Information Program 2017 database. The nutritional quality of bakery products (n=1,789), beverages (n=494), cereals (n=526), combination dishes (n=751), dairy products (n=1,106) and snacks (n=451) were evaluated using the Health Star Rating (HSR) system, with HSRs ranging from 0.5 (less healthy) to 5 (healthier). Kruskal-Wallis tests examined differences in the HSRs of individual companies' products by food category.

Results: Mean HSRs of products offered by individual companies ranged from 1 to 3.3 for bakery (µx̄=2.32, σx̄ =0.58), 1.5 to 5 for beverages (µx̄ =2.08, σx̄ =0.81), 2.4 to 4.5 for cereals (µx̄ =3.52, σx̄ =0.59), 2 to 3.9 for combination dishes (µx̄ =3.12, σx̄ =0.58), 0.5 to 4.5 for dairy (µx̄ =2.97, σx̄ =1.06), and 1.1 to 2.9 for snacks (µx̄ =2.06, σx̄ =0.74). Differences in the HSRs of companies' products were significant for all categories: bakery (X212=195.43, p<0.001), beverages (X216=70.13, p<0.001), cereals (X29=75.674, p<0.001), combination dishes (X29=52.056, p<0.001), dairy (X211=106.01, p<0.001), and snacks (X28=70.532, p<0.001).

Conclusions: Overall, there was significant variation in the healthfulness of comparable products offered by different leading food companies in Canada. On average, products offered by these companies scored at the lower end of the HSR system and are therefore considered less healthy. These findings identify a need and an opportunity for many companies to improve the nutritional quality of their products within major food categories. This study may prompt reformulation from companies by identifying those that currently offer less healthy products, compared with others in the Canadian marketplace.
The development of the first government-supported and region wide walkability tool in Europe

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Corporation strategies and government policies (Chair: Elizabeth Ablah), Club H, June 6, 2019, 12:05 PM - 1:30 PM

Objective
Studies worldwide have shown that living in high-walkable neighbourhoods is related to more physical activity. Despite the advantages of neighbourhoods with a high walkability-score, Flanders is characterized by a spread residential pattern with low walkability-scores. Besides, few practical tools are available to local and supralocal policy makers to assess neighbourhood walkability in order to prioritize neighbourhoods in need for environmental interventions. Therefore, the objective was to develop an objective and visual walkability tool that can be used by policy makers, civil servants, urban planners and health professionals in Flanders and Brussels (Northern region of Belgium).

Methods
Walkability was calculated by following formula: walkability=(2*z-connectivity)+(z-residential density)+(z-land use mix). Based on the input of a panel of urban planners and policy makers, a prototype was developed using geographical information systems (GIS). This prototype was tested and adjusted based on focus groups with civil servants in five municipalities of different scales.

Results
A user friendly open-source walkability tool was developed and can be consulted on 'www.gezondepubliekeruimte.be/walkabilityscore-tool'. Users can indicate their local neighbourhoods of interest to compare walkability scores. Additional data layers at statistical sector level were added to the tool: annual median household income, number of elderly (+65 years) and number of children (<15 years). These additional data layers help to determine neighbourhoods in need of environmental interventions, aiming to reduce known health disparities across socioeconomic groups.

Conclusions
This Flemish walkability tool is probably the first European tool that maps and compares the objective walkability scores of neighbourhoods in a larger region. This tool is disseminated to policy makers, civil servants, private organisations and citizens as part of a larger project on health in local spatial policies. It provides support in making more evidence-based decisions on spatial planning and design. The tool will stimulate health promoters to facilitate discussion about healthy public spaces with other policy domains (e.g. urban planning) and the further development of a more integral local (health) policy (e.g. integration of physical activity in spatial and climate policy).

This project is funded by the Flemish Government.
Environmental facilitators and inhibitors to children’s unsupervised outdoor play in Metro Vancouver, Canada: A participatory and qualitative inquiry

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Purpose: The Playability study aims to determine how friendly neighborhood environments are for children aged 10-13 to play outdoor, unsupervised. This paper: 1) used a participatory approach to collect data which privileges children's voices; and, 2) qualitatively explored the environmental facilitators and inhibitors to children's unsupervised outdoor play.

Methods: Study participants were 105 children (11.4 years, SD=1.1; 50% girls and 66% Caucasian) who lived in three urban, urban-suburban and suburban neighborhoods in Metro Vancouver area, Canada. Each child guided researchers on a go-along and semi-structure interview, touring researchers to familiar places and indicating what they liked about their neighborhood (i.e. facilitators) or not (i.e. inhibitors) in the context of unsupervised outdoor play. All interviews were transcribed and analyzed in NVivo 12 software using a thematic approach guided by Grounded Theory.

Results: Three dominant themes emerged: 1) Having "people around" (a supportive social environment), Facilitators included: having playmates of their own age as it promotes chance meetings and opportunities; knowing their neighbors as it provides eyes on the street; and having social gatherings or sharable resources as they promotes a sense of community connectedness. Inhibitors included encounters with "sketchy" people or teen bullies as this made them feel scared and threatened. 2) Feeling "safe on the street" (environmental safety), Facilitators included having physical infrastructures that enable children to play, walk, and/or bike around in their neighborhood (e.g., safe cross-walks/bike lanes, traffic calming features, cul-de-sac) as these make outdoor places children want to be or go accessible, connected, and safe. Children felt inhibited by heavy traffic. 3) Having "things to do" (affordances), Facilitators and inhibitors were assessed given the proximity, diversity, and functionality that a destination or an outdoor space could offer in promoting outdoor play and exploration with friends/animals.

Conclusions: Efforts to promote unsupervised outdoor play in the neighborhood without adult supervision requires consideration of children's perspectives of the supporting and inhibiting aspects of both physical and social environments. Future research is expected to quantitatively evaluate if these qualitative themes are equally important in defining neighborhood "playability", thus to assist urban planners with child-friendly design of outdoor spaces.
Physical activity and physical fitness in different built environment: What are the associations in the Czech adolescent population?


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Policies and environments (SIG)

Objective: The aim of the study was to estimate the strength of the associations between physical activity or physical fitness and the built environment in adolescents aged 11, 19 years from selected cities in the Czech Republic.

Methods: The research was conducted from 2013 to 2016 by the IPEN Czech working group and includes a total of 1,745 participants (895 boys and 850 girls) of average age 15.50 ±2.13 years. The participants were selected from 32 elementary or secondary schools in 8 cities. Physical activity was measured by means of the IPEN Adolescent questionnaire and monitored concurrently objectively by the Yamax SW-700 pedometer for seven consecutive days, in selected cities also by the ActiGraph GT1M or GT3X accelerometer. Physical fitness was tested using a set designed to assess health-related fitness in children and youth available in the INDARES system. The built environment was identified by means of the IPEN Adolescent questionnaire, in selected cities also using geographic information systems. SPSS software version 24 was used for computing descriptive statistics and also for more advanced analyses (including binary logistic regression).

Results: The results showed significantly higher chances of meeting the physical activity recommendations and at the same of becoming physically fit in adolescents who regularly (at least once a week) use indoor recreational or exercise facilities, playing fields or courts and cycle/hiking/pedestrian trails or paths. Other significant associations were observed in relation to the environment of the place of residence (important features include backyards, common areas and spaces inside houses) and in relation to the ownership and regular use of sports equipment (bicycles, balls, rackets, sticks, etc.). We also observed that adolescent boys living in the historical centre and traditional areas around the city centre generally have a higher chance of meeting the recommendation of 60 minutes of moderate to vigorous physical activity per day than boys resident in housing and satellite locations on the outskirts of the city (OR = 2.34; p = 0.024; 95% CI [1.12; 4.88]).

Conclusions: The research revealed specific associations between the built environment and physical activity or physical fitness in Czech adolescents.
Active play and perceived social and structural neighbourhood features among Czech adolescents

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Purpose:
The importance of light-intensity physical activity, especially in the form of active play, is largely unknown and likely varies significantly among countries, between sexes, across ages, and in urban and rural areas. An emerging interest in the contribution of light-intensity physical activity, such as is typically obtained through Active Play, is evident in the recommendations from the WHO Commission on Ending Childhood Obesity. Neighbourhoods may be of particular importance during adolescence. They provide opportunities both for supportive networks and can also create stressful environment that are associated with adolescent behaviour. Consistent with this neighbourhoods represent an important aspect of adolescents lives during this time of increased autonomy.

In this paper we aimed to answer the following research question: Are perceptions of neighbourhoods (such as, safety, availability of services, ties and relationships within the neighbourhood) associated with adolescent unstructured/unorganized active play?

Methods:
Data was collected in 2018 as a baseline measurement of the 'Social Norms Intervention for Active Adolescents (SONIAA)' project using a web-based questionnaire (1586 students; age 11, 15; 48% girls).

Active Play was defined according Global Matrix 3.0 as % of children who engage in unstructured/unorganized active play at any intensity for more than 2 hours a day.

To address features of the neighbourhood that impact on adolescents daily lives we used "Neighbourhood" package from HBSC study focused on: a) neighbourhood social features and b) neighbourhood structural features.

Results:
Active play was higher during weekends compared to weekdays. There was no association between active play and structural neighbourhood structural features neither during weekdays or weekend. On the other hand, neighbourhood social features were associated with adolescent unstructured/unorganized active play.

Conclusions:
Active play, especially in the outdoors, seems to be increasingly replaced by use of electronic screens for entertainment, used almost always indoors. This process is probably more associated with social features and less influenced by built environment features. It makes the careful monitoring and surveillance of active play important for guiding future strategies and interventions.
O31, O31.4

Neighbourhood drivability: Built environmental characteristics associated with car usage across Europe

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Built and social environment and physical activity/sedentary behavior (Chair: Takemi Sugiyami), South Hall 2A, June 6, 2019, 2:30 PM - 3:45 PM

Purpose
Driving for transport, rather than walking, cycling or using public transport, is a passive behaviour that may contribute to noncommunicable diseases. The choice for driving a car as mode of transport is likely to be shaped by the 'drivability' of the environment, but what built environmental factors are important indicators of 'driveability' is unclear. The twofold purpose of this study was to 1) identify from the literature what built environmental characteristics are related to driving, and 2) determine the extent to which these characteristics explain the variance in weekly driving time on top of individual-level characteristics, in adults of four urban areas across Europe.

Methods
First, a systematic literature search in PubMed and Google Scholar was conducted to identify built environmental characteristics potentially related to car driving. Then, using a Google StreetView audit and available GIS databases, salient environmental characteristics identified from the literature were gathered for 47 administrative neighbourhoods in four large European urban areas in which the SPOTLIGHT survey took place. Car driving (min/week) was self-reported by SPOTLIGHT participants (analytic sample n=3197) and used as outcome. We assessed the proportion of explained variance in car driving for the environmental-level characteristics by adding them to a linear multilevel model with individual-level characteristics age, gender, employment status, household composition and education.

Results/findings
From 54 relevant studies identified in the literature, eight were found to be associated with driving. Of these, residential density, car road density, land-use mix, obstacles on the road, and parking supply were available for our setting (not: parking costs, number of three-way intersections, and distance to work/transit). Whereas the individual-level variables in our model explained only 1.2% of variance in weekly car driving, the five built environmental characteristics explained 22%. Especially a lower residential density and a low land-use mix were linked to more passive transport.

Conclusions
This study is the first to evaluate the combined explanatory power of evidence-derived 'driveability' characteristics related to passive transport. The results suggest that neighbourhood environments may have a considerable influence on driving, and drivability could be part of the research and policy agenda supporting healthy people on a healthy planet.
Built environment and sedentary behaviors: Accounting for daily mobility through an activity-space approach

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Built and social environment and physical activity/sedentary behavior (Chair: Takemi Sugiyami), South Hall 2A, June 6, 2019, 2:30 PM - 3:45 PM

Policies and environments (SIG)

Objective: Despite the dramatic increase of studies on determinants of sedentary behaviors over the past decade, evidence on the influence of the built environment remains unclear and often contradictory. Main limitations encompass the use of self-reported proxies of sedentary time (e.g. TV viewing), the scarce consideration of the plurality of sedentary behaviors (i.e. transport, leisure, work and domestic), and the inaccurate modeling of people-place interactions and related environmental exposure. This study investigates the relationships between residential and GPS-based activity space measures of environmental exposure with accelerometer-based sedentary behaviors measured in total sedentary time, sedentary time at the residence, at locations and during trips.

Methods: This study is part of the international CURHA (Contrasted Urban contexts and Healthy Ageing) project. It uses data from a cohort of 470 older adults residing in Luxembourg. Information related to demographics and health status were collected using standard questionnaires. Participants were asked to wear a GPS and a tri-axial accelerometer for 7 days. Total sedentary time, sedentary time at the residence, at locations and during trips were computed as the sum of minutes spent sedentary per day and prolonged sedentary time (bouts of 20 minutes and up). Environmental exposure was computed for the residential neighborhood and the GPS-based activity space assessed from a previously validated algorithm. Measures include exposure to green and blue spaces, motorized transport infrastructure, density and diversity of amenities, and indicators of walkability and bikability. Associations between environment and sedentary outcomes were examined using linear and negative binomial multilevel models, accounting for demographics and confounders.

Results: Participants spent a mean time of 8h13min sedentary per day, 83% of that sedentary time occurred at locations including 72% at home, and 13% during trips. Accessibility to car parkings, outdoors recreational amenities and the length of public stairs in the neighborhood were associated with total sedentary time per day, during trips, and at the residence. Associations between sedentary time and environment varied whether considering total minutes or prolonged bouts of sedentary behaviors.

Conclusion: These findings suggest focusing on recreational and transport-related amenities when designing active-friendly neighborhood to reduce sedentary behaviors among older adults.
Effects of changes to the social and physical neighbourhood environment on walking behaviour of older adults living in deprived neighbourhoods: results from the NEW.ROADS study

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Built and social environment and physical activity/sedentary behavior (Chair: Takemi Sugiyami), South Hall 2A, June 6, 2019, 2:30 PM - 3:45 PM

Policies and environments (SIG)

Purpose: Creating physical and social neighbourhood environments supportive for walking may increase walking, specifically among older adults. While interventions targeting physical and social neighbourhood features simultaneously may have the largest potential, little is known about the effects on walking behaviour. This is one of the first studies to evaluate the effects of a physical environmental intervention (a designated walking route), a social environmental intervention (a neighbourhood walking group) and their combination on walking behaviour of older adults living in socioeconomically deprived neighbourhoods. The theory and evidence based interventions were developed in collaboration with the target group and policy makers.

Methods: This study had four conditions: 1) designated walking route (physical), 2) walking groups (social), 3) walking groups and walking routes (physical+social), and 4) a comparison condition. Each condition was assigned to one of four demographically comparable deprived neighbourhoods in Rotterdam, the Netherlands. Measurements took place at baseline and three (T1) and nine (T2) months after introduction of the interventions. Questionnaire data of 644 older adults were analysed. Due to skewed outcomes (weekly minutes spent recreational walking, utilitarian walking and total walking, measured with the IPAQ-questionnaire) multi-level negative binomial regression models were fitted, adjusting for clustering of observations within individuals. The statistical interaction between time points and condition indicated the effect of the study condition on the outcomes. All models were adjusted for relevant demographic covariates.

Results: The increase in total weekly minutes walked between baseline and T1 was twice as high in the intervention groups as in the comparison area. The Incidence Rate Ratio (IRR) for the physical condition was 2.13 (95%CI:1.33;3.43), for the social intervention 2.26 (95%CI:1.38;3.70), and for the physical and social condition combined 1.92 (95%CI:1.21;3.05). At T2, these differences remained significant in the physical condition and the social condition, but not in the physical and social condition. These findings were mirrored for utilitarian walking. No evidence was found for an effect on recreational walking.

Conclusion: Implementing small-scale "feasible-to-implement" changes in neighbourhood environments may increase total and utilitarian walking behaviour among older adults. We found no evidence for additive effects of implementing both social and physical environmental interventions.
Objectively measured physical activity over the transition to formal education in British children: cross-sectional and prospective data

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Prevalences and patterns of physical activity and sedentary behavior in children (Chair: Rebecca Wyse), South Hall 2B, June 6, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Objective: Children's activity levels tend to decrease from early primary school, but little is known about how physical activity (PA) patterns change over the transition to school. We describe patterns of objectively-assessed PA in a population-based sample of six-year-old British children, and explored how these change over the transition to school (4-6 years).

Methods: Data were from the Southampton Women's Survey; 775 6-year-old children (47% female) provided uniaxial chest accelerometry for <7 days, 318 children also provided data at age 4. We derived minutes spent in: sedentary (<100cpm); light (LPA >100, 2295 cpm); and moderate-to-vigorous PA (MVPA, >2296cpm). We calculated average daily activity levels, segmented across the day (morning: 6-9am; school: 9am-3pm; evening: 3-11pm). Two-level mixed-effects linear regression models assessed association with temporal (time of week, season) and demographic (sex, BMI, maternal education, siblings) factors cross-sectionally and from 4-6 years.

Results: Six-year-olds were active for 62% of their daily registered time (mean (SD) LPA: 454.0 (70.0) minutes; MVPA:65.0 (27.0)). Boys engaged in more MVPA (vs. girls: b=-12.8 [95% CI -16.3,-9.2] minutes/day), and weekends were more sedentary with lower MVPA (vs. weekdays: sedentary: 27.7[22.5,32.8], MVPA: -13.7[-15.7,-11.6]). Some evidence for compensation effects across the day/activity intensities were found (e.g. girls engaged in less LPA than boys in the mornings but more in the afternoons). Differences by maternal education, child weight status, number of siblings and season were identified. Compared to age 4, 6-year-olds were more sedentary (mean 36.8 (SD 92.8) minutes/day), engaged in less LPA (-44.2 (81.7)) but more MVPA (7.3 (47.3)).

Conclusion: After transitioning to school, children engaged in more high intensity activity but were also more sedentary. Activity behaviours differed by temporal and demographic factors, and compensation across the day was apparent. These observations provide information, over and above average daily physical activity, about where and when children are more or less active. It highlights a shift in children's activity distribution, potentially illustrating children's growing independence and changing preferences. These factors should be accounted for when developing physical activity interventions, allowing efforts to be targeted to achieve the biggest incremental changes in behaviour, particularly in reducing sedentary time.
Weight status and self-reported physical activity among primary school children differ among cities and rural versus urban areas

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Purpose: To compare the prevalence of weight status and physical activity (PA) among primary school children from sites in 1 country with high human development Index (HDI), and 3 low-to-medium HDI countries. Additionally, we examined the relationship between PA and overweight/obesity, and explored how the relationships might differ among cities, or between rural and urban areas.

Methods: Data were from a multinational cross-sectional study involving 9-11-year-old primary school children (n=2364) from 4 cities (Ottawa, Cape Town, Nairobi, Maputo), and 1 rural (Macie) district, Mozambique. Height (meters) and weight (kilograms) were objectively measured. Weight status derived from sex-and-age specific body mass index (BMI) z-scores was categorized using the World Health Organization defined classifications. For present analyses, self-reported moderate-vigorous PA in the last 7 days was dichotomized (= 6 days versus 7 days). Multilevel models accounting for clustering at the school and site levels were used to examine the relationships among overweight/obesity and PA.

Results: Mean age of children in this study (55.7% girls) was 10.3 (0.7) years. Proportions of total variance in BMI z-scores at the individual, site and school levels were 90.1%, 5.5%, and 4.1%, respectively. The proportion of underweight (6.1%) was higher among rural than urban (2.5%) children. Conversely, overweight and obesity were higher (15.1%; 8.5%) among urban than rural children (4.9%; 0.9%). More rural children (48.9%) reported meeting the recommended 60 minutes of daily moderate-vigorous PA compared to urban children (22.8%). Combined rates of overweight/obesity increased linearly with country HDI (11.4%; 21.1%; 26.4%; 30.7%) among urban children in Maputo, Nairobi, Cape Town and Ottawa respectively. There were no statistically significant relationships between overweight/obesity and meeting PA guidelines (βa=0.91; p = 0.4).

Conclusions: Our results show substantial differences in prevalence of weight status and PA for rural and urban children, suggesting the importance of including both rural and urban children in samples of studies, especially those involving countries with low-to-medium-HDI countries where most of the population live rurally. We found no significant relationships between PA and weight status which contradicts results from other studies that used objectively measured PA and may be due to the inherent limitations of self-reported data.
Stability and development of physical performance and physical activity in Childhood. A four-year panel study in primary schools in Leipzig (Germany)

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Prevalences and patterns of physical activity and sedentary behavior in children (Chair: Rebecca Wyse), South Hall 2B, June 6, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Purpose
Physical fitness (PF) is a main determinant of physical activity (PA). In primary school motor development of children is influenced by an interplay of internal and external factors and PA level as well (Roth et al., 2018). In conjunction to individual maturation motor development measured by PF components is less or more stable. For a better understanding of motor development the purpose of the study was to characterize the course and stability of PF in regard to PA.

Methods
A longitudinal study in Leipzig (Germany) measuring from first to fourth grade were initiated in 2014/15. A sample of 652 subjects (336 f) from 7.0 to 9.9 years were tested at each grade. PF assessed by the German motor test (Bos, 2016). PA were measured by the subject's parents should rate the daily PA duration spent while sweating. Two activity groups were set by the threshold of 60 min daily activity time. To calculate stability of PF and PA tracking coefficients were used (Malina, 1996). Changes of PF were analyzed by repeated measures ANOVA with activity group as a between subject factor (p < .05).

Results
PF increased significantly over the four grades in all motor tasks for girls and boys except stand and reach testing. Highest changes were found for jumping sideways (boys: F= 1203.503; p < .01; eta²2; = .857, girls: F = 963.415; p < .01; eta²2; = .812). Otherwise no interaction effect between school grade and activity groups could be observed. Stability correlations of motor tests ranged from moderate to high moderate with a strongest correlation of jumping sideways (boys: r > .64; girls: r > .70). Correlations of PA were continuously lower.

Conclusion
The findings of stability analysis of PF are consistent with the literature (Roth et al., 2018). The results support the assumption that PA behavior is independent of PF level. The influence of PA should be measured in the same scale (interval) like PF testing, e.g. with objective methods like accelerometry. Classification of PA in regard to different domains or intensity levels is needed to evaluate influence more specifically (Worth et al., 2015).
Prevalence of children and youth meeting sedentary behaviour guidelines: a 49-country comparison

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Prevalences and patterns of physical activity and sedentary behavior in children (Chair: Rebecca Wyse), South Hall 2B, June 6, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Purpose: Screen-time (time spent in screen-based sedentary behaviors) is often used as a proxy for sedentary behavior in research, and is associated with a variety of negative health outcomes among children and youth. Data on the international prevalence of 5- to 17- year-olds meeting the guideline of \( \geq 2 \) hours of daily recreational screen time are lacking. This study aimed to estimate the prevalence of children and youth meeting the sedentary behaviour guidelines across 49 countries.

Methods: Data informing the prevalence of 5- to 17- year-olds meeting the sedentary behaviour guidelines were reported by the Active Healthy Kids Global Alliance researchers from 49 countries of varying Human Development Indexes (HDI) to inform their Report Card on Physical Activity for children and youth and grade this indicator using a standardized grading scheme ("A+" to "F"). The data compiled for the Global Matrix 3.0 of Report Cards for the Sedentary Behaviour grade was analyzed to determine the proportion of children and youth meeting the guidelines globally and by HDI classifications (low/medium, high, and very high).

Results/findings: Subjective data from self- or proxy-report surveys were available in 46 countries from 6 continents; three participating countries (Ghana, South Africa, Venezuela) had insufficient evidence to grade the Sedentary Behaviour indicator. Out of these 46 countries, data using the \( \geq 2 \)-hours screen time cut-point were available, and data using a 3-hours cut-point, or reported sitting, doing homework, or other non-screen-based sedentary behaviours were also reported in six countries. The global average grade was a "D+" which corresponds to an estimation of 34-39% meeting the sedentary behavior guidelines globally. The low/medium HDI countries obtained an average of "C+" (54%, 59%), and the high and very high HDI countries obtained an average grade of "D" (27%, 33%), and "D+" (34%, 39%) respectively.

Conclusion: The prevalence of children and youth meeting screen time sedentary behavior guidelines is low, in particular in high and very high HDI countries, showing the need to develop effective interventions to manage screen time in this population.
O32, O32.5

The best and worst of days: optimising activity compositions for children.

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Prevalences and patterns of physical activity and sedentary behavior in children (Chair: Rebecca Wyse), South Hall 2B, June 6, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Objective: Physical activity, sleep and sitting are all associated with children's health, but traditional statistical approaches cannot include all in the same model because of multicollinearity. Furthermore, different mixes of activities in the 24-hour day may have different relationships with different health outcomes. Is it possible to identify a "best possible day" for children?

Methods: Data were drawn from the Child Health CheckPoint module of the Longitudinal Study of Australian Children. Complete activity and health data were available on 856 children aged 11 years. Activity was assessed using 7-day 24-h wrist-worn accelerometers, and time was partitioned into sleep, sedentary behaviours and physical activity (PA) using validated analytics. Health outcomes included adiposity, semi-fasting blood glucose, blood pressure, blood lipids, inflammatory markers and quality of life. Compositional data analysis (CoDA) was used to model response surfaces for each of the outcomes in relation to activity compositions, adjusted for age, sex, socio-economic status and pubertal stage. Heat maps were generated and the best and worst activity compositions were identified for each outcome.

Result: The best and worst activity compositions clustered in the same region of the activity composition footprint. The "best day" consisted of 9.5-11.5 h of sleep, 5-7 h of PA (including light PA) and <8 h of sitting. The "worst day" included 6-8 h of sleep, 0.5-3 h of PA, and >15 h of sitting.

Conclusions: The best and worst values for a wide range of health outcomes were associated with relatively restricted areas of the activity footprint in this population. Optimal outcomes were consistent with public health guidelines around maximising PA and minimising sitting, and with the sleep durations recommended by the National Sleep Foundation.
State of the Evidence of Active Living Among Children and Youth in India: A Scoping Review Informing the 2018 India Report Card on Physical Activity for Children and Youth

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Prevalences and patterns of physical activity and sedentary behavior in children (Chair: Rebecca Wyse), South Hall 2B, June 6, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Objective: There is strong evidence of physical inactivity's association with disease and economic burden. To address the physical inactivity pandemic among children and youth in the second-most populous country in the world, our team developed the 2016 India Report Card on Physical Activity for Children and Youth (IRC), which identified critical evidence gaps. The objective of the 2018 IRC was to address these evidence gaps and develop an advocacy strategy promoting active living in India.

Methods: The 2018 IRC is part of Global Matrix 3.0, which is led by Active Healthy Kids Global Alliance (AHKGA), an international endeavor to evaluate active living across 49 countries. A systematic search of peer-reviewed and grey literature was conducted for 10 core indicators of active living standardized by the AHKGA (Overall Physical Activity, Organized Sport Participation, Active Play, Active Transportation, Sedentary Behaviour, Family and Peers, School, Community and Built Environment, Government, and Physical Fitness), and one additional indicator that is culturally specific to India, Yoga. A Canadian-Indian research team appraised evidence and assigned grades based on the Global Matrix guidelines.

Results: Overall Physical Activity, Family and Peers, Community and Built Environment, and Government were assigned a grade of D. Active Play and Sedentary Behaviour were both assigned a C-grade. Active Transportation was assigned a B-, and Physical Fitness received an F grade. Three other indicators were graded as incomplete due to the lack of nationally representative evidence. Although a major proportion of the children and youth in India appear to participate in active transportation, they are not meeting recommended physical activity and sedentary behaviour guidelines. Physical activity type and levels varied significantly across the intersection of gender and socioeconomic status, with girls from lower socioeconomic status having the greatest disadvantage due to cultural and safety perceptions.

Conclusion: Children and youth in India continue to face active living challenges due to a lack of political, social, and physical environmental support. A national strategy that promotes physical activity among all children and youth, not just athletes, is required. This strategy should include policies addressing gender-based inequities, education/promotion campaigns, as well as urban planning and development.
Play Streets go rural! Physical activity of children at Play Streets in four diverse rural U.S. communities

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Health promotion interventions in disadvantaged families (Chair: Amanda Mclain), North Hall, June 6, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Objective: Physical activity (PA) has many health benefits; however, only 21.6% of 6-19-year-old Americans meet PA guidelines, with notable disparities for females and youth from low-income and/or diverse families. Approximately 20% of U.S. residents live in rural communities facing unique obstacles to regular PA: dispersed land use, fewer walkable destinations, and scarce infrastructure. Play Streets, one approach to addressing disparities in children's PA, provide safe places for play through temporary street closures in areas without access to safe, well-maintained parks/playgrounds. Prior to this project, Play Streets have been implemented in cities, but not rural communities. The purpose of this investigation was to examine youth PA during Play Streets implemented in rural U.S. communities.

Methods: Four community organizations were selected to implement Play Streets in rural African American, American Indian, Latino, or non-Hispanic White communities in the U.S. As part of a larger evaluation, elementary-to-middle school aged children were recruited to wear Digi-walker (Yamax SW200) pedometers while attending Play Streets, and System for Observing Play and Recreation in Communities (SOPARC/iSOPARC) observations were conducted every 30 minutes.

Results: Play Streets were implemented in rural communities across Maryland, North Carolina, Oklahoma, and Texas June-September 2017 (n=16 total, 4/community). A total of 370 elementary-to-middle school aged children wore pedometers across all Play Streets (μ=23.13 children [SD=8.59]/Play Street). Among children with complete pedometer data (n=353, mean age=8.84 years [SD=2.76], 54.7% female), pedometers were worn for an average of 93.23 minutes (SD=60.24) and children had a mean of 42.60 steps/minute (SD=16.88), with no significant differences (p=.07) between boys (μ=44.37 [SD=15.37]) and girls (μ=41.13 [SD=17.93]). Roughly half (49%) of all children, 48% of male teens, and 35% of female teens at Play Streets were engaged in moderate-to-vigorous PA (iSOPARC). Inflatables were implemented at every Play Street; 68% of female and 65% of male children using inflatables were engaged in moderate-to-vigorous PA.

Conclusions: Children in diverse rural communities are physically active at Play Streets. Mean steps/minute accrued during Play Streets are similar to many studies reporting mean steps/minute of children during recess; although longer in duration and with promise for addressing PA disparities often seen for girls.
“We were all together”- Participants’ experiences of the family intervention programme: A Healthy Generation.

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Health promotion interventions in disadvantaged families (Chair: Amanda Mclain), North Hall, June 6, 2019, 2:30 PM - 3:45 PM

Purpose: Physical activity (PA) is associated with a range of positive psychosocial and physical health benefits. PA interventions for children have shown various results on psychosocial health and challenges exist to reach vulnerable groups in socioeconomic disadvantaged areas. Social and environmental factors; such as parents, friends, PA leaders and local communities may be important to promote PA in children and enhance health. Even so, there is a lack of knowledge about PA interventions for families in socioeconomic disadvantages areas and their impact on participants' health. The purpose of this study was to explore how children and their families experienced psychosocial aspects of health after participation in the programme A Healthy Generation.

Methods: The family programme A Healthy Generation is delivered in collaboration with local municipalities in socio-economic disadvantaged areas in Sweden. Families with children in grade 2 (8-9 years) participate twice a week in health promoting activities, focusing on PA, parental education and healthy meals. Data was collected through focus groups with parents (n=27), interviews with parents and children (n=23) and participant observation. Focus groups and interviews were audio recorded, transcribed and analysed using a phenomenological hermeneutical method.

Findings: Participation in the programme A Healthy Generation contributed to increased social participation and sense of belonging for both parents and children. It was the families own free zone, where they had the opportunity to be together, have fun and try new activities. It was also a chance to be together with other families. For participants that were isolated and lacked a social network, their participation helped them to feel more included. During the programme, parents negotiated their different parenting styles and strengthened their family relations. Some participants described that the experience of trying different sport activities in a safe environment helped them improve their self-confidence in relation to performing sport activities and others became inspired to make healthy lifestyle changes.

Conclusions: The findings give insight to participant's experiences of psychosocial aspects of health, such knowledge can contribute to the understanding of how to design health promoting family interventions in socioeconomic disadvantaged areas.
Effectiveness of the programme A Healthy Generation on metabolic risk factors in children and their parents from socioeconomic disadvantaged areas, a pilot study

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Health promotion interventions in disadvantaged families (Chair: Amanda Mclain), North Hall, June 6, 2019, 2:30 PM - 3:45 PM

Purpose: To evaluate the effects of a universal family intervention on metabolic risk factors in children and their families in socioeconomic disadvantaged areas.

Methods: In total, 67 children (8-9 years) and 90 parents participated in this controlled study. Four schools were included (2 intervention/2 control) from socioeconomic disadvantaged areas in Stockholm County. The duration of the intervention was 9 months and was led by a foundation in cooperation with the municipality and local organisations. Different physical activities and healthy meals were arranged once to twice a week, free of charge, where children and at least one parent attended. Weight, height, waist circumference, sagittal abdominal height and blood pressure were measured by standard procedures. BMI status for the children was defined according to IOTF. Fasting glucose, insulin, low density lipoprotein (LDL), high density lipoprotein (HDL) and triglycerides (TG) were measured in blood. Outcomes were measured at baseline (August 2016) and after the intervention (June 2017).

Group differences were analysed with ANOVA analysis, adjusted for sex and baseline values.

Results: The prevalence of overweight and obesity was 33 percent in the children and 63 percent in the parents. There was a significant difference between children in the intervention and control group in glucose levels (p=0.006) after the intervention. The fathers in the intervention group had lower LDL (p=0.046) and higher insulin levels (p=0.04) compared to the control group after the intervention. There were no significant differences between groups in the other variables.

Conclusion: The need is high for effective health promoting interventions in socioeconomic disadvantaged areas. This study shows small intervention effects on BMI and metabolic risk factors in children and their parents. A larger randomised study is needed in order to evaluate the effects of this family intervention implemented in socioeconomic disadvantaged areas.
“Bridging the gap”: evaluation of a participatory approach to facilitate prevention of childhood obesity among African-Surinamese and West-African communities living in deprived neighbourhoods in Amsterdam, the Netherlands

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Purpose: To gain insight into the process of participatory intervention development and roles and responsibilities of actors involved in a family based intervention for African-Surinamese and West-African parents. The intervention aimed to increase awareness for well-being, healthy nutrition and physical activity and to improve parents’ grip on life and all its stressors, which is an important condition for healthy lifestyle.

Methods: Intervention development: ten African-Surinamese and West-African parents were trained in six sessions around healthy lifestyle and communication skills, after which they provided feedback to professionals of parenting support services (OKT) in two deprived neighbourhoods in Amsterdam. Subsequently, OKT professionals were guided in a process to reflect on and increase accessibility of their services. Both parents and OKT professionals shared their experiences on six local radio channels to generate awareness in the community.

Developmental Evaluation (DE): DE was applied to give real-time feedback about intervention development and for more thorough analysis. The dual role of researcher and team member gave the best possible insight and understanding of the project. Data was collected through minutes and observations of all activities, team (reflection) meetings, interviews with various stakeholders and consultation of various experts. The data were analysed using content analysis, aiming to identify barriers and facilitators for successful development of this participatory project.

Results: Five themes emerged from the analysis: personal relationships, communication skills, responsibility and ownership, cultural sensitivity and sustainability. Personal relationships were important to understand (non-verbal) communication, to create support for proposed activities, but mostly to learn how various stakeholders experienced certain issues, in order to adequately address these needs through a bottom-up approach. We identified the importance of 1) creating responsibility and ownership among all stakeholders and ways to do so, 2) discussing cultural sensitivity, and 3) ensuring sustainability by working with district level policy officers and community key figures, for successful intervention development.

Conclusions: Using an inclusive approach, taking into account the needs of parents and professionals during the development and implementation of healthy lifestyle interventions may bridge the gap and increase accessibility and satisfaction of services for families in deprived areas.
Adapting an Australian group-based weight management programme for fathers of young children to a disadvantaged ethnically-diverse UK setting; a feasibility study

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Health promotion interventions in disadvantaged families (Chair: Amanda Mclain), North Hall, June 6, 2019, 2:30 PM - 3:45 PM

**Children and families (SIG)**

**Objective:** Healthy Dads, Healthy Kids (HDHK) is a successful Australian weight management programme for fathers and their primary school aged children. As behavioural interventions do not always transfer directly between different settings and contexts, we adapted HDHK for delivery in a socio-economically disadvantaged multi-ethnic UK setting using the Liu 2012 typology of cultural adaptation. We evaluated the feasibility of delivering the adapted intervention and of a definitive randomised controlled trial in the UK.

**Methods:** A randomised feasibility study of the adapted HDHK programme with mixed-methods process evaluation. Eligible participants were overweight/obese fathers of primary school children recruited from two ethnically diverse, socio-economically disadvantaged areas of the West-Midlands, UK. Participants were randomised 2:1 (intervention:control). The intervention included nine weekly 90-minute group sessions targeting lifestyle education and physical activity. The control group received one family voucher for a local leisure centre. Feasibility to progress to a definitive trial was assessed by: recruitment (target 90 fathers); retention at 3 and 6-months; ability to deliver the programme, programme attendance, fidelity and acceptability, mean weight loss in the intervention group.

**Results:** Overall, 43 (29 intervention) fathers participated (48% of target) despite multiple recruitment methods (e.g. schools, children's activities, mosques, work places, shopping centres, social media). Fathers' mean BMI was 30.2kg/m2 (SD5.1), 60.2% were from a minority ethnic group and 53% from communities in the most disadvantaged quintile for socio-economic deprivation. Follow-up at 3 and 6-months was 63%. Identifying convenient delivery sites and appropriately skilled and trained programme facilitators proved challenging. Four programmes were delivered in leisure centres and community venues. Of participants who attended the intervention at least once (n=20), 75% completed the course (attended =5 sessions). Sessions were delivered with high fidelity. Intervention participants rated the sessions as 'good/very good' and reported behavioural change; they lost 2.9kg (SD 4.1) at 6-months.

**Conclusions:** The intervention was well received, but there were significant challenges in recruiting overweight men, programme delivery and follow-up. The HDHK-UK study was not feasible for progression to a full trial in this socio-economically disadvantaged multi-ethnic UK setting; we cannot comment on the feasibility of recruitment outside this challenging context.
The Family Life, Activity, Sun, Health, and Eating Study: Updated data resources for analyzing eating and physical activity behaviors among parent-adolescent dyads

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Health promotion interventions in disadvantaged families (Chair: Amanda Mclain), North Hall, June 6, 2019, 2:30 PM - 3:45 PM

Children and families (SIG)

Objective: The Family Life, Activity, Sun, Health, and Eating (FLASHE) Survey was conducted in 2014 to collect information on eating, physical activity, sedentary behaviors, and behavioral correlates from a national sample of parent-adolescent dyads in the United States. FLASHE is a publicly available data resource offering opportunities to investigate research questions about psychosocial, generational, household, and neighborhood correlates of health behaviors (https://cancercontrol.cancer.gov/brp/hbrb/flashe.html). This presentation describes additional FLASHE data resources that can enhance analyses of the earlier survey datasets and are relevant to ISBNPA's research interests.

Methods: Three supplemental FLASHE datasets include: a "geoFLASHE" dataset, a multiple imputation dataset, and an adolescent accelerometer dataset. The geoFLASHE project used parent-provided address information for their home and adolescents' school to geocode these locations and compute a set of variables applied to several different neighborhood definitions, including both circular and street-network buffers with distances ranging from 400, 1200 meters. The multiple imputation dataset was produced using weighted sequential hotdeck imputation to address a high missing data rate for eight items in the parent physical activity survey. A dataset of accelerometer variables was computed for a subset of adolescents who wore an Actigraph GT3X+ for seven days and includes estimates from raw and activity counts data.

Results: The resulting geoFLASHE dataset includes variables for neighborhood socioeconomic status index, factor scores for three built environment characteristics (high density, older neighborhoods, and short commutes), and other contextual variables, for each of the buffer configurations. The multiple imputation dataset allows researchers to analyze data on parent-reported life goals for their child and/or physically limiting health conditions with sufficient sample size. The adolescent accelerometer dataset provides several key summary variables of accelerometer data and minute-level estimates of light, moderate, and vigorous activity using Crouter, Chandler, and GGIR processing methods.

Conclusions: These tools offer opportunities for researchers to apply objective and imputed data in their studies of diet and physical activity behaviors among families. These resources complement the public use survey data and can be accessed and used in a variety of individual and dyad level analyses to understand activity and nutrition within families.
16848

O34, O34.1

Design your best day: Customising lifestyle interventions

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Interventions and methods in behavior change studies (Chair: Marta Marques), Terrace 2A, June 6, 2019, 2:30 PM - 3:45 PM

Motivation and behavior change (SIG)

Objective: Novel statistical methods (such as compositional data analysis) enable us to model the health impact of modifying multiple lifestyle factors simultaneously. However, results can be difficult to interpret in a meaningful way. We present an approach to assist in the translation of research findings, and to inform the design of tailored lifestyle interventions. Our approach enables us to estimate the health benefit gained by simultaneously adjusting multiple lifestyle behaviours within a 24-hour day.

Methods: We illustrate our concept using cross-sectional data from the Longitudinal Study of Australian Children (Wave 3: B cohort: n=1413: 4-5 y: 52% boys). We used a linear model to regress lifestyle behaviour variables (explanatory) against a nationally administered test of cognitive function, ‘WhoAmI’ (WAI) (dependent). Lifestyle behaviours included 24-hour time use (from time-use diaries) and consumption of fruit and vegetables, unhealthy food items and sugary drinks on previous day, all reported by parents. Time-use variables were expressed as isometric log ratios to respect the compositional nature of the data. Adjustment was made for sex, age and socioeconomic status. We used the model to compare the estimated influence of the various behaviour modifications, or trade-offs.

Results: 24-hour time-use (p<0.001) and consumption of fruit and vegetables (p=0.03) were associated with cognitive function, but effect sizes were modest. For the average child, the model estimated that a 1.0 (ES 0.1) increase in cognitive function could be achieved by either: i) swapping 60 min of screen time for school-related activities; ii) swapping 80 min of screen time for physical activity; iii) consuming an additional 3 serves of fruit and vegetables; iv) swapping 60 min of screen time for 30 min school-related activities and 30 min screen time, and consuming an additional 1.5 serves of fruit and vegetables.

Conclusions: We present a novel interactive approach to aid the meaningful translation of lifestyle behaviour research. Our findings will inform a customisable tool to enable practitioners, parents and children to design the 'best day', taking into account personal preferences and non-negotiable constraints. This self-determinant approach may facilitate better uptake and long-term adherence to positive behaviour change interventions.
Effects of Active Video Games on Preschool Children’s Motor Skills, Cognition, Sedentary and Physical Activity Behaviors

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Interventions and methods in behavior change studies (Chair: Marta Marques), Terrace 2A, June 6, 2019, 2:30 PM - 3:45 PM

Motivation and behavior change (SIG)

PURPOSE: Few schools offer opportunities to engage in structured physical activity among preschool children, and study focusing on the effects of active video games (AVG) on these young children's health outcomes remains unexplored. This study was designed was to examine the effectiveness of a school-based AVG intervention on preschool children's motor skills, cognition, sedentary and physical activity behaviors as compared to usual care (recess).

METHODS: Sixty-five preschoolers (33 girls; Mean age = 4.45 ±smn; 0.46) from 2 urban underserved elementary schools in a Midwestern U.S. state were assigned to one of two conditions: (1) usual care recess group (8 weeks of 100 minutes [5 days x 20 minutes] recess/week); and (2) AVG intervention group (8 weeks of 100 minutes [5 days x 20 minutes] exergaming/week at school). All children underwent identical assessments of motor skills, cognition, sedentary, light physical activity (LPA) and moderate-to-vigorous physical activity (MVPA) behaviors at baseline and at the end of the 8th week.

RESULTS: Analysis of variance with repeated measures indicated that there were significant Time effects for motor skill competence (F(1, 63) = 18.09, p < 0.01, ?;2 = .22) and cognition (F(1, 63) = 9.84, p < 0.01, ?;2 = 0.14), with post-tests demonstrating higher scores. A significant Group by Time effect was also observed for cognition, (F(1, 63) = 5.70, p < 0.05, ?;2 = 0.20). Specifically, the intervention children displayed significantly greater increased cognition at 8 weeks than the comparison children. Additionally, multivariate analysis of variance with repeated measures suggested the Time effect for sedentary, LPA, and MVPA approached significant level (F(3, 60) = 2.64, p = 0.058, ?;2 = 0.06). Follow-up tests revealed no significant effects for any variables.

DISCUSSION: AVG demonstrated a positive effect in promoting preschool children's motor skills and cognition at school. However, no changes in sedentary, LPA and MVPA were identified across groups over time. More research with larger sample sizes and longer intervention period is needed.
Objectives: The goal of the Accumulating Data to Optimally Predict obesity Treatment (ADOPT) Core Measures Project is to identify key biological, psychological, behavioral and environmental variables related to weight loss to determine potential predictors of successful weight loss and maintenance. ADOPT is designed to provide a framework for how obesity researchers, working collectively, can generate an evidence base to advance our understanding of how to optimally predict response to obesity treatment and ultimately, lead to more precise and tailored obesity treatments.

Methods: The ADOPT working group consisted of 43 scientists selected for their expertise in one of the four ADOPT domains. The group was charged with recommending a list of constructs and associated measures that are most likely to yield predictors, mediators, or moderators of response to obesity treatments.

Results: The working group's efforts have resulted in an ADOPT working model/framework, a core list of constructs and measures that we recommend be collected in adult weight loss trials, and a publicly available database of constructs and measures (see https://www.gem-beta.org/public/wsoverview.aspx?cat=8&wid=35&aid=0). The ADOPT Working Group is now focused on outreach efforts to promote the use of the ADOPT core set of measures in weight loss and maintenance trials.

Conclusions: The identification of a core set of measures to be used in a consistent manner across adult weight loss trials represents a first step in an ongoing process, which will be refined and updated dynamically as the science advances. Consistent use of the ADOPT core measures in adult weight loss trials will enhance opportunities to identify replicable predictors, mediators, and moderators of obesity treatment responses. The accumulation of data on key factors from the four ADOPT domains should improve our understanding of the interplay among factors within these domains and their coordinated impact on treatment responses, ultimately enabling more precise targeting of obesity-related interventions and potentially resulting in more effective treatments for obesity.
The role of practical experience in interventions to enable cycling participation

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Interventions and methods in behavior change studies (Chair: Marta Marques), Terrace 2A, June 6, 2019, 2:30 PM - 3:45 PM

Motivation and behavior change (SIG)

Purpose: Cycling provides opportunities to adopt and maintain an active lifestyle by incorporating it into daily activities for both transport and leisure. In the UK, 28% of the adult population currently cycle less than once per month but would like to cycle more regularly. The aim of this study is to examine Behaviour Change Techniques (BCTs) and intervention strategies that enable cycling participation in adults.

Methods: A systematic literature search was conducted and using pre-established criteria. Study selection, quality appraisal and data extraction was completed by independent researchers. Using the 93-item BCT taxonomy developed by Michie et al. (2013), BCTs were identified in studies which saw positive change, no change, or negative change in cycling behaviour. Further, six employee focus groups were conducted across different UK city branches of a major bank between September and October 2018. A total of 32 (27 infrequent/non-cycling and 5 frequent cycling) bank employees participated in the focus groups. Transcripts were analysed thematically.

Results: From 23,787 articles screened, a total of 25 studies on adult cycling interventions were included for further analysis. Of these studies, 21 showed a positive change and 4 showed either no change or a negative change in cycling behaviour. Only 16/93 BCTs were reported; of these, the most commonly used were: instruction on how to perform the behaviour; demonstration of the behaviour; behavioural practice/rehearsal; habit formation; restructuring the social environment; and adding objects to the environment. There was moderate evidence for effectiveness of provision of bicycles/e-bikes and practical cycle training, but insufficient evidence for education without a practical element. Focus groups self-identified the need for a practical component combined with education to modify workers' cycling behaviour: 'I think people, if they felt that they were going from zero interaction with a bike, to physical interaction with support on how to do that, how to ride your bike, how to be safe on your bike. I think that would really help most people.'

Conclusion: Future interventions may consider the use of practical cycle training and bicycle provision to enable cycling participation in infrequent cyclists.
Use of a novel methodology for translating recommendations from the Brazilian Dietary Guidelines into behavior-change messages.

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*Interventions and methods in behavior change studies (Chair: Marta Marques), Terrace 2A, June 6, 2019, 2:30 PM - 3:45 PM*

**Motivation and behavior change (SIG)**

**Purpose:**
To translate recommendations from the Brazilian Dietary Guidelines (DG) into behavior-change messages and test their acceptability within a sample of Brazilian adults.

**Methods:**
A sequential, multi-step, mixed-methods approach was used for translating DG recommendations into messages targeting urban adults. Step 1: The DG was reviewed to identify appropriate content; Step 2: A panel of experts determined the hierarchy of importance of the content; Step 3: Beliefs, assumptions, and perceptions of the target audience w.r.t healthy eating were mapped. The Theoretical Domains Framework and best practices related to message length, tone, framing and wording, guided message construction. In Step 4, messages were tested for their content validity through an online survey, where experts (n=43) gave feedback on message clarity and content; Step 5: Face validity of the messages was determined through an online survey of adult Brazilians (n = 1500) where importance and acceptability of the messages, the degree of persuasion and likelihood of behavior change was captured on 7-point Likert scales.

**Results:**
A total of 112 messages were developed, based on 5 themes and 6 sub-themes addressed in the DG. The themes included Planning, Shopping, Cooking, Eating and the introduction of the NOVA classification system. The sub-themes were Gender, Pleasure, Environment/Sustainability, Economy, Sodium reduction, and Sugar reduction. The messages were short, simple, solution- or substitution-based, and generally emphasized benefits of adopting a healthy diet from a cost-, time-, energy-saving, and environmental and health perspective. Content validity helped narrow the messages to 60 that were further tested for face validity. On average, 64% of adult Brazilians thought the messages were easy or very easy to understand, 62% said the messages were convincing, 55% thought the theme of the message was important, and 32% said they were very likely or extremely likely to change behavior.

**Conclusion:**
This study makes important contributions to the methodology of message development and testing and demonstrates the practical examples of health promotion efforts in Brazil. Messages were well accepted by the target population, however, would need to be supplemented by other efforts for stimulating behavior-change.
A co-designed mHealth programme to reduce risk factors for heart disease, obesity and diabetes in Maori and Pasifika communities in New Zealand: Results from the OL@-OR@ cluster randomised controlled trial


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Socio-economic inequalities (SIG)

OBJECTIVE:
The OL@-OR@ mHealth programme (a smartphone app and website) was co-designed with Maori and Pasifika communities in New Zealand to reduce their risk of non-communicable disease by supporting positive, culturally relevant, changes to lifestyle. Our aim was to determine the effects of the OL@-OR@ programme on key risk factors, i.e. diet, physical activity, smoking, and alcohol consumption.

METHODS:
A two-arm, cluster randomized controlled trial was conducted with Maori and Pasifika communities across New Zealand. Clusters were randomly assigned (1:1 ratio) to either the full OL@-OR@ programme or a control version of the app (data collection only plus a weekly notification), stratified by geographic location (Auckland or Waikato) for Pasifika clusters or by region (rural, urban, or provincial) for Maori clusters. The primary outcome was adherence to healthy lifestyle behaviours measured using a validated, self-reported composite health behaviour score (fruit and vegetable intake, physical activity, smoking behaviour, and alcohol intake) at 12 weeks. Secondary outcomes were self-reported body weight, holistic health and wellbeing status, medication use, and engagement with the OL@-OR@ app.

RESULTS:
Between January and July 2018, 69 community clusters (34 Maori, 35 Pasifika) were randomly assigned to the intervention (n=37) or to the wait-list control group (n=32) and contributed data to the analysis. Of the 1,456 participants, 70% were female and their mean age was 38 years (range 18-78). At baseline, mean daily fruit and vegetable intake overall was 3.2 serves (SD 2.0) and 50% of participants were sufficiently physically active based on weekly moderate/vigorous physical activity (MVPA) score. The majority of participants were non-smokers (76%) and had a non-harmful alcohol intake (91%). Baseline mean body mass index (BMI) was 34.6 kg/m² (SD 9.2).

CONCLUSION:
12-week follow up of participants will be completed in December 2018 and full trial results will be presented at the ISBNPA conference.
How does bridging social capital relate to health-behavior, overweight and obesity among low and high educated groups? A cross-sectional analysis of GLOBE-2014

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Socio-economic inequalities in nutrition (Chair: Eric Calloway), Terrace 2B, June 6, 2019, 2:30 PM - 3:45 PM

Socio-economic inequalities (SIG)

Purpose Social capital is an important determinant of health, but how specific sub-dimensions of social capital affect health and health-related behaviors is still unknown. To better understand its role for health inequalities, it is important to distinguish between bonding social capital (connections between homogenous network members; e.g. similar educational level) and bridging social capital (connections between heterogeneous network members, e.g. dissimilar educational levels). In this study, we test the novel hypothesis that bridging social capital is positively associated with health-behavior, and negatively associated with overweight and obesity, but only among educational groups.

Methods Cross-sectional data on educational level, health-behaviors, weight status (overweight and obesity) from participants (25-75 years; Eindhoven, the Netherlands) of the 2014-survey of the GLOBE study were used (N=2702). Social capital ("How many of your close friends have the same educational level as you have?") was dichotomized as: bridging ('about half', 'some', or 'none of my friends'), or bonding ('all' or 'most of my friends'). Logistic regression models were used to study whether bridging social capital was related to health behaviors (smoking, food intake, physical activity), weight status, and whether these associations differed between low and high educational groups.

Results Low educated with bridging social capital were less likely to report overweight (OR 0.73, 95% CI 0.52-1.03) and obesity (OR 0.58, 95% CI 0.38-0.88), compared to low educated with bonding social capital. In contrast, among high educated, having bridging social capital increased the likelihood to report daily smoking (OR 2.11, 95% CI 1.37-3.27), no leisure time cycling (OR 1.55, 95% CI 1.17-2.04), not meeting recommendations for vegetable intake (OR 2.09, 95% CI 1.50-2.91), and high meat intake (OR 1.39, 95% CI 1.05-1.83).

Conclusions Bridging social capital had differential relations with health-behavior among low and high educational groups. Policies aimed at reducing segregation between educational groups may reduce inequalities in overweight and obesity.
Examining physical activity and nutrition changes in a rural population with Severe Mental Illness

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Socio-economic inequalities in nutrition (Chair: Eric Calloway), Terrace 2B, June 6, 2019, 2:30 PM - 3:45 PM

Socio-economic inequalities (SIG)

Objective: Quasi-experimental design study to determine the impact of an integrated behavioral health intervention on BMI, physical activity and nutrition, pain and disability using the Duke Health Profile.

Methods: The community participatory study used a quasi-experimental design to enroll 552 consumers (302 in program and 250 in comparison sites) with severe mental illness (SMI) at baseline with 364 (211 program and 153 comparison) at 12-month follow-up. All participants resided in rural South Texas. Mixed effect models and multivariable linear regression models were used to test the impact of the program at 12-months. TRIP for Salud y Vida Program Enhanced Integrated Services (EIS) included physical activities (tai chi, water aerobics and walk in the park) and La Cocina (Kitchen) de REAL introduced culturally appropriate recipes with locally available foods. Certified community health workers delivered the sessions. TRIP for Salud y Vida program included seamless transportation services in the rural area.

Results: The mean age of participants was 43 years (SD: 13); 54% of participants were female; mean BMI in the population was 33 (SD=8.8) and over 70% were uninsured; 47% reported pain; 53% reported disability and lack of physical activity. No differences between program and comparison participants were found at baseline. Changes in weight loss from 0 to 30 pounds were found in the program group, however no significant changes in BMI were found at 12-months between the program and comparison groups. Those in the intervention group reported significantly less depression at 12-months (p<0.043), less disability (p<0.001), less pain (p<0.001) and less social isolation (p<0.001) than the comparison group. Participants attended more behavioral health appointments at the program clinics than the comparison clinics and reported overall better health. Tailored programming to the specific rural county area using local resources and partners was programmed. Process evaluation noted satisfaction with EIS sessions, improved physical activity and less sedentary lifestyles as well as less social isolation.

Conclusions. The integration of physical activity and nutrition programs to behavioral health care will promote healthier weight as well as decreases in depression, pain and disability in populations with severe mental illness. Integrated behavioral health in rural areas should include transportation and tailored chronic disease prevention and management programming to meet the community's needs.
O35, O35.4

Is food security associated with diet and health? A cross-sectional online panel of UK adults.

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Socio-economic inequalities in nutrition (Chair: Eric Calloway), Terrace 2B, June 6, 2019, 2:30 PM - 3:45 PM

Socio-economic inequalities (SIG)

Objective
Prevalence of adult food insecurity is estimated to be 8-10% in the United Kingdom (UK) but the impact on population diet and health in unknown. Here, we aimed to investigate associations between food security and diet and health outcomes in UK adults.

Methods
We used cross-sectional UK data from the International Food Policy Study, which recruited 4047 UK adults (18-64 years) through quota sampling from an online panel. 767 participants were excluded for incomplete adult food security status (measured using the USDA Adult Food Security Survey Module). 748 further participants were excluded for incomplete outcome data. Adjusted logistic regression models were used to explore associations between food security and frequency of fruit and vegetable intake (above vs. below median), self-rated diet quality, health, stress and body mass index (BMI). A sub-sample of participants were used to explore association with BMI (n=1949) due to missing data and implausible BMI. All outcomes measures were self-reported. Sample weights were used to improve population representativeness. Our sample was similar to the UK population in terms of sex, age and region of residence.

Results
2551 participants were included in our analysis, 24.3% of whom were food insecure. Food insecure adults had lower odds of being above the median for fruit and vegetable intake frequency compared to food secure adults, OR 0.59 (95% CI 0.47, 0.74) and OR 0.68 (95% CI 0.54, 0.86), respectively. Odds of poor self-rated diet quality were higher in food insecure vs. food secure adults, OR 1.65 (95% CI 1.31, 2.09), as were odds of poor general health, OR 1.90 (95% CI 1.50, 2.41), poor mental health, OR 2.10 (95% CI 1.65, 2.69), high stress levels, OR 3.15 (95% CI 2.42, 4.11) and overweight, OR 1.32 (95% CI 1.00, 1.75).

Conclusions
Food insecurity was associated with markers of poor diet and health. Strong associations with mental health and stress, in particular, point to strong correlations between mental wellbeing and food security. Greater odds of overweight among the food insecure group suggests that compromising diet quality, rather than reducing energy intake, could be the more common experience among UK adults facing food security.
Socioeconomic disadvantage across the life course is associated with diet quality in young adulthood

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Socio-economic inequalities in nutrition (Chair: Eric Calloway), Terrace 2B, June 6, 2019, 2:30 PM - 3:45 PM

Socio-economic inequalities (SIG)

Purpose: Three principal theories have been advanced to explain how inequities in health and health-related behaviours are generated, reproduced and maintained across the life course: latent, pathway and cumulative effects. All three life course theories may be implicated in the socioeconomic patterning of diet quality, however, these pathways have rarely been studied. This cross-sectional study examined: 1) independent and joint associations between socioeconomic position (SEP) in childhood and young adulthood with diet quality in young adulthood, and 2) whether adult SEP mediated associations between childhood SEP and adult diet quality. Methods: Canadian young adults (18-30 years; n=1,949) from five large urban centres completed an online survey. Childhood and adult SEP were represented by self-report of participants' parent(s)' and their own highest educational level, respectively (High School or less, Certificate/Diploma, University). Healthy Eating Index, 2015 (HEI-2015) scores were calculated from one 24-hour dietary recall to assess overall diet quality. Linear regression examined independent and joint associations between childhood and adult SEP and adult HEI-2015 scores, adjusting for age, sex, race/ethnicity, BMI and survey mode. Mediation analyses examined whether adult SEP mediated associations between childhood SEP and adult HEI-2015 scores. Data were weighted to be representative of the Canadian young adult urban population. Results: Lower SEP in childhood and adulthood were jointly and independently associated with lower HEI-2015 scores in young adulthood. Associations between childhood SEP and adult HEI-2015 scores remained significant but were attenuated following adjustment for adult SEP. Specifically, the effect size for parental educational level High School or less, compared to University, declined in magnitude from -2.73 (-4.96, -0.51) to -2.22 (-4.41, -0.03). Longer duration and intensity of negative socioeconomic exposures were associated with lower adult HEI-2015 scores. Adult SEP mediated up to 13.0% of associations between childhood SEP and adult HEI-2015 scores. Conclusions: Achievement of a higher SEP in adulthood partially buffered the negative impacts of childhood socioeconomic disadvantage on diet quality. Nevertheless, childhood SEP laid a critical foundation for subsequent adult SEP and diet quality. Findings point to latent, pathway, and cumulative effects of SEP in shaping the socioeconomic patterning of diet quality in young adulthood.
O35, O35.6

Recruiting participants with low socioeconomic status in an e-cohort study on nutrition: a preliminary theory-based study to explore motivation and beliefs

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Socio-economic inequalities in nutrition (Chair: Eric Calloway), Terrace 2B, June 6, 2019, 2:30 PM - 3:45 PM

Objective: Populations with low socioeconomic status (SES) are more likely to develop diseases across lifespan and are frequently underrepresented in large cohort studies. The aim of this study was to examine motivation and beliefs towards participating in an e-cohort study on nutrition (NutriQuebec) among this population.

Methods: A cross-sectional survey was conducted in the Province of Quebec, Canada among low SES adults (high school or less and gross annual household income < 55,000 CAN$). The questionnaire was based on the theory of planned behaviour and assessed intention to participate in NutriQuebec (aha;=0.80), attitude (aha;=0.89), subjective norm (aha;=0.65), and perceived behavioural control (PBC; aha;=0.82). Behavioural and control beliefs (identified from a preliminary elicitation study) were also assessed. A linear regression analysis was conducted to examine the determinants of intention. Logistic regression analyses were conducted to examine beliefs associated with high intention (scores = 4 on a 5-point Likert scale). Analyses were controlled for sex, age, and perceived Internet competencies.

Results: Overall, 184 women and 141 men completed the questionnaire and the mean age was 57.9 y (SD=13.6). Attitude (B=0.54, p<0.0001) and PBC (B=0.50, p<0.0001) were significantly associated with intention, but not subjective norm (B=0.06, p=0.30). Participants who believed that participating in the study would contribute to an improvement in population health were more likely to express high intention (OR=1.9, 95%CI: 1.1-3.2). Believing that participation will be time-consuming was negatively associated with intention (OR=0.6, 95%CI: 0.4-0.7). Obtaining a health report (OR=1.6, 95%CI: 1.1-2.2) was a significant facilitating factor associated with intention. Those who believed that they would participate in the study even without financial compensation (OR=1.4, 95%CI: 1.0-1.9) and even if the total duration for completing the questionnaires would be two hours (OR=1.8, 95%CI: 1.3-2.4) were more likely to have high intention.

Conclusions: Developing a positive attitude and a high PBC toward participating in the NutriQuebec study will be crucial to ensure the representativeness of low SES populations. Although motivation seems to have an altruistic basis (improvement of population health), control beliefs and disadvantages will need to be addressed and overcome to favour an optimal recruitment of low SES participants.
The need for dietary support among overweight or obese colorectal cancer survivors is associated with poorer perceived psychological and physical health.

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Ageing and nutrition (Chair: Abby King), Club A, June 6, 2019, 2:30 PM - 3:45 PM

Cancer prevention and management (SIG)

Objective: To improve health outcomes, colorectal cancer (CRC) survivors are advised to meet diet and body weight recommendations. However, the majority does not meet these recommendations. For example, two-thirds of Dutch CRC survivors are overweight or obese. Previous research shows that CRC survivors with overweight or obesity are particularly in need for dietary support. Although it is known that poor psychological and physical health may be barriers to improving diet, and thus should be incorporated into appropriate dietary support, knowledge on psychological and physical health of CRC survivors in need for dietary support is lacking. Therefore, this study aimed to assess associations between perceived psychological and physical health and the need for dietary support in overweight or obese CRC survivors.

Methods: A cross-sectional survey was conducted among Dutch CRC survivors (BMI 25) using the population-based PROFILES registry (http://www.profilesregistry.nl). Participants completed a self-administered questionnaire, including a single item assessing need for dietary support (yes/no), the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-CR30) to assess Health-Related Quality of Life (HRQoL), and the Hospital Anxiety and Depression Scale (HADS) to measure symptoms of anxiety and depression. Multivariable logistic regression analyses were conducted to assess associations between need for dietary support and HRQoL, symptoms of anxiety, and symptoms of depression.

Findings: One fifth (21%) of the 756 participants reported a need for dietary support. Compared with those without a need for dietary support, those with a need for dietary support were more likely to report symptoms of anxiety (OR 2.02, 95% CI: 1.22-3.33), symptoms of depression (OR 2.06, 95% CI: 1.26-3.39), and a lower HRQoL across all domains (OR 0.30, 95% CI: 0.15-0.58 for high vs. below average overall HRQoL).

Discussion: This first study on perceived health and the need for dietary support among overweight or obese CRC survivors shows that the need for dietary support is associated with poorer perceived psychological and physical health. Findings suggest that it is important to include promotion of psychological and physical health while promoting a healthy diet in overweight or obese CRC survivors with a need for dietary support.
17063

O36, O36.2

New life situations and food related behaviour: When senior citizens lose a spouse

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Ageing and nutrition (Chair: Abby King), Club A, June 6, 2019, 2:30 PM - 3:45 PM

Ageing (SIG)

Purpose:
Consuming nutritious food when ageing is important for maintaining health and to prevent physical decay, and for general quality of life. Therefore, knowledge about changes in food-related behavior for senior citizens is important for preventive action and public health recommendations. The objective of this study was to identify how food habits, food related capabilities, and food related quality of life are affected in life stage transitions involving the loss of a spouse. Second, the extent of formal (public) and informal (private) support received in relation to food and meals in connection with this transition was studied, including the senior citizen's perception of a need for nutrition advice and support.

Methods:
The study used qualitative data from 11 semi-structured interviews with both male and female seniors over the age of 60, living independently, who had lost their spouse within the past three years. Data was analyzed by abductive, thematic approaches, based on theories of (changes in) family identity and satisfaction with food-related life.

Results/findings:
Common for all seniors was a close connection between the social aspect of a meal and food-related quality of life, and a need for support was clearly expressed. This need was often met by family, friends and neighbors through invitations for dinner, cooking classes etc. Social relations were the most important factor for wellbeing and preservation of self. Male seniors were more challenged and often lacked cooking competencies. These were even more difficult to acquire when grieving. This resulted in a lack of variety in the chosen meals. Some seniors joined cooking communities, meeting social needs as well as developing cooking competences, but not all communities were appealing.

Conclusions:
When losing a spouse, there is a tendency to choose meals that are easy to prepare, due to a lack of motivation to cook. Seniors citizens who lose a spouse often need support to maintain healthy food-related behaviors, and find this in friends, family and neighbors as well as in cooking communities. The latter could be encouraged by public and private initiatives to develop cooking competences, improve nutrition and meet social needs and quality of life.
Objective: Consumption of processed food has increased, and these foods are typically high in sugar, fat and salt. We examined the association between ultra-processed food consumption and glucose dysregulation in a prospective cohort study.

Methods: Analyses were conducted using prospectively collected data in the Framingham Offspring Study (FOS) among 2,483 participants ≥25y, with normal fasting glucose (<110mg/dl; ATP) and complete dietary data at exam 5 (baseline for these analyses). Data on diet, measured by a food frequency questionnaire, anthropometrics, sociodemographic factors, smoking, alcohol consumption, physical activity and fasting glucose concentrations were collected at in-person clinical exams 5 and 6. Foods were classified into 4 processing levels according to the NOVA classification; minimally processed foods, processed culinary ingredients, processed foods and ultra-processed foods. Tertile of ultra-processed food consumption at exam 5 (measured as servings/day) was used as the exposure variable. Multivariable logistic regression was used to evaluate the association between ultra-processed food consumption at exam 5 and impaired fasting glucose (≥110mg/dl) at exam 6 (average follow-up of 4 years).

Results: Consuming >8.2 servings of ultra-processed foods/day at exam 5 was associated with 47% higher odds of having impaired fasting glucose at exam 6, compared to consuming <5.2 servings/day, controlling for age, sex and total energy intake (OR: 1.47, 95%CI:0.97-2.24). Associations did not remain significant when controlling for BMI and physical activity. When stratifying analyses by weight status (normal weight vs. overweight/obesity), the highest vs. lowest tertile of ultra-processed food consumption was associated with 165% higher odds of impaired fasting glucose among normal weight participants (N=918, OR: 2.65, 95%CI:1.12-6.28) in age and sex-adjusted models. However, the association did not remain significant when controlling for total energy intake and physical activity. Ultra-processed food consumption was not associated with impaired fasting glucose among overweight and obese participants.

Conclusions: Ultra-processed food consumption was associated with impaired fasting glucose but not when adjusting for BMI and physical activity. Our next analyses will examine the influence of multiple time points of ultra-processed food consumption and impaired fasting glucose over 20 years in the FOS.
O36, O36.4

Protein intake does not impact improvements in body composition, strength and physical function in obese inactive older women in response to caloric restriction and exercise training

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Ageing and nutrition (Chair: Abby King), Club A, June 6, 2019, 2:30 PM - 3:45 PM

Ageing (SIG)

Worldwide, the obesity epidemic has resulted in a new phenotype of frailty in older adults (OAs); the obese and functionally frail OA with reductions in lower extremity physical function (LEPF) and an increased risk for physical disability, especially older women. Weight loss in OAs often invokes concerns regarding reductions in lean mass and bone mass/density. However, growing research has indicated a positive impact of weight loss on LEPF in OAs. Exercise (EX) and a higher protein diet (PRO) are both known to independently and positively impact body composition, muscle strength and LEPF; however, the interactive effects of EX and PRO in OAs undergoing caloric restriction have not been studied. Objective: The aim of this study was to determine the relative efficacy of a PRO with or without EX to improve body composition, muscle strength, and LEPF in older inactive obese women undergoing weight loss. Methods: Women (n=61, BMI=31.1±smn;5.1 kg/m2, 69.2±smn;3.6 y) completed a 6-month weight loss program after randomization to three groups: 1) higher protein diet (PRO, ~30% energy from protein; n=20), 2) PRO plus exercise (PRO+EX; n=19), or 3) a conventional protein control diet plus EX (CON+EX, ~18% energy from protein; n=22). EX was supervised, multi-modal and 3 sessions/week. Body composition was measured via dual-energy X-ray absorptiometry; muscle leg strength by isokinetic dynamometry; and LEPF via 6-minute walk, 8-foot up and go, and 30-second chair stand tests. Results: Changes in weight (-7.5±smn;4.1 kg; -9.2±smn;4.8%), fat mass, and lean mass did not differ among groups (all P>0.05). Despite weight loss, muscle strength improved in the exercise groups (PRO+EX; 7%; CON+EX; 6%) whereas it declined in the PRO group by -6% (P<0.001). For all LEPF measures, the PRO group had attenuated improvements compared to both PRO+EX and CON+EX (all P<0.01). Conclusions: Exercise during weight loss is critical to preserve strength and enhance LEPF; however, a higher protein diet does not appear to influence body composition, muscle strength or LEPF changes when combined with exercise. More research is needed regarding the interactions of dietary protein intake and exercise during weight loss for functional improvements in older women. (ClinicalTrials.gov identifier: NCT01893684).
Effectiveness of the Singapore Physical Activity and Nutrition Study: A Clustered Randomised Controlled Trial

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Ageing and nutrition (Chair: Abby King), Club A, June 6, 2019, 2:30 PM - 3:45 PM

Purpose: The World Health Organisation has recommended a focus on increasing physical activity (PA) and improving nutrition to curb high burden rates of non-communicable diseases. Despite escalating levels of sedentary behaviour and poor dietary habits, limited intervention research has been undertaken in aging Asian populations. The Singapore Physical Activity (PA) and Nutrition Study represents the first study to examine the impact of a community-based intervention to improve the health behaviours (physical activity and diet), anthropometric and blood parameter outcomes of sedentary Singaporean women.

Methods: A 6-month PA and nutrition clustered randomised controlled trial targeting women aged 50 years and over from 27 recreational centres, was implemented across five districts - intervention (n=3) and control (n=2). The intervention group received educational resources; nutrition workshops, PA classes and dietary counselling sessions which was guided by the Social Cognitive Theory. Study outcomes were self-reported PA and dietary habits; lipid and glucose profile; anthropometric (body mass index, waist-hip ratio, body fat percentage) and blood pressure measurements analysed using descriptive analysis, bivariate analysis (chi square and t-tests) for comparison between groups from baseline to 6 months.

Results: 1324 potential participants were screened; 683 were eligible and blinded to the intervention (n=351, 14 centres) and control (n=332, 13 centres) group. 84% (n=295) and 86% (n=285) of participants completed the 6-month intervention. The intervention group significantly increased their level of moderate PA (p<0.001), vigorous PA (p<0.001), and total PA (p<0.004); consumed significantly higher daily servings of fruit (p <0.001) and vegetables (p=0.027); reduced salt and salty sauce intake (p=0.026); reduced diastolic blood pressure (p<0.015) and blood glucose (p<0.004) post-test relative to the control group.

Conclusions: These findings suggested that the Singapore Physical Activity and Nutrition study was efficacious in improving PA and dietary behaviours, reducing diastolic blood pressure and blood glucose levels among Singaporean women. Government and policy makers may consider implementing such health interventions within recreational settings to support healthy aging.

Trial registration
Australian and New Zealand Clinical Trials Registry, ACTRN12617001022358.
Registered on 14 July 2017.

Funding source
This study is financially supported by the researcher's institution only.
Promoting health literacy in older adults through self-reliant working groups – Results of the GeWinn intervention

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Objective
Health literacy (HL), defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions," has been demonstrated to be limited among seniors over the age of 65. Nevertheless, HL interventions are lacking. The objective of this study was to develop a community-based intervention to strengthen HL and self-management competencies among seniors. Participants included 283 seniors over the age of 60, living in their own households in rural areas in Germany. A participatory approach was used to determine subgroup-specific needs and resulted in a peer-moderated intervention including 19 meetings over a time span of 1 year. Self-management competencies, physical activity, nutrition and joint activities were addressed through self-reliant working groups HL.

Methods
HL was measured three times using the HLS-EU-16 questionnaire. Repeated-measures analysis of variance (RM ANOVA), Bonferroni’s post hoc tests, and partial eta-squared (?;p2) coefficient were used for investigating the effect of time on selected variables and effect size evaluation.

Results
Of 183 people, who completed the HL questionnaire (mean age 69.8, SD 6.74; 20.1% male), 42.3% had intermediate or low levels of HL. A statistically significant effect of time on HL scores (F1.91 = 16.948, p = 0.01, eta squared = 0.085) over the one year period was identified. HL subdimensions showed similar results. The age also had a significant influence as a covariate (F1.93 = 3.062, p = 0.05), with a small effect size (partial eta squared = 0.017).

Conclusions
The results indicate that the structure of the intervention is appropriate to involve seniors in self-reliant working groups to improve health literacy. Further research designed specifically to address whether this type of intervention can improve HL disparities in different vulnerable groups (e.g. older men, seniors with low socio-economic status, migrants) is needed.
Are changes in adherence to the 24-hour movement guidelines associated with depression and anxiety symptoms among youth?

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Mental health and behavioral nutrition and physical activity (Chair: Megan Teychenne), Club B, June 6, 2019, 2:30 PM - 3:45 PM

Other

Purpose: There remains a need for prospective research examining the 24-hour movement guidelines in relation to mental health among large youth populations. This study examined whether changes in adherence to the guidelines (moderate-vigorous physical activity [MVPA], resistance exercise, sleep, screen time) were associated with depression and anxiety symptoms.

Methods: Conditional change models were used to analyze two waves of longitudinal questionnaire data (2016/17, 2017/18) from students in grades 9-12 (N=2272 depression; N=2609 anxiety) attending 14 schools in Ontario and British Columbia, Canada, as part of the COMPASS study. Change in adherence to the MVPA, screen time, sleep duration, and resistance exercise guidelines were modeled as predictors of depression (CESD-10R) and anxiety (GAD-7) symptoms at wave 2, controlling for wave 1 scores and covariates. Models were stratified by sex.

Results: Adherence to the MVPA and resistance training guidelines was not associated with anxiety or depressive symptoms in females or males, when controlling for sleep and screen time guideline adherence and covariates. For both females and males, continued adherence to sleep guidelines (anxiety: females: Est:-1.07,SE:0.33,p=.001, males: Est:-0.88,SE:0.32,p<.01; depression: females: Est:-1.47,SE:0.38;p=.0001, males: Est:-1.62;SE:0.38,p<.001) and transitioning from inadequate to sufficient sleep (anxiety: females: Est:-1.70,SE:0.41,p<.0001, males: Est:-0.89,SE:0.40,p=.03; depression: females: Est:-1.77,SE:0.47,p=.0002, males: Est:-1.10;SE:0.49,p<.03) were associated with lower anxiety and depressive symptoms. For screen time, females (Est:-1.66,SE:0.76,p=.03) and males (Est:-2.77,SE:1.19,p=.02) who transitioned from exceeding guidelines to guideline adherence reported lower depressive symptoms than students who continued to exceed guidelines. Both females (Est:-1.66,SE:0.76,p<.03) and males (Est:-2.77,SE:1.19,p<.02) who consistently met screen time guidelines reported lower depressive symptoms than their counterparts who transitioned from excessive screen time to meeting guidelines.

Conclusions: Adherence to the sleep guidelines emerged as the most consistent predictor of both anxiety and depression symptoms when considering the movement behaviours simultaneously. Results were similar across sex and type of symptoms, with the exception of screen time. This study provides prospective evidence of the important link between screen time and depressive symptoms. Promoting adherence to sleep and screen use recommendations should be considered priorities for youth mental health at a population level.
O37, O37.2

Are changes in adherence to the 24-hour movement behaviour guidelines (MVPA, total screen time, sleep) associated with flourishing among youth?

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Mental health and behavioral nutrition and physical activity (Chair: Megan Teychenne), Club B, June 6, 2019, 2:30 PM - 3:45 PM

Objective

Extensive research has examined whether physical activity (PA) reduces risk of mental health disorders such as depression. There is less evidence regarding the relationship between PA and positive mental health constructs such as flourishing. The objective of this study was to examine if changes in adherence to the Canadian 24-hour movement behaviour guidelines (moderate-to-vigorous PA, total screen time, sleep) are associated with changes in flourishing over one year.

Methods

Students (N=2774) were recruited from 14 secondary schools (grade 9-12) in Ontario and British Columbia, Canada as part of the COMPASS study. Self-report questionnaires were used to assess health behaviours and flourishing (Diener's Flourishing Scale; Diener et al., 2010) at two time points (2016/17; 2017/18). Conditional change models were used to analyze two-wave longitudinal data. The dependent variable was the flourishing score at wave 2, and independent variables included flourishing at wave 1 and change scores on the health behavior predictors. The analyses were stratified by sex and implemented in SAS9.4.

Results

For males only, a one unit increase in adherence (related to meeting one more guideline) from wave 1 to wave 2 was significantly associated with 0.29 more points in wave 2 flourishing, controlling for wave 1 flourishing and other covariates. For males only, meeting MVPA guidelines both years was associated with higher flourishing (Est:0.78,SE:0.33,p<.02). Reducing screen time was associated with higher flourishing for males only relative to other males who continued to exceed the screen time guidelines (Est:2.10,SE:0.96,p <.02). Changing to meet sleep guidelines was consistently associated with higher flourishing among both females (Est:0.87,SE:0.35,p<.01) and males (Est:0.96,SE:0.42,p<.02).

Conclusions

This study provides prospective evidence supporting the relationship between movement behaviours and flourishing among youth. There were important sex differences with positive associations more likely among males. An improvement in sleep had the most consistent association with greater flourishing highlighting sleep as an increasing public health priority in the context of 24-hour movement behaviours. These findings contribute to increasing calls for research examining positive mental health constructs independent of mental illness. This may provide a platform for novel messaging about the benefits of PA at a population level.
Reciprocal associations between depression and screen behaviors in adolescents differs by depressive dimension and screen-type

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Mental health and behavioral nutrition and physical activity (Chair: Megan Teychenne), Club B, June 6, 2019, 2:30 PM - 3:45 PM

Other

Purpose: The four-factor model of depression has four distinct dimensions - negative affect, positive affect, interpersonal disturbances, and somatic symptoms. Two individuals with depression may experience unique symptomologies, thus exhibiting few overlapping depressive dimensions. Sedentary behaviors are associated with depression in youth, however previous studies assessing the relationship between screen-based sedentary behaviors and depression have failed to account for the specific dimensions of depression, which may partially explain inconsistencies in the literature. The aim of this study is to assess whether these four dimensions of depression are uniquely and bi-directionally associated with screen-based sedentary behaviors in adolescents across a one-year period; and to test sex as a moderator.

Methods: Participants from a longitudinal cohort (N=2,717, baseline Mage=14.57yrs) completed paper-and-pencil questionnaires during two assessment periods one year apart. At each time point, participants reported on daily television viewing and computer/videogame use (=2 hours/day; yes vs. no). Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D) and the four depressive dimension subscale scores were treated as continuous variables. Bi-directional associations for each screen-based sedentary behavior and CES-D subscale pair were assessed with linear and logistic regression models, controlling for demographic characteristics, physical activity levels, body mass index, and school at baseline.

Results: Baseline computer/videogame use was related to negative affect (βa;=0.06, p=0.01) and somatic symptoms (βa;=0.06, p=0.02) at one-year follow-up. This association was moderated by sex; baseline computer/videogames and subsequent negative affect was significant in girls (βa;=-0.11, p=0.002), but not in boys (βa;=-0.004, p=0.90). Baseline negative affect was related to greater odds of engaging in =2 hours/day of computer/videogames (OR 1.29, 95%CI 1.06-1.58, p=0.01). Conversely, baseline positive affect was protective against subsequent engagement in excessive computer/videogame use (OR 0.87, 95%CI 0.77-0.98, p=0.03).

Conclusions: Television viewing and dimensions of depression were unrelated in this sample. Bi-directionality is specific to computer/videogame use and the negative affect dimension of depression in girls. Interventions aimed at reducing screen behaviors as means of improving emotional health and vice versa should target computer/videogame use in girls with high negative affect.
Air Pollution, Psychological Resilience, and Recovery from Injury: The Behavioral Protocol of Program 4 in the HAIE Study

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Purpose: Over 90% of the world’s population live in areas exceeding the WHO air quality guidelines. Air pollution has been linked to increased mortality and morbidity, raising the question of whether the health and wellbeing benefits of physical activity (PA) can be fully realized in individuals living in highly polluted environments. Herein, we introduce the behavioral study protocol of Program 4 in the HAIE study, which aims to assess the impact of air pollution on a range of health indicators including psychological outcomes associated with PA and sport-related injury.

Methods: This is a prospective cohort study of 1,500 persons aged 18-65 comparing: (1) individuals living in the highly polluted, industrial region surrounding the city of Ostrava (n=750), and (2) controls from the comparison region with relative low pollution levels in Southern Bohemia (n=750). Quota sampling will be used to obtain samples balanced on age, gender, PA status (60% active runners vs. 40% insufficiently active) and reflecting the socioeconomic distribution of the population. Participants will be screened and complete baseline assessments through online questionnaires and in-person lab-based assessments of physiological, biomechanical, neuroimaging and cognitive function parameters. Prospective monitoring of behavioral parameters (PA, sedentary behavior, and sleep), sport-related injuries and their psychological correlates will take place for 12 months through fitness trackers, smartphones, and mobile apps.

Results/findings: The prospective monitoring together with bursts of intensive sampling of daily experiences will allow for (1) the assessment of both short-term variation and long-term change in behavioral parameters, (2) evaluation of the incidence of musculoskeletal injuries and psychological factors impacting behavior and injury recovery, and (3) the impact that air pollution status has on behavior, psychological resilience, and injury recovery. This presentation will introduce the objectives of the behavioral assessment, hypotheses, and methods utilized in this interdisciplinary study (with data collection commencing in March 2019).

Conclusions: This study will evaluate the benefits of physical activity for individuals living in areas with high versus low air pollution, helping inform individuals about personal risk factors as well as decision-makers about the impact of environmental factors on negative health outcomes and potential underlying biological, behavioral and psychological mechanisms.
Objective: The relationship between exercise and body image in complex. This project aimed to test the impact of everyday social comparisons on body image and physical activity behaviour among young women (aged 17-25 years) using an Ecological Momentary Assessment approach.

Methods: Undergraduate women (N = 38) aged 17-25 years completed a baseline survey (incorporating measures of trait social comparison and body appreciation) followed by a series of brief online momentary assessments at five random intervals per day over five days. Participants wore a GeneActiv wrist-worn accelerometer to objectively measure physical activity (MVPA) for the same time period (24h/5d). At each momentary assessment, participants responded to questions on state body image and were asked to indicate whether they had compared their physical fitness or appearance with anyone since the last assessment.

Results: The majority of participants compared both their appearance (77%) and their physical fitness (87%) to someone else during the 5-day period. Trait levels of appearance comparison significantly predicted the frequency of making both daily appearance comparisons and fitness comparisons. At a daily level, higher body satisfaction and making appearance-based comparisons were associated with increased levels of MVPA.

Conclusions: The findings highlight the important role that body satisfaction and everyday appearance comparisons may play in relation to physical activity behaviour. More research is needed to understand the mechanisms by which body image and social comparison impact physical activity behaviour.
Associations between aerobic and muscle-strengthening exercise with depressive symptom severity among 17,839 U.S. adults.

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Mental health and behavioral nutrition and physical activity (Chair: Megan Teychenne), Club B, June 6, 2019, 2:30 PM - 3:45 PM

Objective: For the prevention and management of chronic diseases, global physical activity guidelines state that an adult should engage in regular moderate-to-vigorous aerobic physical activity (MVPA; e.g. walking, cycling, running) and muscle-strengthening exercise (MSE; e.g. strength/resistance training). However, the associations between combined MVPA-MSE with chronic health conditions is rarely examined in large population studies. In particular, little is known about the associations between combined MVPA-MSE with depressive disorders, one of the leading causes of disability worldwide. The aim of this study is to describe the associations between MVPA and MSE with depressive symptom severity among a large sample of U.S. adults.

Methods: Data were drawn from the U.S. 2015 Behavioral Risk Factor Surveillance System. During interviews, MVPA and MSE was assessed by validated questionnaires. Depression symptom severity was assessed by validated eight item Personal Health Questionnaire Depression Scale (PHQ-8). Poisson regression with a robust error of variance were used to assess prevalence ratios (PR) of depression symptom severity (mild, moderate, moderately severe/severe) across categories of physical activity guideline adherence (met neither [reference]; MSE only; MVPA only; met both), adjusting for potential confounders (e.g. age, sex, income, self-rated health, smoking, previous depression diagnosis).

Results: Data were available on 17,839 adults (18-85 years). Across physical activity classification categories, 45.2% met neither guideline, 9.6% met MSE guideline only, 28.4% met aerobic MVPA guideline only and 17.8% met both guidelines. When compared with those meeting neither guideline, for mild, moderate and moderately severe/severe depressive symptoms, the PRs were lowest among meeting both guidelines (range: 0.26-0.54), followed by MVPA only (range: 0.36-0.62) and MSE only (range: 0.49-0.84). Across the three levels of depression symptom severity, the APRs for depressive symptom severity showed an inverse linear gradient, with the lowest for each physical activity guideline adherence category among the group with the most depressive group.

Conclusions: Among a large sample of U.S. adults, compared to other guideline adherence categories, meeting both MVPA-MSE guidelines was associated with a lowest likelihood of reporting depressive symptoms. Future public health programs to prevent and manage depressive disorders should promote both concurrent MVPA-MSE.
Tackling obesity with big data: a new data reporting framework

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Objective

Data that relate to nutrition and physical activity behaviours are being generated at an alarming rate, through smart phone applications, wearable devices and supermarket loyalty card schemes. Often these are referred to as 'big data'. When using such data in research, they are re-purposed, rather than generated specifically to answer a research question. As such, they present new challenges in reporting and interpreting. The purpose of this work was to generate a new framework for reporting big data sources that could be applied to a whole systems approach to obesity research.

Methods

Expert opinion, generated by a group of multidisciplinary, multi sector and international individuals was used to ascertain the most important requirements for reporting sources of re-purposed data. These experts were collectively named the Economic and Social Research Council funded Strategic Network for Obesity. A new reporting framework was created and then applied and tested on a variety of data sources. Exemplar indicative use cases were described for each data source, alongside an indication of how these relate to a whole systems approach to obesity, using the Foresight obesity systems map as a guide (Foresight, 2007).

Results

Eight areas were identified as essential to reporting of big data for obesity research: Background; Elements; Exemplars; Content; Ownership; Aggregation; Sharing; Temporality (BEE-COAST). The new BEE-COAST framework was applied and tested on data sources from the UK, including: Physical activity applications/wearables; Web based or smartphone apps to record diet; and Ordnance Survey (OS) Points of Interest (POI) Data. Collectively, the big data sources covered 80% of the obesity system, as depicted in the Foresight report (Morris et al., 2018).

Conclusions

New data sources, generated as 'big data' offer exciting opportunities for obesity research. However, effective reporting of such data are essential in order to maintain integrity and reproducibility of findings.

References

Lessons learned from a 1-year feasibility study of people aged 57-74 years with obesity and sedentary life-style undergoing exercise, nutrition and psychological counselling

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Objective: Permanent lifestyle change among sedentary people with obesity can provide individual and public health benefits. This study expands current knowledge on long-term maintenance of lifestyle changes, by evaluating novel tools in a complex intervention.

Methods: Participants were recruited from the seventh survey of the population-based Tromsø Study (2015-16). Inclusion criteria were; age (55-74 years), body mass index (BMI) (=30kg/m2), physical activity (PA) level (sedentary), cardiovascular disease risk (NORRISK 2 elevated), and no prior myocardial infarction. The 22-week intervention program included instructor-led gradually intensified endurance and strength training twice weekly. During the first 10 weeks one individual nutritionist counseling session followed by three group counseling sessions (Nordic Nutritional Recommendations), and three psychologist group counseling sessions (Implementation Intention strategies). Polar M430 pulse watch monitored daily activity level during and six months after the intervention. Using validated questionnaires, we examined nutritional and psychological status from baseline to end of intervention. Semi-structural interviews at 14 weeks and six months after intervention focused participants' lifestyle habits, barriers to lifestyle changes and experiences from intervention.

Results: Altogether 75 were invited, 20 responded and sixteen participants (eleven men, mean age 66.1±smn;5.8 and mean BMI 35.6±smn;5.3) were included. All met for individual nutritionist counselling, and group session attendance was 80%. Psychologist sessions attendance was 80%. There were no dropouts from the exercise program. Fourteen participants attended 71% of 42 workouts. Two participants engaged in alternative to aerobic exercise due to physical limitations. Participants who experienced exercise-related pain did alternative exercises. Participants' endurance, strength, self-efficacy increased significantly and total PA increased (ns). Waist circumference and fat mass decreased significantly. In semi-structured interviews, participants expressed high satisfaction with group exercises, but total counselling overload during the first 10 weeks. Majority of participants reported challenges to maintain the level of physical activity from the intervention on a long-term basis.

Conclusion: Sedentary participants with obesity aged 57-74 years adhered to the intervention, benefitted from strength and endurance exercise, and increased their total PA. Interviews added important information regarding stepwise introduction of intervention elements, and structure for follow-up when proceeding to a full RCT aiming permanent lifestyle change.
Identification of Internet-based Media Content Analysis Methods for Food and Nutrition Topics

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Behavioral nutrition assessment in adults (Chair: Joline Beulens), Club C, June 6, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose
The internet is widely used by consumers to acquire information about food and nutrition. Insights about the scope, coverage, content and framing (tone or spin) of online messages that target consumers can help researchers and public health practitioners understand widespread beliefs, attitudes, and values around food and nutrition. Prior literature has not identified or categorized the wide range of internet-based content analysis methods used to analyze these messages. We examined the research methods used in published studies on food and nutrition messages delivered through different internet platforms to understand how relevant issues are framed.

Methods
A systematic search was conducted in four English electronic databases using the key search terms of "content analysis" AND "nutrition" OR "food" AND "Internet". The topic areas, objectives, methods, and results were extracted from each study, and descriptive statistics were used to analyze results.

Results
Out of 201 studies identified, 37 met the inclusion criteria for this review. Studies utilized both qualitative and quantitative content analysis methods. Qualitative methods include developing an inductive or deductive codebook to capture food and nutrition themes, whereas quantitative methods include scoring content about food and nutrition by using a survey or questionnaire. There was no uniformity in search strategies for collecting data about food and nutrition on the internet, which included the use of internet search engines (n=8), advertisements (n=6), internet data analytic websites (n=3), and media websites to locate news releases (n=5). All studies analyzed either only textual information (n=11), videos (n=1), pictures (n=3), games (n=2) or a combination of these components (n=20). About 60% of studies assessed website content (n=22). The most researched topic was food marketing techniques for websites targeting youth (n=15). Only studies nine studies assessed framing (tone or spin).

Conclusion
Internet-based content analysis methods can be used to analyze to a wide range of food and nutrition issues. The rapid development of internet content, such as the creation of new social media platforms, games, or website interfaces, calls for a broad, yet uniform, internet-based content analysis procedure that can adapt to the future methods of presenting food and nutrition information.
Socioeconomic status is associated with energy misreporting but not with consumption of energy-dense, nutrient-poor foods

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Behavioral nutrition assessment in adults (Chair: Joline Beulens), Club C, June 6, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: A higher consumption of energy-dense, nutrient-poor (EDNP) food has been associated with lower socioeconomic status in many surveys. The aim of this study was to examine the role of socioeconomic status in the reporting of food and energy intakes in a national nutrition survey.

Methods: The Goldberg criteria were used to classify low energy reporters (reported energy intake divided by basal metabolic rate < 0.9) and plausible reporters (reported energy intake divided by basal metabolic rate > 0.9) using the first day of 24-hour recall for 9,435 adults aged 19 years and over participating in the Australian National Nutrition and Physical Activity Survey 2011-12. Differences in food type (healthy versus EDNP) and energy intake were assessed by socioeconomic status quintile (based on summary of income, education and occupation of region) between the two groups using a generalised linear model.

Results: The proportion of low energy reporters decreased with higher socioeconomic status quintile; from 22.1% in the lowest quintile to 16.6% in highest quintile, Ptrend<0.001. Energy intake from EDNP foods was 33.8% in the lowest socioeconomic quintile compared with 31.2% in the highest quintile (P<0.001). Although the proportion of energy from EDNP foods was smaller for low energy reporters compared to plausible reporters (26.6% energy compared to 34.1%, respectively), there was no significant difference in the magnitude of misreporting EDNP foods across the socioeconomic quintiles (P=0.568).

Conclusions: Low energy reporting was more common in people of lower socioeconomic status but when comparing low energy reporters to plausible reporters, EDNP foods were not differentially underreported across the socioeconomic gradient. These findings provide a better understanding of sociodemographic factors associated with Australian national dietary data enhancing the interpretation of the survey results. Improved understanding sociodemographic factors in dietary data assists to elucidate the role of diet in chronic disease.
What do Australian adults eat for breakfast? A latent variable mixture modelling approach for understanding combinations of foods at eating occasions.

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Behavioral nutrition assessment in adults (Chair: Joline Beulens), Club C, June 6, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: Little is known about the patterning of food intake at eating occasions (EO); understanding how foods are combined together at EO will help identify nutritional strategies to improve diet quality. However, the many permutations of food combinations at EO require novel analytic approaches to capture this complexity. We applied a latent variable mixture modelling approach to understand how foods are consumed in relation to each other at breakfast EO in Australian adults.

Methods: Dietary intake at breakfast (n=8361 EO) was assessed via 24-h recall during the 2011-12 National Nutrition and Physical Activity Survey (n=3545 men and n=4127 women, ?19 y). Two-part latent variable mixture modelling, appropriate for use with semi-continuous data, was used to determine distinct breakfast food profiles based on 35 food group variables reflecting compliance with Australian Dietary Guidelines, or diet quality. F and adjusted-chi2 tests assessed differences in socio-demographics between the latent breakfast profiles.

Results: Five distinct profiles were found. Three were similar for men and women. These were labelled: "Wholegrain cereals and milks" (men: 16%, women: 17%), "Brunch" (men and women: 11%) and "Mixed cereals and milks" (men: 33%, women: 37%). Two "Breads and spreads" profiles were also found that were differentiated by their accompanying beverages (men) or type of grain (women). Differences in diet quality and socio-demographics between profiles were observed. For example, nuts and seeds, fruit and yoghurt featured more prominently in the "Wholegrain cereals and milks" profile whereas refined cereals/grains featured more prominently in the "Mixed cereals and milks" profile. Men with a "Bread and spreads (plus tea/coffee)" profile were older (P<0.001) and a higher proportion were in the lowest income quintile (P<0.05) and resided in inner regional areas (P<0.001), when compared to the other profiles. Women with a "Brunch" profile were younger (P<0.001) and less likely to be married (P<0.01).

Conclusions: We identified five breakfast food profiles in adults that varied by indicators of diet quality and socio-demographics. Latent variable mixture modelling is a useful approach to capture the complexity of food combinations at EO. Future research could examine associations of EO food profiles with overall diet quality and health.
Healthy Eating Index-2015 and the Dietary Patterns Methods Project: Enhancing Understanding of Diet Quality

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Behavioral nutrition assessment in adults (Chair: Joline Beulens), Club C, June 6, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Four research groups initiated the Dietary Patterns Methods Project in 2012 to strengthen the scientific evidence base on dietary patterns and inform dietary guidance. With the release of the updated Healthy Eating Index-2015 (HEI-2015), developed to align with the 2015-2020 Dietary Guidelines for Americans, we examined its predictive validity and compared it with other key diet quality indices.

Methods: The HEI-2015 is the most current version of the HEI. We tested the HEI-2015 for construct validity and reliability, as well as for predictive validity, as part of ongoing efforts with the Dietary Patterns Methods Project. We examined the relationship between the HEI-2015 and all-cause, cardiovascular disease (CVD) and cancer mortality in the NIH-AARP Diet and Health Study (n = 492,823). Data from a 124-item food-frequency questionnaire were used to calculate scores; adjusted hazard ratios (HR) and 95% confidence intervals (CI) were estimated. We also compared findings with the HEI-2010, Alternative Healthy Eating Index-2010 (AHEI-2010), alternate Mediterranean Diet (aMED), and Dietary Approaches to Stop Hypertension (DASH).

Results: During 15 years of follow-up among the NIH-AARP prospective cohort, 84,774 deaths were documented, including 27,962 cancer deaths and 23,438 CVD deaths. Men and women in quintile 5 (highest diet quality) compared with quintile 1 (lowest) had a 13-23% decreased risk of all-cause, cancer, and CVD mortality. Specifically, the adjusted HRs (and 95% CI) for men and women, respectively, for all-cause mortality were HR: 0.80 (95% CI: 0.78, 0.82) and 0.77 (95% CI: 0.74, 0.80); for cancer mortality, HR: 0.78 (95% CI: 0.74, 0.82), and 0.80 (95% CI: 0.75, 0.86); and for CVD mortality, HR: 0.87 (95% CI: 0.83, 0.92), and 0.79 (95% CI: 0.73, 0.85). Additional analyses found similar results with other scores (12-28% decreased risk), including the HEI-2010, AHEI-2010, aMED, and DASH.

Conclusions: These findings indicate that multiple scores reflect core tenets of a healthy diet that may lower risk of mortality. As the application of dietary patterns continues to expand, additional efforts can inform behavioral nutrition research and dietary guidance, supporting the robust use of index scores to enhance understanding of diet quality among the population.
THURSDAY JUNE 6 2019
SHORT ORAL SESSIONS
SO01, SO01.1

Making hospital shops healthier: implementation of an innovative nutrition-based mandatory standard for products and promotions in hospital food retail outlets

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Nutrition policies and environmental interventions (Chair: Cindy Gray), South Hall 2A, June 6, 2019, 3:50 PM - 4:25 PM

Policies and environments (SIG)

Objective Food retail outlets in the healthcare setting have the potential to facilitate healthier food choices by staff, patients and visitors. The innovative Scottish Healthcare Retail Standard (HRS) is a national mandatory scheme for all hospital food retail outlets that aims to addresses access, promotions and product range, seeking to increase healthy choices and reduce unhealthy products and promotions. We aimed to explore retailers' experiences of implementing HRS and the impact of implementation on food and drink product range and promotions.

Methods We conducted a mixed methods study to examine implementation of HRS in a sample of hospital retail outlets (n=17: 13 shops and 4 trolley services) comprising: (a) structured observational audits of stock, layout and promotions; (b) face-to-face, semi-structured interviews with the shop manager or nominated members of staff (n=32). Data were collected at Wave 1 (2016), during the early stages of HRS implementation; and Wave 2, 12 months later, after the HRS implementation deadline.

Results All outlets (both commercial and not-for-profit) in the sample successfully implemented HRS. Although the number of chocolate product lines and promotions reduced substantially between Waves 1 and 2, there was not a corresponding increase in fruit product lines and promotions. Implementation was more challenging for independent shops. Retail managers identified areas where more implementation guidance and support could have been provided. Despite initial negative expectations of HRS’s impact, managers identified some opportunities in the scheme and positive changes in the supply chain.

Conclusions Positive changes in food retail outlets occurred after hospital shops were required to implement HRS. By creating a consistent approach across hospital shops in Scotland, HRS changed the context in which food purchase decisions are made by hospital staff, visitors and patients. HRS provides a regulatory template and implementation learning points for influencing retail environments in other jurisdictions and settings.
Benchmarking the implementation of policies to create healthy food environments compared to best practice: A case study from Singapore

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Nutrition policies and environmental interventions (Chair: Cindy Gray), South Hall 2A, June 6, 2019, 3:50 PM - 4:25 PM

PURPOSE: Government policies and actions to create healthy food environments are increasingly recognized as crucial to prevent obesity and non-communicable diseases. In 2016, the Singapore government launched a multi-year plan to systematically tackle type-2 diabetes. This offers a window of opportunity to evaluate national policies compared to best practice, and propose actions that support the development of healthier food environments.

METHODS: The Healthy Food Environment Policy Index (Food-EPI) tool and process were used. The tool contains 47 good practice indicators related to specific government actions across 7 food policy domains and 6 infrastructure support domains. We compiled evidence on extent of implementation by Singapore's government for each of the 47 indicators, which was subsequently verified by government officials for accuracy and completeness. Based on this evidence, a national panel of 20 independent, non-government public health experts specializing in nutrition, obesity, or chronic disease, rated the extent of implementation of policies and infrastructure support actions against international best-practice. Based on implementation gaps identified, the panel prioritized indicators using a voting system, in consideration of importance and achievability. Concrete actions proposed by the panel for the top 11 indicators were summarized and sent to the expert panel for final approval.

FINDINGS: A majority of the indicators was rated at 'moderate implementation (46.8%), followed by 'high' implementation (23.4%), 'very little, if any' implementation (17.0%) and 'low' implementation (12.8%). Many (75.0%) of the indicators which rated at 'very little, if any' implementation were from the food policy domain, and these were largely the ones prioritized for further government action. The national panel recommended 25 food policy actions and 6 infrastructure support actions, which included establishing minimum standards for nutrients of concern across all food categories, strengthening existing guidelines for nutrition and menu labelling and restricting advertising to children, and considering fiscal mechanisms to support healthier food purchase.

CONCLUSION: This is the first study to evaluate food environment policy implementation in Singapore. Results from this study, which reflect expert's ratings supported by documented evidence, provides meaningful guidance to government officials and public health advocates in their efforts to improve the food environment in Singapore.
Validity and reliability of the “Canteen Scan”: an online tool to assess the health level of a canteen.

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Nutrition policies and environmental interventions (Chair: Cindy Gray), South Hall 2A, June 6, 2019, 3:50 PM - 4:25 PM

Objective
To create healthier canteens we need valid and reliable tools to measure health levels of canteens. This study examined in Dutch schools the reliability and validity of the "Canteen Scan", an online tool to evaluate the health level of canteens by assessing the availability and accessibility of food/drink products.

Methods
In 50 school canteens, a canteen employee, a school canteen advisor (SCA) of the Netherlands Nutrition Centre and a researcher filled out the Canteen Scan (CS) and took pictures independently. In the first 25 schools, a second SCA also filled out the CS. A reference score was created by consensus between the first SCA and the researcher. In addition, "remote scans" were performed by SCA’s, i.e. they adjusted scans according to pictures of the canteens. Scores of different users were compared and analysed separately for food availability on display, and in vending machines (VM) and for food accessibility. Inter-rater reliability and validity were calculated with Weighted Cohen's Kappa coefficients.

Results
Food availability on display showed moderate to good validity and reliability for all users (K>0.70). Food availability in VM and food accessibility revealed good validity if filled in by SCA (K>0.72), but not for canteen employees (K<0.38). Canteen employees scored accessibility structurally more positive. The reliability analyses of food availability in VM and food accessibility showed moderate reliability between SCA's (K>0.63), but low reliability between SCA's and canteen employees (K<0.43). Analyses that compared the scores in the canteen with the scores of remote scans showed moderate to good validity and reliability (K>0.77), if a SCA made the pictures and filled out the scan.

Conclusions
The Canteen Scan is a valid and reliable online tool to assess availability of products on display in school canteens. The tool can also evaluate product availability in vending machines and product accessibility valid and reliable if filled out by SCA's, but not yet if filled out by canteen employees. This study increased the knowledge about how to assess the health level of canteens valid and reliable and how to combine the assessment of food availability and accessibility in one online tool.
Feasibility of working with a wholesale supplier to independent UK Fish & Chip Shops to co-design and test the acceptability of an intervention to promote smaller portion meals.


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Nutrition policies and environmental interventions (Chair: Cindy Gray), South Hall 2A, June 6, 2019, 3:50 PM - 4:25 PM

Policies and environments (SIG)

Purpose: Takeaway meals deliver large portions, driving high energy consumption. The estimated 10,500 UK Fish & Chip Shops deliver takeaway meals with a median energy content > 1,600kcal. Our aim was to explore the feasibility of working with a wholesale supplier to Fish & Chip Shops to co-design and test the feasibility and acceptability of an intervention emphasising portion control through box-packaging, and actively promoting smaller portion meals (SPMs).

Methods: We used an uncontrolled before-and-after study to assess the feasibility of working with a wholesale supplier to co-design and deliver an engagement event with shop owners/managers, describing the financial benefits of promoting SPMs served in box-packaging. Business incentives and posters promoting SPMs were provided. We conducted in-store observations at baseline and two and six weeks post-intervention; collected sales data pre and post-intervention; undertook an exit survey with customers; and semi-structured interviews with owners/managers and intervention deliverers post-intervention.

Results: Twelve Fish & Chip Shops were recruited from northern England, observational data were collected from eight. At baseline, six of these eight shops did not clearly display the availability of SPMs; at follow-up all eight did and five displayed the promotional poster. Seven out of 12 shops provided sales data, all of which reported increased sales of SPMs post-intervention. Of 46 customers from five shops surveyed: 13 were unaware of the availability of SPMs; nine had bought SPMs; and 17 of those who had not bought them were interested to try them in the future. The nine owners/managers interviewed found the intervention acceptable but wanted a clearer definition of a SPM; the supplier valued the experience of intervention co-production and saw the intervention as being compatible with their responsibility to drive innovation but the financial costs of delivery were substantial.

Conclusions: Co-design of the intervention was feasible and facilitated delivery of an intervention that was acceptable to both owners and customers. Sales of subsequent SPM specific packaging suggest that promotion of such meals is viable and may be sustainable. Wider delivery of the intervention, as delivered by the supplier, was financially prohibitive.
Reducing Greenhouse Gas Emissions (GHGE) through Affordable and Nutritionally Adequate Diets for UK Families Optimized for Cultural Acceptability

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Background and Aim: Modification of dietary patterns can contribute to reduce global warming as the production of food is associated with app. one fourth of global GHGE. However, holistic solutions are needed that take nutritional adequacy, cost and cultural acceptability into consideration.

Methods: Total GHGE from the foods consumed by a 4-member UK family per day (Food Basket, FB) were calculated based on previous life cycle assessment data1. Prices of 15,133 food items from different online food retailers were obtained and median prices for comparable products were used to calculate cost of FBs. All FBs met the recommendations on nutrient intake (RNI) and macronutrient ratios (AMDRs). To achieve cultural acceptability, FBs with a 40% reduction in GHGE were optimized by linear programming for best possible similarity to the distribution of 67 foods/food groups as reported by the National Diet and Nutrition Survey (NDNS). The effect of implementing the Eatwell Guide was also investigated.

Results: The daily FB of the reference family was associated with 30.2 kg CO2eq and dropped to 28.4 kg after implementation of the Eatwell Guide recommendations (-6.0%). Implementation of the Eatwell Guide and enforcing nutritional adequacy resulted in a 10.2% average relative deviation (ARD) from the observed diet. Compared to the observed diet, the envisioned 40% reduction in GHGE to 18.2 kg CO2eq was achieved at comparable cost (26.87 vs. 26.27£) and was associated with a marginal increase of the ARD to 11.3%. Food groups to be reduced the most to achieve GHGE reduction while following the Eatwell Guide and meeting nutritional recommendations were sugars, beef, biscuits, milk and pork while fish, "other vegetables" and cereals had to be increased.

Conclusion: When following recommendations of the Eatwell Guide, only relatively minor additional deviations from the reported consumption of food groups by UK families have to be applied to achieve a 40% reduction in GHGE on top of that.

1Audsley E et al. (2009). How low can we go? An assessment of greenhouse gas emissions from the UK food system and the scope to reduce them by 2050. FCRN-WWF-UK.
SO02, SO02.1

Social Network Analysis in child physical activity and sedentary behavior research: A systematic literature review.

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Objective

The promotion of child physical activity (PA) has been linked to many positive health outcomes. Despite the health benefits, many children do not meet guidelines. Research suggests an adolescent's social relationships have a significant impact on their PA and sedentary behavior. Social Network Analysis (SNA) is both a set of theories and methodologies used to measure and understand the social influences that may affect a person and their health behaviors. While reviews of SNA studies investigating child PA have been conducted before, numerous new studies have been published since these reviews were conducted. An updated, comprehensive review of all SNA studies investigating child PA would synthesize important social contexts and relationships associated with child PA that does not presently exist in the literature. The goal of this study was to conduct a systematic review of the literature pertaining to child PA and sedentary behavior that applies SNA as an analysis tool.

Methods

A search of the literature revealed 11,824 articles refined to a final sample of 33 articles. All articles included focused on children or adolescents, measured PA or sedentary behavior, and collected social network data. Study design, type of network data collected, PA data collected, findings, and conclusions were extracted from all articles that met inclusion criteria.

Results

Articles reviewed used a variety of study designs (cross-section, longitudinal, and experimental) and data analysis techniques (ERGM, Stochastic Modeling, etc.). Whole network and ego network data were collected and analyzed across studies, revealing the overall finding that a child's social network plays an important role in current and future activity behavior. Specifically, total network PA, number and gender of friends, and reciprocated ties predict current and future activity.

Conclusions

While the impact of a child's social network is evident in their PA behaviors, more research is needed to examine how and why these networks form in relation to PA and sedentary behavior. Special attention should be placed on explicitly explaining name generators and statistical analysis used to improve reproducibility. Future researchers should use interventions utilizing SNA to more effectively promote PA, especially in underserved or minority populations.
SO02, SO02.2

Effects of acute physical activity on NIH Toolbox-measured executive functioning in children

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Purpose: The acute and chronic effects of physical activity (PA) on academic performance and cognitive functioning are of continued interest to researchers and educators. Much of the published research has examined correlational associations between these variables, leaving questions regarding the dose of PA which may elicit improvements in cognition in the short term. Identifying the dose of PA required to elicit improvements in learning has important implications for school-day PA recommendations. The purpose of this study was to examine the dose-response relationship between PA and cognition in a sample of students from grades five and six.

Methods: The NIH Toolbox™ iPad application was used to administer four different cognitive assessments in a classroom setting. Participants completed cognitive assessments before and after exposure to one of four randomized, ten-minute PA conditions (sedentary, light, moderate, and vigorous). Conditions were standardized through use of videos to lead movement, and participants wore accelerometers to confirm fidelity to PA condition. Cognitive assessments included executive functioning outcomes of cognitive flexibility, inhibitory control, processing speed, and episodic memory. Instruments included Dimensional Change Card Sort, Flanker, Pattern Comparison, and Picture Sequence Memory tests. Participants (n=134, ages 10 and 11 years) were recruited from eight classes. Each testing period lasted approximately 60 minutes. Hierarchical linear regression models were used to estimate the time by condition interaction effect for each test using an intention to treat analysis. Models accounted for nesting of observations within participant, date and classroom.

Results: Fidelity to PA condition was acceptable overall, with compliance rates among each condition at 92% (sedentary) 97% (light) 81% (moderate) and 86% (vigorous). In multilevel models, change in scores from before to after the 10-minute PA bout did not vary significantly by condition for any of the assessments.

Conclusions: Fidelity data confirmed that the intervention conditions elicited intended differences in PA intensity for the 10 minute episode, but changes in cognitive function did not differ based on the intensity of the activity. Results did not substantiate a dose-response link between PA intensity and executive functioning in children aged 10-11 years old in a classroom setting.
How is cohabiting partner support received and used by men changing their dietary practices and physical activity to lose weight?

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Objective: Although some weight loss interventions for men have proved successful, there is still a need to understand how social context influences this process. This paper explores how men's attempts to change dietary practices and physical activity were influenced by their cohabiting female partners, within the context of Football Fans in Training (FFIT), a gender-sensitised weight management and healthy living programme for overweight/obese men. Its novelty is that it explores both couple member's perspectives and demonstrates variation in partners' influence on men's behaviour change attempts.

Methods: Separate semi-structured face-to-face interviews were conducted with 20 men and their cohabiting female partner, 3-12 months after the men had completed FFIT. These explored experiences around the man's participation in FFIT and subsequent attempts to change dietary practices and physical activity. Using a framework approach, data were thematically analysed by combining individual interviews for dyadic analysis. Analysis was guided by Self-Determination, Gender and Interdependence theories.

Results: All women presented themselves as supportive of their partner's decision to join FFIT. Men's and women's accounts revealed varied levels of women's involvement in their partner's behaviour change attempts, which included both moral support and practical involvement through codieting and coactivity. Men displayed varied levels of resoluteness and reliance on/receptiveness to partner support. A woman's influence on her partner's ability to make changes was determined by levels of both her involvement and his resoluteness/reliance on her.

Conclusions: These results highlight the importance of the cohabiting couples' context for health behaviour change. A key determinant explaining how a cohabiting female partner influences a man's changes to dietary practices and physical activity following a weight loss intervention is interactions between her involvement and his resoluteness/reliance on her support. Understanding this relationship could increase the impact of health interventions aimed at one individual's behaviour by considering the roles that other family members may play in facilitating those changes. The typologies developed for this paper might contribute towards the development of behaviour change theories within the cohabiting couple context.
SO02, SO02.4
Ecological correlates of activity-related behavior typologies among adolescents

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Physical activity and sedentary behavior studies in adolescents (Chair: Zdenek Hamrik), South Hall 2B, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Adolescents engage in various combinations (typologies) of physical activity and sedentary behaviors, which impact their health and wellbeing in different ways. As such, there is a need to understand the factors that may inhibit or facilitate engagement in combinations of activity-related behaviors to help inform effective intervention strategies targeting those most in need. The aim of this study was to identify ecological correlates of typologies of physical activity and sedentary behaviors among adolescents.

Methods: Cross-sectional study of 473 adolescents (15.0±1.6 years, 41.4% boys) from 18 secondary schools in Melbourne, Australia. Intrapersonal, interpersonal and neighborhood-physical environmental factors were assessed via self-report surveys and Geographic Information Systems. Multinomial logistic regression models determined the relative risk ratio of membership of three homogenous activity-related behavior typologies based on the potential correlates. Typologies were determined from self-reported participation in sports teams/physical activity outside school, active school travel, screen-based behaviours and sedentary homework and objectively-measured moderate-to-vigorous-intensity physical activity and sedentary time.

Results: Higher levels of self-efficacy for physical activity (RR=1.1, 95%CI=1.0-1.2), parental screen-time restriction rules (RR=1.3, 95%CI=1.1-1.6), parental support for physical activity (RR=1.2, 95%CI=1.0-1.3), sibling screen-time co-participation (RR=1.3, 95%CI=1.1-1.5) and perceptions of neighborhood pedestrian/traffic safety (RR=1.1, 95%CI=1.0-1.2) were associated with greater likelihood of adolescents being in the typology defined as highly active and low sedentary compared to the physically inactive, highly sedentary typology. Higher frequency of co-participation in screen-time with friends was associated with greater likelihood of adolescents being in the typology defined as moderately active, high screen-time compared to physically inactive, highly sedentary (RR=1.1, 95%CI=1.0-1.3).

Conclusions: A range of intrapersonal, interpersonal and environmental correlates appear to play a role in activity-related typology membership among adolescents. The findings may inform public health interventions targeting unique subgroups of adolescents most at risk of poor health outcomes based on their engagement in combinations of activity-related behaviors.
Time-Varying Effects of Intentions on Engagement in Leisure-Time Sedentary Behaviors: An Ecological Momentary Assessment Study in Adolescents

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Objective: There is an epidemic of physical inactivity among U.S. youth, who on average spend 6-8 hours daily in sedentary behaviors. Intentions to be sedentary are one of the most important predictors of actual engagement in sedentary behaviors. However, previous studies have not assessed how the strength of intention-behavior associations may vary across the day. Therefore, the purpose of this study is to use time-varying effect modeling to identify the specific hours of the day that the strongest intention-sedentary behavior associations are observed in adolescents.

Methods: Youth (N=11, mean[SD] age=13[±smn;1.18] years, 18.2% male, 45.5% Hispanic, 63.6% healthy weight) completed ecological momentary assessment (EMA) surveys for 7-14 days; EMA prompts occurred about every 2 hours between 7am and 8pm. Participants were prompted up to 3 times/day on weekdays (during after school hours) and 7 times/day on weekend days (across the entire day). At each prompt, participants reported on their intentions to be sedentary "in the next two hours" as well as any engagement in sedentary behaviors "right now". Time-varying effect models assessed the association between sedentary behavior intentions and reports of engagement in sedentary behavior at the next EMA prompt (approximately 2 hours later). Models were adjusted for day of week and the time-invariant covariates of age, sex, ethnicity, maternal education, and body mass index percentile.

Results: Participants contributed a total of 239 EMA prompts across 125 assessment days. Intentions to be sedentary were positively associated with EMA-reported sedentary behavior only during the late afternoon (3pm to 5pm). Post-hoc analyses indicated that there were no significant associations between intentions to be sedentary and actual engagement in SB across the entire day on weekend days (N=135 prompts across 50 assessment days).

Conclusions: Associations between intentions to be sedentary and actual engagement in sedentary behaviors are only significant on weekdays in the 2-hour time period directly following school hours, highlighting a potential critical intervention time-point for reducing sedentary behavior in youth.
An Integrative Approach to Exploring Physical Activity Parenting in Irish Parents

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Nutrition and physical activity studies in children and adolescents (Chair: PJ Naylor), North Hall, June 6, 2019, 3:50 PM - 4:25 PM

Physical activity parenting (PAP) is defined as modifiable parental behaviours intended to influence children's physical activity (PA) (Sleddens et al, 2012). Objective: The objective of the study was to examine patterns of PAP practices using an innovative approach where both parent and child perspectives were included. This research aims to identify Irish PAP practices (positive and negative), parental attributes and parental perceptions of child attributes using an established theoretical model to map behaviours. Methods: A purposive sample of 117 families from wave 1 of the child cohort from Growing Up in Ireland (National Longitudinal Study of Children) were included in the study. Parents and children were interviewed in the family home using multi method participatory approaches (parent and child interviews, photographs, child activity sheets). Families were stratified by socio-economic status. The Integrated Model of Physical Activity Parenting (Davison et al. 2013) was used to consolidate PAP behaviours from the archived interview transcripts. The theoretical model was adapted to include conceptualised PAP behaviours proposed by Masse et al. (2017) to enable the complexities of PAP behaviours to be explored in greater depth. A deductive thematic approach was used to map the data and the constant comparison method was used to analyse data. Results: PAP behavioural themes of encouragement, involvement and facilitation were positively associated with children's organised sport. Fathers from higher socioeconomic groups indicate the importance of facilitating PA for boys as a preventive effect against future health risk behaviours. Co-participation was positively associated with children's unstructured PA with fathers more engaged in skill-based PA. Parents from higher socioeconomic groups engaged in more pressuring behaviours relating to their children's involvement in structured PA. Parents who reported an active lifestyle, who valued PA and who perceived their child to be athletically competent adopted enabling PA parenting practices. Conclusion: This study identifies how Irish parents engage in PA parenting practices and indicates that fathers and young children may be compatible for co-activity in PA. This research is innovative in that it captures the collective voices of parents and children and therefore uncovers nuances across such a relationship that have not been explored previously.
Evidence for banning unhealthy food marketing in public spaces: Children’s exposure to unhealthy food marketing and the impact of policy options

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Nutrition and physical activity studies in children and adolescents (Chair: PJ Naylor), North Hall, June 6, 2019, 3:50 PM - 4:25 PM

Objective
Reducing children's exposure to unhealthy food marketing is accepted as a key strategy to end childhood obesity. Currently, there is limited research assessing children's exposure to outdoor food advertising in both time and space. This study aimed to understand where and when children were exposed to unhealthy food advertising in public outdoor spaces during their everyday lives and evaluate the impact of potential policy options.

Methods
We compiled data on 138 12 year-old children in Wellington, New Zealand, using wearable cameras and GPS devices worn over four consecutive days. We extracted 59,150 images taken in public outdoor areas, 1,631 of which contained unhealthy food marketing exposures. Images were linked to GPS data to calculate an exposure rate across a 100m-by-100m grid.

Results
Children were exposed to 8.3 (95% CI 7.9 to 8.7) food advertisements for every hour they spent in outdoor settings, 7.4 (95% CI 7.0 to 7.8) or 89.2% were for non-core food products. High density exposure areas were shopping centers, residential areas and sport facilities with advertisements on shop fronts and streets most common. Children were exposed most to advertisements for fast food, sugary drinks, ice cream, cookies, and confectionery. We found the weekend afternoons and evenings and weekday times before and after school were peak exposure times. In a case study across Wellington City we estimated that banning unhealthy food advertising within 400m of playgrounds would yield a 33% reduction, followed by residential areas (27%), and 400m of schools (25%). Banning advertising in residential areas and within 400m of both schools and playgrounds would reduce estimated exposure by 50%.

Conclusions
This work provides real-time evidence that children are exposed to unhealthy food advertising in public outdoor spaces. Implementing bans on unhealthy food advertising in residential areas and within 400m of schools and playgrounds in Wellington City would likely halve children's exposure to unhealthy food marketing and contribute to the reduction of childhood obesity. Given the ubiquity of advertising in public spaces, this New Zealand research provides new methods and innovative findings likely relevant in other jurisdictions.
Interrelations of dietary and movement behaviours and their combined effect on mental health in early adolescence

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Objective: Associations of diet and movement with mental health have been established, however multiple health behaviours are rarely considered, especially in younger populations. Given that lifestyle risk factors are interrelated and typically cluster, this prospective study is the first to examine the associations of adherence to recommendations for multiple dietary and movement behaviours with mental health disorders in adolescence.

Methods: Population-based prospective study (n=3436) linking 2011 health behaviour survey data among 10-11 year-old adolescents with administrative health data from 2011-2014. Health behaviours were measured with the Harvard Food Frequency Questionnaire and self- and parental-proxy reports, expressed as meeting dietary recommendations for vegetables and fruit, grain products, milk and alternatives, meat and alternatives, saturated fat, and added sugar and movement recommendations for sleep, screen time, and physical activity. Mental illness was defined by physician diagnosed internalizing, externalizing, and other psychiatric conditions. Negative binomial regression was used to determine the association of meeting individual lifestyle recommendations, multiple dietary and movement recommendations, and combined recommendation compliance with physician visits for mental illnesses.

Results: For all 9 recommendations, 12%, 67%, and 21% of students respectively met 1-3, 4-6, and 7-9 recommendations, and 15% had a mental illness diagnosis during 4 years of follow-up. Compared to meeting 1-3 recommendations, adolescents who met 4-6 and 7-9 lifestyle recommendations had respectively 39% (p=0.002) and 56% (p<0.001) fewer mental health visits. For the 6 dietary recommendations, students meeting 3-4 and 5-6 had respectively 27% (p=0.014) and 28% (p=0.039) fewer mental health visits in comparison to those meeting 2 or less. For the 3 movement recommendations, students meeting 2 and 3 had respectively 29% (p=0.029) and 54% (p<0.001) fewer mental health visits in comparison to those meeting 1 or less.

Conclusions: Whereas individual lifestyle behaviours have marginal associations, multiple behaviours have stronger associations with mental health. Investigation of multiple health behaviours may be especially important to mental health research. Health promotion initiatives that focus on modifying multiple health behaviours in adolescence may have a greater effect in reducing the burden of mental illness than those that target a single behaviour.
SO03, SO03.4

The impact of different serving sizes on the ‘pass’ rate of foods using the Nestlé Nutritional Profiling System in comparison with Food Standards Australia New Zealand Nutrient Profiling System

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Nutrition and physical activity studies in children and adolescents (Chair: PJ Naylor), North Hall, June 6, 2019, 3:50 PM - 4:25 PM

Policies and environments (SIG)

Objective: The use of different serving sizes can impact the eligibility of foods or food categories when NP systems that use different reference quantity criteria are applied in education, regulation or reformulation programs. The purpose was to evaluate differences in the classification of food products with small or large serving sizes using two nutrient profiling systems with different reference units (serving size vs. 100g).

Methods: Using the University of Toronto 2017 Food Label Information Program (a branded Canadian food composition database of prepackaged foods), cereal-based foods; and cakes, cookies and desserts were evaluated using the Nestlé (NNPS) and Food Standards Australia New Zealand Nutrient Profiling Systems (FSANZ), as these categories had many products with different serving sizes. Percentage of products classified as 'pass' (if all nutrient targets were met) by the NNPS and FSANZ were calculated for small (<50g) vs. large (≥ 50g) serving sizes, according to the reference quantity criteria set by each model (per serving size vs. 100g).

Results: For cereal-based products, the NNPS model categorized 31% of small serving size and 0% large serving size products as passing all NNPS criteria whereas FSANZ categorized 69% of small serving size and 77% of large serving size products as 'pass' (Figure 1). Agreement between models was 52% for small serving size and 23% for large serving size. For foods within the cakes, cookies and desserts category, the NNPS model classified 47% of products with small serving size and 3% of products with large serving size as 'pass' whereas the FSANZ categorized 3% of small serving size products and 4% for large serving size products as 'pass' (Figure 1). Agreement between models was 56% for small serving size and 95% for large serving sizes.

Conclusions: The NNPS model was much more stringent for the large serving size products compared to small serving size products in both categories whereas the FSANZ NP system, based on a standardized 100g, rated small and large serving size products similarly. NP systems based on serving sizes can be effective in promoting smaller serving sizes while NP systems based on 100g can help lower density of negative nutrients.
Improving cognitive performance of 9 to 12 years old children: Just dance? A Randomized Controlled Trial

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Nutrition and physical activity studies in children and adolescents (Chair: PJ Naylor), North Hall, June 6, 2019, 3:50 PM - 4:25 PM

Children and families (SIG)

Objective: Exercise is assumed to have positive effects on children's cognitive performance. However, given the inconclusive evidence for the long-term effects of exercise, it is difficult to advise schools on what specific exercise programs can improve children's cognitive performance. In particular, little is known about the effects of small exercise programs that may be feasible in daily school practice. Therefore, we assessed the effects of a 9-weeks program consisting of daily exercise breaks on children's cognitive performance, aerobic fitness and physical activity levels.

Methods: We conducted a cluster-randomized controlled trial in 21 classes of eight Dutch primary schools. A total of 512 children aged 9, 12 years participated. The exercise intervention had a duration of 9 weeks and consisted of a daily 10-minute classroom-based exercise break of moderate to vigorous intensity. Before and after the intervention, we used four cognitive tasks (i.e. the Attention Network Test, Stroop test, d2 test of attention and Fluency task) to measure children's cognitive performance in domains of selective attention, inhibition and memory retrieval. In addition, we measured aerobic fitness with a Shuttle Run test and physical activity during school hours by accelerometers. We analyzed data using mixed models, adjusting for baseline scores, class and school.

Results: After 9 weeks, there were no intervention effects on children's cognitive performance or aerobic fitness. Children in the intervention group spent 2.9 minutes more of their school hours in moderate to vigorous physical activity as compared to the children in the control group.

Conclusion: Daily 10-minute exercise breaks in the classroom did not improve, nor deteriorate cognitive performance in children. The exercise breaks had no effect on children's fitness, and resulted in 2.9 minutes more time spent in moderate to vigorous physical activity during school hours. Daily exercise breaks can be implemented in the classroom to promote children's physical activity during school time, without adverse effect on their cognitive performance.
Time orientation and risk perception moderate the influence of nutritional warnings on food choice


Determinants of nutrition and/or physical activity (Chair: Alissa Jane Burnett), Terrace 2A, June 6, 2019, 3:50 PM - 4:25 PM

Nutritional warnings are becoming popular as a front-of-package labelling scheme aimed at discouraging consumption of products with high content of nutrients associated with non-communicable diseases. Factors claimed to influence the effectiveness of such nutritional warnings include personality traits linked to risk perceptions and the extent to which individuals are present-oriented or future-focused in their decision-making style. Therefore, the study aimed to explore whether time orientation and sodium risk perception may moderate the influence of nutritional warnings on food choices.

An online study involving 498 participants was carried out. Participants performed a choice-conjoint task involving bread packages differing in three 2-level variables: sodium warning (present vs. absent), type of bread (regular vs. whole wheat) and brand (well-known vs. unknown). They were presented with 8 pairs of bread packages and for each pair, were asked to indicate the one they would choose if they were in a supermarket. Next, participants answered a scale on 'consideration of future consequences' adapted to eating habits, and responded to statements measuring perceived risk of sodium consumption. Data were analyzed using mixed logit models.

Results revealed that the inclusion of the sodium warning on the packages discouraged participants' choice (p=0.001), reinforcing its potential to reduce sodium consumption. Time orientation and sodium perceived risk moderated the effect of bread characteristics on participants' choices. Besides, participants preferred the well-known (vs. unknown) brand (p=0.036), while the type of bread only had a marginal effect on their choice of bread packages (p=0.095). It was found that both a focus on immediate consequences and thinking that the risk associated with sodium consumption can be compensated decreased the effectiveness of the sodium warning. In addition, the relative importance of brand on participants' choices decreased as perceived risk increased. Regarding type of bread, participants who prioritized immediate consequences of eating habits preferred white bread over whole bread, while those with greater consideration of future consequences preferred whole wheat bread. Results from the present work suggest that communication campaigns aimed at encouraging participants to consider nutritional warnings in their decision-making process should promote a future-oriented vision on eating habits, as well as raise risk awareness.
It is not all about information! Sensory experience overrides the impact of nutrition information on consumers’ choice of sugar-reduced drinks

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Determinants of nutrition and/or physical activity (Chair: Alissa Jane Burnett), Terrace 2A, June 6, 2019, 3:50 PM - 4:25 PM

Motivation and behavior change (SIG)

Objective
Excessive sugar intake is a global public health concern, and sugar-sweetened beverages (SSB) represent one of the main sources of added sugar in the diet. In this sense, the inclusion of front of pack (FOP) nutritional schemes and food reformulation are strategies that could contribute to reduce sugar consumption and improve population health status. The aims of this work were to evaluate adults and children's choice of sugar-reduced drinks in the context of the implementation of FOP nutrition labelling under different evaluation conditions, and to compare the influence of two FOP nutrition labelling schemes: the traffic-light system (TLS) and nutritional warnings.

Methods
For that, 400 adults and 400 children (6-12 years old) divided in 2 groups (n=200) each chose samples of grape nectar or chocolate flavoured milk (control and two sugar reduction levels) featuring different FOP nutritional schemes, under three experimental conditions: (a) blind, tasting the samples without any information, (b) expected, looking at the packages, and (c) informed, looking at the packages and tasting the samples. In each experimental condition, participants were asked to choose one of the three products.

Results
Both FOP schemes encouraged adults and children's to choose for healthier products under the expected condition. In the case of adults, nutritional warnings outperformed the traffic light system in the task involving grape nectars. However, when participants tasted the products (blind and informed conditions), choices were defined by their sensory characteristics and the control samples without sugar reduction were the most frequently selected.

Conclusions
These results indicate that consumers' hedonic experience overrode the effect of FOP nutrition labelling and suggest that this public policy is unlikely to have a real effect on consumers' choices if there are no healthy alternatives that meet their sensory and hedonic expectations.
Child perceptions of support for healthy behaviors and associations with measured diet and physical activity

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Determinants of nutrition and/or physical activity (Chair: Alissa Jane Burnett), Terrace 2A, June 6, 2019, 3:50 PM - 4:25 PM

Motivation and behavior change (SIG)

Purpose: Previous research examining determinants of eating and physical activity behaviors among children has largely focused on parental behaviors, role modeling and rules. It is unclear how children perceive supportive factors, and if perceptions are associated with diet and physical activity. The purpose of this study was to examine child perceptions of support for healthy behaviors by family and friends, and association with measured child diet and physical activity.

Methods: Cross-sectional survey data were obtained from 127 elementary-aged children (mean 10.1 years), which included questions on how much family (mother and father) and friends 1) care about healthy eating/exercising, 2) encourage healthy eating/exercising, and 3) talk about importance of healthy eating/exercising. Responses were dichotomized as 'Very Much' or 'Somewhat, A little bit and Not at all.' Dietary outcomes including fruit, vegetable, whole grain, and added sugar were obtained using a Block Food Screeners for Ages 2-17. Physical activity outcomes included light, moderate and vigorous physical activity and sedentary time, which were obtained using an accelerometer. Linear regression was used to determine association between diet and physical activity outcomes and child perceptions while controlling for child age, sex, height and weight.

Results: Children who perceived their mother to care 'very much' about eating healthy food had higher mean intakes (all p<.05) of fruit (1.9 vs 1.1 ce), vegetables (1.0 vs 0.50 ce) and whole grains (.8 vs .4 oze). Positive perceptions across all questions and all social groups were associated with increased vegetable consumption (all p<.05). Children who perceived their mother (530 vs 563), father (531 vs 564) or friends (524 vs 559) to care 'very much' about exercising had fewer mean sedentary minutes on weekdays (all p<.05). Fathers encouraging physical activity and friends taking about the importance of physical activity was associated with fewer mean sedentary minutes on weekdays (533 vs 566 and 513 vs 557, p<.05, respectively).

Conclusions: When designing diet- and physical activity-focused interventions among children, child perceptions of established and measured determinants of behavior should be considered. Future research should examine the longitudinal importance of child perceptions, in addition to if and how they can be modified.
Motivation and behavior change (SIG)

Objective: To examine the relationship between long term weight loss (LTWL) success and monetary savings among a national sample of U.S. adults who at one point in life 'diverged' from normal weight status.

Methods: Data on 1,994 adults with a maximum BMI of 25kg/m2 (or above) were derived from a U.S. population-based study. The independent variable was LTWL success (loss maintained for at least 1 year), which was operationalized as <10% (reference group), 10.00%-19.99%, and =20.00%. The dependent variable was monetary savings (e.g., 401K), defined as a 3-category ordinal variable. We employed ordered logistic regression to estimate the relationship between LTWL success and increased odds for higher overall savings.

Results: Adjusting for income, education and other covariates, being in the highest LTWL category (=20.00%) significantly reduced the likelihood of monetary savings in comparison to the reference group (OR=0.55, 95%CI=0.34-0.91). This relationship was not observed in the lower LTWL category (10.00%-19.99%).

Conclusions: Previously overweight or obese adults who exhibited high levels of LTWL success were markedly less successful when it came to their finances. LTWL and financial prudence, both linked to enhanced health and welfare, should be addressed jointly in future interventions.
Increasing participation in cycling: a qualitative investigation of barriers and facilitators

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Determinants of nutrition and/or physical activity (Chair: Alissa Jane Burnett), Terrace 2A, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Only 1 in 8 adults cycle regularly in the UK. The greatest potential for population-level health gains from cycling is most likely to come from increasing participation amongst those who cycle infrequently. Understanding perceptions of cycling among novice, infrequent cyclists is important to inform the design of effective cycling interventions. The current qualitative study therefore aimed to use the social ecological model as a framework to identify barriers and facilitators to cycling participation.

Methods: Six focus groups (each with 3-7 participants, total n=32) were conducted with employees (the majority of whom were infrequent/non-cyclists) at branches of a major bank in six cities across the UK in autumn 2018. Transcripts were analysed thematically.

Results: Important barriers and potential solutions to cycling participation existed at all levels. Participants identified barriers at both policy and physical environment levels: "I would be scared to go on the road now...the traffic's so bad". At an individual level, infrequent/non-cyclists lacked confidence in cycling but suggested that support from others might help them overcome this. “…if I had a buddy, that would teach me the etiquette, what to do when I'm coming across someone… you know, who's got right of way". Participants also felt that safe route planning would help build their confidence and encourage them to cycle more: "If I had a clear route 20, 25 miles into work, I'd cycle every day", and that an interactive app, that included education around route planning, specifically targeted at infrequent/novice cyclists, could potentially overcome barriers at an individual level: "you could type in where you want to go and it could be colour coded for safety". Participants also felt an app could help them overcome environmental barriers associated with effortful cycling, for example by showing them "how steep climbs are".

Conclusion: For people who do not cycle regularly, concerns about safety, lack of confidence, lack of social support and effort emerged as important barriers to stopping them cycle more. The development of an app which addresses these barriers and is specifically targeted at infrequent/novice, rather than expert cyclists, may be considered as a strategy for future cycling interventions.
The influence of plate-clearing tendencies and food waste concerns on food intake from large portions.

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Nutrition and physical activity studies (Chair: Katherine Livingstone), Terrace 2B, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Globally, we have problems with both obesity and food waste, but the role that concerns about wasting food have in explaining over-eating is yet to be examined. One hypothesis is that food waste concerns may promote a tendency to "plate-clear" which in turn promotes over-eating when exposed to large portions of energy-dense food. Thus, we predict that individuals with concerns about wasting food will be more likely to have habitual plate-clearing tendencies and therefore consume more of a large portion of food when tested in controlled laboratory settings.

Methods: Participants (N=119, 34 males, 85 females) completed self-report measures of plate-clearing tendencies and food waste concerns before attending a lunchtime session in an eating laboratory where they were served a large portion of pasta in tomato sauce. The amount of food consumed was covertly measured. Regression analyses investigated the associations between food waste concerns, plate-clearing tendencies and weight of food eaten. The indirect effect of food waste concerns on energy intake via plate-clearing tendencies was examined using PROCESS (Hayes, 2018).

Results: Linear regression analyses revealed that food waste concerns were predictive of plate-clearing tendencies; individuals who reported stronger food waste concerns reported higher plate-clearing tendencies (B= .28, 95% CI = 0.06-0.25, p=.002). Also, plate-clearing scores were predictive of food intake; individuals with higher plate-clearing tendencies consumed significantly more food (B= .20, 95% CI = 0.79-12.97, p=.027). However, there was no significant indirect effect of food waste concerns on food intake via plate-clearing tendencies (b(SE) = .86 (.87), 95% CI = -0.10, 3.06).

Conclusions: These findings suggest that plate-clearing tendencies and food waste concerns encourage individuals to consume more food, potentially making these individuals more likely to over-consume, especially from larger portion sizes. This highlights the urgent need for 'downsizing', a widespread reduction of portion sizes. The potential for food waste reduction strategies, for example taking home leftover food from restaurant meals, to aid reductions in both wasting and over consuming food also warrants exploration.
A taxonomy of disagreements related to health and nutrition information

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Nutrition and physical activity studies (Chair: Katherine Livingstone), Terrace 2B, June 6, 2019, 3:50 PM - 4:25 PM

Other

Purpose:
In today's society and media environment, people are increasingly exposed to conflicting or contradictory health and nutrition information. Consumers need to navigate this information to make commonplace decisions, such as which foods to consume, a process many find difficult. This complexity leads to confusion, and a mistrust in health advice. Although some consumers - particularly highly educated ones - do attribute these scientific disagreements to the complexity of research, many use a narrower set of explanations. There is a gap in existing frameworks to understand the range of reasons for these contradictions. The aim was to create a taxonomy that assists in supporting consumers in navigating these conflicts.

Methods:
In this paper, we argue for, and develop a taxonomy of disagreements. We derive this classification taxonomy and develop a framework from (1) a review of studies into consumer perspectives on scientific disagreements; (2) a review of a set of studies presenting such conflicting information to consumers, and the nature of those conflicts; and (3) a conceptual analysis of disagreements in a set of nutrition topics. We validate the framework through expert interviews to demonstrate its application to common examples of conflicting health and nutrition topics.

Results:
Preliminary analysis indicates disagreements can be sub-classified into categories including outcome ambiguity, probabilistic uncertainty, knowledge gaps, bias, and epistemic, informational, or decisional conflict. Analysis of existing work on dealing with conflicting sources suggests that these tend to focus on source credibility disagreements (e.g. an expert versus lay author). A taxonomy and its use as a framework to navigate health and nutrition related disagreements are presented.

Conclusion:
A taxonomy is proposed to facilitate an awareness of the differences in disagreement. We discuss the role of the taxonomy as a framework to support and plan future research, to facilitate communication, and to guide practice, e.g. in health and nutrition education.
Muscle mass can be conserved with adequate protein intake and fat loss further facilitated through physical activity: a randomised, controlled study.

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Objective: It is well-known that physical activity is essential for the preservation of muscle mass during weight loss regimen. However, overweight people often have difficulties with intensive physical exercises. We conducted a study to explore whether it is possible to maintain muscle mass with adequate protein intake without physical activity in the initial stages of a weight loss program.

Methods: Fifty-five women with BMI >25 were randomly assigned into diet alone (D, n = 25) or diet + exercise group (D + EP, n = 30) for a two-month weight loss program. Both groups received similar nutrition recommendations with an emphasis on protein intake that should comprise about 30% of daily caloric intake. To support participants' weight loss effort they were advised to keep a food journal and submit it for feedback on a weekly basis. The second group (D + EP) also attended group workouts 3-times a week for 60 min. Measurements included bioimpedance analysis, Ruffier functional test, circumference measurements and orthostatic hypotension analysis.

Results: After 2 months the weight loss in D group was -2.56% (mean = 1.95 kg ±smn; 2.35) while D + EP lost -3.66% (mean = 2.89 kg ±smn; 2.46) on average. Interestingly, according to bioimpedance analysis muscle mass loss was negligible in both groups standing at -1.1% and -1.3% for D and D + EP, respectfully. However, the fat loss was significantly higher (-8.23%) in D + EP group compared to D group (-4.85%). According to spirometry and dynamometer fitness analyses, there has been some insignificant improvement in lung capacity and strength levels in D + EP group with no change for D group in the initial values.

Conclusions: With adequate protein intake overweight women can conserve muscle mass while losing fat. The fat burn process can be facilitated by adding low-intensity exercise routine 3-times a week with additional benefits to a person's fitness level.
The effect of work shift on daily activity behaviors and dietary pattern in crane operators

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Nutrition and physical activity studies (Chair: Katherine Livingstone), Terrace 2B, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Shift work is a well-known risk factor for several non-communicable diseases. However, little is known about how shift work affects daily activity behaviors and dietary pattern. The aim of this study was to test the effect of work shift on time spent sleeping, in sedentary behavior and physical activity and on dietary pattern.

Methods: Forty-three male crane operators wore activPAL and Garmin Forerunner (3 shifts) for up to five consecutive working days to obtain objective measure of sitting/lying time and heart rate. Sleep time and dietary pattern were self-reported using a diary. One-way ANOVA with post hoc t-test (and Kruskal-Wallis test for non-normally distributed data) was used to determine differences between daily activity behaviors test results. Dietary pattern was analysed according to the national criteria for unhealthy dietary pattern.

Results: The afternoon shift group spent significantly (p < 0.05) more time sleeping and less time in sedentary behavior (458 ±smin; 56 mins/day and 604 ±smin; 86 mins/day, respectively) than the morning (359 ±smin; 79 mins/day and 722 ±smin; 107 mins/day) and the night shift group (309 ±smin; 58 mins/day and 714 ±smin; 58 mins/day). Average time spent in moderate to vigorous physical activity did not differ (p > 0.05). Reviewing the dietary patterns, least favorable results appeared to be when working in morning shift, with the highest percentage of those who eat 2 or less meals daily (33 %), no breakfast (27 %), eating fried food (33 %) and red meat (67 %) often.

Conclusions: Our results show that specific work shift affects daily activity behaviors and dietary pattern. The most favorable behaviors, with the lowest sedentary time and the highest sleep time, were found in the afternoon shift group. This relationship is in line with previous findings that sleep restriction leads to more sedentary behavior. Reviewing food diaries revealed less healthy dietary pattern in the morning group, compared to the others. Shift workers should receive additional attention in healthy lifestyle promotion activities.
Objective: The purpose of this study was to examine how distinctive, longitudinal leisure-time physical activity (LTPA) trajectories from childhood to mid-age are related to fruit and vegetable consumption frequency (FVCF) among males and females at different ages.

Methods: The data was obtained from an on-going, longitudinal, population-based study called the Cardiovascular Risk in Young Finns Study with six cohorts. LTPA was measured eight times and FVCF seven times between years 1980 and 2011 through self-administered questionnaire covering ages 9 to 48 (n=3536, 51% females). For the identification of the LTPA trajectories a latent profile analysis was conducted. The association between the LTPA trajectories and FVCF was examined using BCH approach.

Results: The following LTPA trajectories were identified for males and females: persistently low-active (41% and 52%, respectively), decreasingly active (16% and 12%), increasingly active (31% and 15%), and persistently active (12% and 3%). Additionally, a persistently very low-active trajectory (17%) was identified for females. Males generally reported lower FVCF than females. Males following the low-active and females following the very low-active trajectory had the lowest FVCF at nearly all age points with the FVCF being significantly lower in these low-active trajectory classes when compared to the persistently active trajectories (p<0.05). Before the age of twelve, no statistically significant differences were found between the low-active and the increasingly active trajectory classes among females. However, after turning twelve years, females who increased their LTPA started to consume fruits and vegetables more frequently when compared to those following the very low-active trajectory (p<0.05). The same phenomenon was seen among males but not until they turned 18 years. Additionally, the decreasers of PA consumed fruits and vegetables more frequently than their low-active counterparts in childhood, adolescence and young adulthood (p<0.05) while the difference ceased to exist in mid-age.

Conclusions: The development of LTPA is associated with the FVCF from childhood to adulthood. Generally, those who were physically low-active had the lowest FVCF while those who were physically active had the highest FVCF at different phases of life. Increase and decrease in LTPA was associated with similar changes in FVCF from childhood to adulthood.
SO06, SO06.1

A Social Connectedness Intervention to Support Sustained Physical Activity Among Older Adults: Effects on Psychological Flourishing

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Healthy ageing (Chair: Dori Rosenberg), Club A, June 6, 2019, 3:50 PM - 4:25 PM

Ageing (SIG)

Purpose: Psychological flourishing is a multidimensional construct of eudaimonic well-being, including aspects such as having positive relationships, feelings of competence, and having meaning and purpose in life. The purpose of this study was to examine the extent to which group-based exercise classes that were designed to foster a sense of social connectivity resulted in improvements in psychological flourishing among older adults. The assessment of psychological flourishing represented one of the trial's secondary outcomes. Methods: Older adults (= 65 years) were randomized to one of three conditions as part of the 'Group-based Physical Activity for Older Adults' randomized controlled trial (clinicaltrials.gov: NCT02023632). These included similar age same gender (SASG), similar age mixed gender (SAMG), or 'standard' mixed age mixed gender (MAMG) group-based exercise programs. The SASG and SAMG conditions were informed by the tenets of self-categorization theory, and were specifically designed to foster a sense of social connectedness among participants. The MAMG condition reflected what one would typically see in community group-based exercise programs in North America. Participants (n = 485; Mage = 71.40 years, SD = 5.46, 71.8% female) were invited to complete measures of flourishing on six occasions over the course of the 24-week intervention, and represented a subsample from the larger trial. Multilevel growth models, using multiple imputation to handle missing data, examined the effects of the intervention on flourishing scores, over time, and after controlling for participants' general health status and personality factors. Results: Results of this study demonstrated significant main effects for the SASG (b = 1.16, SE = .53) and SAMG (b = 1.04, SE = .49) with participants in those conditions reporting improved psychological flourishing when compared to older adults in the 'standard' MAMG condition. However, neither a main effect of time, nor a condition by time interaction effect were observed. Conclusions: The results provide some support for the utility of community group-based exercise programs, designed to foster social connectivity, in relation to supporting the eudaimonic well-being (i.e., psychological flourishing) of older adults.
Concordance in Objectively Measured Physical Activity between Older Spouses

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Healthy ageing (Chair: Dori Rosenberg), Club A, June 6, 2019, 3:50 PM - 4:25 PM

Ageing (SIG)

Purpose: It is recognized that one spouse's health behaviors, including physical activity (PA) tend to be similar to the other spouse's health behaviors. However, research on PA of spouses has been restricted by the use of self-report measures, limiting the reliability and validity of findings. Further, updated PA guidelines give greater attention to the importance of decreased sedentary behavior. Therefore, the purpose of this study is to examine how concordant objectively measured activity (including light and sedentary behavior) is between older spouses at baseline and how this concordance changed after an 8-week couple-focused PA intervention.

Methods: Twenty-six couples (average age husbands=65±smn;9, wives = 62±smn;8 years) wore accelerometers for 7 days to measure sedentary, light, moderate, and vigorous PA at two time points, 8 weeks apart. Partners participated together in goal-setting PA interventions and outcome results have been previously reported. Pearson correlations and multiple regression were used to examine concordance of PA (which was adjusted for accelerometer wear time).

Results/findings: Husbands' and wives' PA across three levels of intensity were significantly correlated at baseline (sedentary: r=0.50; p<0.01; light: r=0.48; p=0.01; Moderate-to vigorous PA: r=0.69; p<0.01). Controlling for age and intervention condition, husbands' change in sedentary activity was associated with wives' change in sedentary activity (βa;=0.90; p<0.01). Similarly, husbands' change in light intensity PA was associated with wives' change in light PA (βa;=0.89; p<0.01). However, husbands' change in MVPA was not significantly associated with wives' change in MVPA (βa;=-0.51; p=0.82). Findings for change in wives' PA followed a similar pattern.

Conclusions: The current study utilizing objective measures of PA and assessing the concordance of change in PA between partners contributes to a growing literature on spouse PA concordance. Notably, findings revealed that change in sedentary and light PA behaviors are concordant between older partners who participated in a couple-focused PA intervention. These findings suggest that interventions focusing on both partners of a couple have the potential to be more effective than individual level interventions as couple-focused interventions simultaneously target the health of both partners, making interventions more practical and efficient.
Factors influencing physical activity in later life: A mixed methods study using accelerometer and interview data

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Healthy ageing (Chair: Dori Rosenberg), Club A, June 6, 2019, 3:50 PM - 4:25 PM

Purpose: Older people have much to gain from regular physical activity, yet their participation rates are typically low. Increasing activity levels among older people is a global health objective. There are two major gaps in the literature that are addressed by the present study: (1) almost all research in this field relies on self-reported physical activity measures and (2) little is known about the circumstances of those seniors exhibiting especially low activity levels. This information is needed to inform effective interventions to increase activity levels among older people.

Methods: In total, 425 community-dwelling Australians aged 60+ years (M=70.28, SD=5.91) participated in the study, just over half of whom were female (56%). The study participants wore accelerometers for seven days and engaged in semi-structured interviews during which they discussed their activity levels and the factors influencing their activity-related decisions and behaviours. The accelerometer data were analysed using an established cut-off point for 'moderate to vigorous physical activity' for older people and the interview data were thematically analysed using NVivo.

Results: Around one-third of the sample members (n=102, 65% female) were identified as having very low levels of physical activity (operationalised as less than half the recommended minimum of 150 mins per week). Many participants considered themselves to be much more active than evidenced by their accelerometer data, illustrating the limitations of using perceived physical activity measures. The primary factors differentiating the responses of those exhibiting very low levels of physical activity related to the ways in which they adapted to various circumstances associated with ageing. While many reported deteriorating health with age, those demonstrating higher activity levels tended to adopt a 'gain' (versus 'loss') orientation to the ageing experience. Lifetime exercise habits and former occupation also appeared to be highly influential. Caring duties for loved ones were often cited as a reason for low levels of activity.

Conclusions: Objectively measured physical activity may be substantially more accurate than self-reported activity among older people. Interventions targeting seniors with very low levels of physical activity may need to address psychological barriers in the form of negative attitudes to the ageing process.
Purpose: Sedentary behaviour (SB) can be assessed and interpreted in different ways so the results of various studies are inconsistent. Recently, it was suggested that more specific patterns of accumulation and distribution of SB (e.g. duration, number of bouts, frequency of breaks etc.) bring highly important information about influence on health outcomes. Growing body of evidence indicates that SB is associated with adverse obesity and adiposity indices. Therefore, we aimed to assess the cross-sectional associations between accelerometry-measured SB and adiposity indices in elderly women, who are at higher risk of adiposity due to postmenopausal changes. The project was funded by the Internal institutional grant (IGA-2017-003).

Methods: We performed an analysis of 314 healthy elderly women (average age of 66.6±6.5 years) from Central European countries. The fat mass percentage (FM%) and the fat mass index (FMI) were assessed by a bioelectrical impedance method and SB was monitored using an accelerometer set at 1 min epoch. The following categories of bouts were exported and analysed: 1, 4, 5, 9, 10, 19, 20, 29, 30, 39, 40, 59 and 60+ min. We performed a multiple linear regression analysis that was adjusted for age, wear time and moderate-to-vigorous PA (MVPA). All women provided also demographic and socio-economic information and reported their health status, so we additionally adjusted analysis for these confounding variables.

Results: On average, the women spent 466±88 min per day in SB. Looking at patterns of SB, 75% of the total sitting time was accumulated in bouts lasting <30 min. Both, FM% and FMI were positively associated with frequency and duration of all categories of sedentary bouts. After adjustment for confounders, there was a significant association of FM% and FMI with frequency of bouts <30 min (p=0.01) and duration of bouts <20 min (p=0.05). The association weakened in longer bouts in both indicators.

Conclusions: Our results suggest that not even sedentary time, but also specific SB patterns may predict adiposity independently of age, PA, demographic, socio-economic and health factors. These findings promote the relevance of SB measuring in elderly women and also highlight the benefits of detailed assessment of SB patterns.
The RESEDENT study: REducing SEDENTary behaviour in senior living facilities: a Pilot Study

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Healthy ageing (Chair: Dori Rosenberg), Club A, June 6, 2019, 3:50 PM - 4:25 PM

Ageing (SIG)

Purpose: Increasing amounts of sedentary behavior (SB), independent from a lack of moderate to vigorous physical activity has been shown to have negative effects on human metabolism, physical functioning and various other health outcomes. Older adults, especially those who reside in a senior living facility are susceptible to considerable amounts of sitting throughout the day. The primary purpose of this pilot study was to determine if reducing the amount of sedentary behaviour in this setting would have an impact on cognitive function; and secondary, to examine its effects on physical function.

Methods: Twenty-one residents (12 Female, mean age 87.2y) were assigned into a 10-week clustered randomized control trial. Participants completed the Alzheimer's Disease Assessment Scale-Cognitive (ADAS-cog) to assess cognitive function (primary outcome) and the Timed Up and Go (TUG-secondary outcome) to assess physical function pre and post intervention. Those in the intervention group were prompted to interrupt their SB with three 10 min bouts of light physical activity throughout the day and record it in a diary. Those in the control group were instructed to go about their usual activities of daily living; no diary was provided. As a fidelity check, an objective measure of physical activity was obtained using an Actical® accelerometer (Philips Respironics, 920) for a 10-day period both pre and during the intervention.

Results/Findings: Repeated measures ANOVA revealed a significant time x group interaction effect for ADAS-cog scores F(1,18) = 53.11, p = 0.00, Wilks' &Lambda; = 0.263, rho2 = .737. Those in the intervention group increased their cognitive function whereas those in the control group decreased their cognitive function. There was also a significant time x group interaction effect for TUG scores F(1,16) = 16.44, p = 0.001, Wilks' &Lambda; = 0.508, rho2 = .492. Only those in the intervention group improved their physical function. As expected, the fidelity check showed that only those in the intervention group improved their physical activity profile (p < 0.05) over the 10 weeks.

Conclusions: The pilot study provides preliminary evidence that reducing sedentary behaviour improves both cognitive and physical function in older adults living in senior living facilities.
Third-wave cognitive behaviour therapies for weight management: Systematic review and network meta-analysis

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Disease prevention and weight management (Chair: Carol Maher), Club B, June 6, 2019, 3:50 PM - 4:25 PM

Purpose: Third-wave cognitive behaviour therapies (CBT) are increasingly used for weight management but evidence of their effectiveness is sparse. This systematic review and network meta-analysis assessed the effect of third-wave CBGs on body weight/BMI change in adults with overweight or obesity.

Methods: Eight databases were searched from inception, with no restrictions, using a strategy based on the concepts: (1) third-wave CBT (2) overweight, obesity or weight management. Reference lists of relevant articles were searched and authors of abstracts contacted. Studies using any third-wave CBT focusing on weight loss/maintenance for adults (=18 years) with a body mass index (BMI) =25kg/m2 were included. All study designs (except case reports) were eligible. Two independent reviewers screened articles for eligibility, extracted data, assessed risk of bias using RoB 2.0 and ROBINS-I tools, and assessed quality using the GRADE approach. Random-effects pairwise and network meta-analysis was conducted using Stata (v14.2) to estimate direct and indirect intervention effects.

Results: Of the 7540 identified articles, 40 articles (35 studies; n=2650) were included. Interventions used mindfulness-based cognitive therapy (MBCT) (n=21; 60%), acceptance and commitment therapy (ACT) (n=10; 28%), dialectical behavioural therapy (DBT) (n=2; 6%), DBT plus pharmacotherapy (n=1; 3%) and compassion focused therapy (n=1; 3%). Most studies reported outcomes up to 6-months follow-up. All CBGs combined resulted in greater weight loss compared to standard behavioural therapy immediately post-intervention (Standardised Mean Difference (SMD): -0.14, 95% CI: -0.28, -0.00) and at 12-months post-randomisation (SMD: -0.17, 95% CI: -0.36, 0.02). Random-effects network meta-analysis found ACT to be better than MBCT (SMD: -0.48, 95% CI: -0.91, -0.04) and no/minimal intervention (SMD: -0.33, 95% CI: -0.59, -0.07) at 9-months follow-up. ACT was found to rank as the best intervention up to 9-months follow-up, after which MBCT stood out to be the best-ranking intervention.

Conclusion: This extensive review suggests that third-wave CBGs may be helpful in assisting with weight management but better quality studies with longer term follow-up are imperative. The findings are being used to inform the development of a weight management programme, and are of great value to those working with people with overweight or obesity.
Functional exercise capacity and physical activity levels following stereotactic body radiotherapy in early stage lung cancer patients: The Lung PLUS study

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Disease prevention and weight management (Chair: Carol Maher), Club B, June 6, 2019, 3:50 PM - 4:25 PM

Cancer prevention and management (SIG)

Purpose
Stereotactic Body Radiation Therapy (SBRT) has emerged as the treatment of choice for inoperable patients and those refusing surgery in the management of early stage non-small-cell lung cancer (NSCLC). SBRT improves survival and is considered safe and tolerable. Increasing physical activity (PA) is a well-recognized health-promoting behavior throughout the cancer continuum, however, data regarding the impact of SBRT on PA levels and functional exercise capacity are lacking. Therefore, the aim is to present the first results of the Lung PLUS study on the impact of SBRT on functional exercise capacity and PA levels.

Method
A monocentric prospective longitudinal study was conducted in patients with confirmed primary early stage NSCLC receiving SBRT. Functional exercise capacity was measured before SBRT and after 3 months with the 6-minute walk test (6MWT) and the physical domain of the validated EORTC-QLQ-C30 questionnaire was surveyed at the same data points. Clinically meaningful important differences (MCID) of 6MWT was defined as 37 meters and and 10-points on the physical domain. PA was scored with the Godin-leisure time questionnaire. The Wilcoxon signed rank test was used to compare changes over time.

Results
Interim-analyses were conducted on the first half of the intended patient group (25 out of 50 planned), recruited between June 2017 and October 2018. The majority (median age 73) was male (64%) with stage I disease (96%). Before SBRT, all patients were inactive and the median physical function was 53. The 6MWT was not administered in 8 patients due to wheelchair or crutches use (n=4), continuously oxygen intake (n=2) or another reason (n=2). Patients walked an average distance of 377 meters (SD111) before SBRT with an average O2 saturation of 95% before and 92% after the 6MWT. So far, no significant differences in 6MWT (p=0.650) and physical function domain (p=0.087) have been found over 3 months. MCID in physical function was found in 42% (32% improvement and 10% detoriation).

Conclusion
The first interim results indicate that functional exercise capacity is maintained after SBRT. However, PA levels are low in this group of early stages NSCLC patients, not amenable to surgery. Updated results will be presented.
Comparison of objectively measured activity behaviour among dog owners and non-dog owners in cardiac rehabilitation

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Disease prevention and weight management (Chair: Carol Maher), Club B, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Research shows that dog ownership may be associated with improvements in physical and mental health among general populations. Recently research has looked at this association among chronic disease populations; however, there is still little evidence in this area. It is thought that the association may be due to the potential extra physical activity (PA) that accompanies owning a dog. This study aimed to determine whether people with coronary heart disease (CHD) were more likely to have greater activity levels if they were dog owners.

Methods: Participants completed a baseline survey and wore an accelerometer to measure activity levels every 5 seconds over a 9-day period. CHD patients had to have ≥ 1 valid accelerometer day (i.e., ≥ 600 minutes of wear-time per day) to be included and have answered the dog ownership question. ANOVAs were used to determine the differences in activity levels between dog owners and non-dog owners. The procedure was repeated for follow up measures.

Results: 320 participants from 8 sites across Canada completed relevant baseline measures; 280 were retained at 6 months (88%). The percentage of participants owning a dog at baseline and follow-up were 27% and 28%, respectively. Multiple measures of activity were analyzed including frequency and duration of both bouts and total amounts of moderate to vigorous PA (MVPA), light PA (LPA) and sedentary behaviour (SED). After all comparisons, only total LPA at baseline was found to be significantly different in favour of dog owners (131 vs. 118 minutes; p=.016). At time 1, 15% said no one actually walked the dog; at time 2 it was 14%.

Conclusions: This study shows that among CHD patients, those who own a dog may be more likely to accumulate higher amounts of daily LPA. Dog walking may be a feasible methods of promoting decreasing sedentary behaviour among the general population and chronic disease populations. The percentage of those who did not walk their dog at all also indicates a potential area for intervention among this population.
Does Neighborhood Type Impact Success in a Weight Management Program?

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Disease prevention and weight management (Chair: Carol Maher), Club B, June 6, 2019, 3:50 PM - 4:25 PM

Disease prevention and management (SIG)

Purpose: With adult obesity rates in the United States remaining near 40% despite decades of efforts to lower them, the factors that influence success in weight management programs must be evaluated. Residential environments of program participants may be either supportive or unsupportive to weight loss, so program participants may see different success based on where they live. Traditional evaluations of residential environments rely on regressions to identify single features that are helpful or not. Yet residential environments are complex, and information may be lost when they are characterized as the additive sum of various features. Methodologies that characterize neighborhood types based on the full complement of environmental features considered jointly and simultaneously may more accurately reflect the experience of living in a neighborhood. This study compared success in a weight management program for participants with different residential environments using a non-traditional neighborhood characterization method.

Methods: In this secondary analysis, we used latent class analysis to identify neighborhood types based on egocentric measures from the food, physical activity, and socioeconomic environments for a nationwide sample of 585,630 adults, 28,575 of whom participated in a weight management program. We used a difference-in-difference analysis to estimate the impact of neighborhood type on body mass index (BMI) change associated with participation in a weight management program.

Results/findings: We identified nine exhaustive and mutually exclusive neighborhood types. Program participants had lower BMI at the end of a six-month intervention window compared to matched controls regardless of neighborhood type, with program effects ranging from -0.53 to -0.76 BMI units for men and between -0.49 and -0.87 BMI units for women. Additionally, male program participants had smaller decreases in BMI when they lived in neighborhoods characterized by low neighborhood socioeconomic status.

Conclusions: These findings suggest that in a nationwide weight management program, both men and women successfully lost weight regardless of residential neighborhood type. However, smaller BMI reductions were noted in men living in some neighborhood types characterized by low neighborhood socioeconomic status, suggesting that tailoring the program to specifically address barriers to weight loss associated with low neighborhood socioeconomic status may increase overall program impact.
Impact of nutrition interventions on dietary intake in children and adolescents with overweight or obesity: A meta-analysis of randomised controlled trials

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Disease prevention and weight management (Chair: Carol Maher), Club B, June 6, 2019, 3:50 PM - 4:25 PM

Objective
Assessing dietary intake is an important antecedent to understanding amenability to dietary change. The aim of this systematic review was to synthesise the best available research evidence on the impact on dietary intake of nutrition components of interventions to treat or manage overweight or obesity in children and adolescents.

Methods
Following a published protocol, a search of eight databases for randomised controlled trials (RCTs) ever published up to April 2018 was conducted. Inclusion criteria were: RCT; intervention with a dietary component for treatment of 2-20 year olds with overweight or obesity; and reported a dietary intake outcome. Data followed guidelines for conducting systematic reviews from the Joanna Briggs Institute (JBI) with quality assessed using JBI Checklist for RCTs, a 13-item quality appraisal tool, and meta-analysis conducted using R software.

Results
Of 299 RCTs identified, only 88 papers had reported dietary outcomes, with 80 reporting at least one statistically significant dietary change. Meta-analysis for change in energy intake in studies using 24-hour recalls or food records found reduced total energy intake, [standardised mean difference, -193.9kcal 6months (-340.1, -47.9); -154.7kcal 12months (-282.2, -27.2); -158.30kcal 24months (-359.8, 43.2), p<0.001] for intervention versus controls(n=13 studies). A significant reduction in total daily energy intake (X2(1) 6.65, p=0.036) was found for interventions in which the dietary component was administered by a dietitian. Other changes included increased fruit and vegetable intakes over 3-12 months (n=18 studies, +0.3 to +0.5 serves/day) and decreased sugar-sweetened beverages (SSBs) (n=18 studies, -0.25 to -1.5 serves/day) between 4-24 months. Studies that reported a significant reduction in at least one adiposity measure were more likely to have reported a reduction in energy-dense, nutrient-poor food intakes (X2(1) 8.65, p<0.01).

Conclusions
Interventions aimed at reducing children and adolescent adiposity have a modest, but sustained impact on reducing intakes total energy, SSBs, energy-dense, nutrient-poor foods, and increasing fruit and vegetables. Synthesis of dietary assessment methods and outcomes was limited by incomplete and inconsistent reporting of dietary intervention components and dietary outcomes. There is a need for standardised reporting of dietary intervention components and outcomes within future interventions for children and adolescents with overweight and obesity.
Reliability and validity of an online and paper administered Physical Activity Neighborhood Environment Scale (PANES)

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Assessment and methodologies of the environment (Chair: J Schipperijn), Club C, June 6, 2019, 3:50 PM - 4:25 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Introduction: Perceptions about supportiveness of built environment characteristics for physical activity remains an important focus in built environment-physical activity research. While self-report tools exist, such as the Physical Activity Neighborhood Environment Scale (PANES), measurement properties may differ depending on the geographical context, and the administration mode. The 17-items (seven-core, four-recommended, and six-optional) of the PANES capture perceptions of neighbourhood walkability. The seven-core items of the PANES have been used in international comparison studies, including Canada; however, the reliability and validity of the PANES have yet to be evaluated among Canadian adults.

Objective: Our study objectives were to 1) assess test re-test reliability and internal consistency of an online and paper PANES, and; 2) estimate the correspondence between the online and paper PANES and objectively-measured neighbourhood built environment, among adults residing in a Canadian urban setting.

Methods: Between July 2016 and February 2017 adults from Calgary (Alberta, Canada) were recruited to complete a paper (n=75), or online (n=261) PANES on two occasions approximately seven-days apart. Test-retest reliability was estimated for the seven-core PANES items using one-way random effects intraclass correlation coefficients (ICC). Cronbach's alpha coefficients (aha;) estimated the internal consistency of the seven-core items. Spearman rank correlations (r) estimated the linear associations between the PANES Built Environment Index (BEI) and Walk Score®. Independent samples t-tests estimated the differences in the BEI scores between participants residing in grid versus non-grid street pattern neighbourhoods.

Results: For the paper PANES, 6/7 items had moderate-to-substantial test-retest reliability (ICC=0.46-0.80). For the online PANES, 5/7 items demonstrated moderate-to-substantial test-retest reliability (ICC=0.49-0.72). Time 1 BEI to had moderate internal consistency for the paper PANES (aha;=0.58) and online PANES (aha;=0.55). Correlations between the PANES BEI scores and Walk Score® were fair (paper: r=0.26 to 0.40; online: r=0.33 to 0.39). PANES BEI was higher among those residing in grid versus non-grid street pattern neighbourhoods (paper: 5.3±smn;0.8 vs. 4.4±smn;1.4, p<.05; online: 4.9±smn;0.9 vs. 4.1±smn;1.0, p<.05).

Conclusions: The PANES administered via paper or online, can provide reliable and valid estimates of the self-reported neighbourhood-built environment supportive of physical activity within the Canadian context.
Co-creating a local public open space with children from a deprived neighborhood: A RE-AIM evaluation

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Objective: Knowledge on how to improve public open spaces in deprived neighborhoods to increase active living among children is scarce and comprehensively evaluated public open space interventions are needed. Firstly, the aim was to explore if co-creating installations in a public open space in a deprived neighborhood with local fifth-grade children (11-12-years-old) influenced their use of this space. Secondly, we wanted to explore if RE-AIM was a useful evaluation framework for evaluating a built environment intervention. To our knowledge this has never been done before.

Methods: Thirty-nine children participated in 12 workshops during their art and craft classes from January to June 2017. Three installations were developed and built together with the children: a boxing pavilion, a 7-meter-high tower, and big nets. The evaluation was conducted in the pre- and post-intervention phase using a convergent mixed-methods triangulation design to capture all RE-AIM dimensions. We used survey data and archival records to assess Reach. Accelerometers, GPS and survey data from the children were used to assess Effectiveness and interviews with children, teachers and designers were used to assess Adoption, Implementation and Maintenance. All survey, accelerometer and GPS data were analyzed using descriptive analyses and interviews were analyzed using thematic analysis.

Results: Findings revealed that on average, children spent 15 minutes more in the space post-intervention. However, the space was used fewer days and by fewer children, being less physically active after the intervention. Most children never used the space during recess (89.6%), class hours (79.3%), nor after school or during weekends (65.5%). Using the RE-AIM framework, the adoption, implementation and maintenance dimensions of the project helped explain these results. Our research highlighted challenges associated with how the children were involved and showed a lack of maintenance after the intervention ended.

Conclusions: To avoid this, future built environmental projects should be systematically and comprehensively designed and evaluated using an evaluation framework integrated from the beginning of the project. Our study suggests that the RE-AIM framework could be a useful tool for such evaluations of built environment interventions.
A cluster-randomized controlled trial to promote active commuting to and from school and physical activity: The PACO Study


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Assessment and methodologies of the environment (Chair: J Schipperijn), Club C, June 6, 2019, 3:50 PM - 4:25 PM

Objective: The aim of the PACO (Pedalea y Anda al COlegio) study is to design, implement and examine effects of 3 school-based interventions for promoting active commuting to and from school (hereinafter referred as to school) on transport to school patterns and physical activity levels in Spanish adolescents.

Methods: The design is a cluster-randomized controlled trial with school as the unit of randomization. Participants are 480 adolescents aged 14-15 y belonging to 16 schools from 4 cities in Spain (Granada, Valencia, Jaen and Toledo). All the public secondary schools were invited to participate by e-mail and afterwards, separately within each city, those schools accepting to participate and those who did not answered the e-mail were randomly allocated to one of three intervention groups or control group. The interventions are settled in the Physical Education lessons during 1 month and consist on: 1) promote walking (W) using a gamified mobile app called "Mystic School", where the steps that participants walk are kept and exchanged for movements into the game to reach the end, 2) promote biking (B) through theory and practice lessons about cycle training skills including on-road training, and 3) promote active commuting focusing on parenting participation (P) using an app mobile to find safe routes and social networks of Facebook and WhatsApp to communicate. The outcomes are measured during 1-week before and after the interventions. The primary outcomes are: mode of commuting to school and physical activity levels, assessed by accelerometers, GPS and questionnaire to the adolescents. The secondary outcomes are: children’s behaviours and perceptions via questionnaire to the adolescents, parent&acute;s behaviours and perceptions assessed by questionnaire to the parent’s participants, location and characteristics of the route via GPS and body composition assessed by anthropometry to the adolescents.

Conclusions: The findings of this study will provide a comprehensive understanding of the effects of the three different school-based in the mode of commuting to school and physical activity levels of Spanish adolescents. These findings will guide researchers and policy makers to implement effective interventions to promote active commuting to school and contributing to healthier societies.
Exploring the implementation and mechanisms of impact of a park prescription intervention on physical activity and quality of life: Process evaluation of the Park Prescription Trial

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Assessment and methodologies of the environment (Chair: J Schipperijn), Club C, June 6, 2019, 3:50 PM - 4:25 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: The Park Prescription Randomised-Controlled Trial assessed effectiveness of a multi-component intervention promoting physical activity (PA) focussing on the use of parks for improving health and wellbeing. This process evaluation explored its implementation and mechanisms of impact on the primary trial outcome: objectively-measured moderate-to-vigorous PA (MVPA).

Methods: 160 participants recruited from the community were allocated to a 6-month park prescription intervention or control group. Process evaluation assessments were conducted at baseline, 3- and 6-months with the intervention group (n=80). Evaluating implementation included collecting demographic data to assess reach, tracking participant exposure to each intervention component and conducting focus group discussions (FGDs) post-intervention with group exercise non-attenders and regular-attenders. Mechanisms of impact were explored via FGDs assessing barriers and enablers to intervention participation. Linear regression compared differences in the main study outcome, adjusting for baseline self-report survey measures of physical activity, between non-attenders (0% attended, n=18), irregular attenders (0-35.9% attended, n=18), semi-regular attenders (>35.9-67.9% attended, n=17) and regular-attenders (>67.9% attended, n=18) who completed the trial (n=71).

Results: The intervention reached participants who were middle-aged (mean, 52 years), predominantly female (79.4%) and of Chinese ethnicity (81.3%). All intervention participants received the park prescription, and materials, whilst 94% received the follow-up counselling. Group exercise attendance declined from 48% in week one to 24% in week 26. In FGDs non-attenders shared that the intervention had motivated them to engage in physical activity and their preference was for unstructured activities. Mean MVPA/week according to different levels of attendance were: non-attenders 130 minutes, irregular attenders 96 minutes, semi-regular attenders 50 minutes and regular-attenders 189 minutes. These remained significantly different in the adjusted model (p=0.005).

Conclusion: A Park Prescription intervention effectively increased recreational PA, psychological quality of life, park use and park PA. Although intervention participants achieved greater accelerometer-measured MVPA time/week than controls, this result was not statistically significant. When exploring reasons for this result, qualitative feedback revealed group exercise non-attenders preferred unstructured activity and were motivated by the intervention to do this, yet regular-attenders achieved significantly greater MVPA at six-months. Intervention effectiveness may be enhanced by tailoring it to participants' preferences for structured or unstructured PA.
Associations between occupational sedentary time with adiposity markers, and the influence of moderate to vigorous physical activity: does domain matter?

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Background: Associations between daily sedentary time and health-related outcomes are known to be attenuated by physical activity; however, there is limited evidence on the role that domain-specific sedentary time contributes to these. The primary aim of this study was to examine the variable effects of occupational sedentary time on two measures of adiposity (waist circumference (WC) and body mass index (BMI)); a secondary aim was to determine the role that moderate to vigorous physical activity (MVPA) has on any variable associations.

Methods: The Health Survey for England 2008 (an annual survey that monitors the health of the nation) provided data on both adiposity markers and physical behaviours. The ActiGraph GT1M accelerometer was worn by a sub-sample of adult participants for seven days: physical behaviours (sedentary time and average daily time in MVPA) were computed using count data from the vertical axis. Time in occupational sedentary behaviour was calculated using the commonly used cut-point of <100 cpm, and MVPA was calculated using Freedson cut-points. Quantile regression models were used to examine the variable effects of occupational sedentary time on WC and BMI; models were adjusted for age, gender, accelerometer wear-time, lifestyle variables, non-work sedentary time and average time per day in MVPA.

Results: Of the 2356 adults with accelerometer data, 911 were in full-time employment. Occupational sedentary time was not found to be associated with either adiposity marker, after the quantile regression models were adjusted for MVPA; however, MVPA was a significant predictor in change in adiposity markers. For each one minute increase per day in MVPA, there were significant associations with both reduced WC and BMI, and these effects varied with increasing quantiles respectively (WC: $\beta_a$; coefficients for the 25th, 50th, 75th quantiles were -0.045, -0.065, -0.101; BMI: $\beta_a$; coefficients for the 25th, 50th, 75th quantiles were -0.011, -0.021, -0.021).

Conclusions: In contrast to studies that have found associations with total sedentary time and health-related outcomes, in this study, there was no evidence that occupational sedentary time is associated with health-related outcomes in the same way. Significant variable effects of daily MVPA were observed for both WC and BMI.
SO09, SO09.1

Sodium Calculator Plus: Development and iterative testing of a detailed web-based dietary sodium assessment tool for consumers and health practitioners to rapidly assess sodium intake and sources

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E- & mHealth observational studies (Chair: Katrien de Cocker), Club D, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Dietary sodium reduction is a public health priority to address the burden of hypertension and cardiovascular disease. In many countries, including Canada, populations consume sodium in excess of the WHO recommendation (<2000 mg/day). Many people have misconceptions and lack awareness about the amount and sources of sodium in their diet. Traditional sodium assessment methods are complex, time-consuming and do not provide timely, individualized feedback, thereby potentially impeding effective reduction of sodium intakes. The objective was to develop a web-based dietary sodium food frequency-type questionnaire, the Sodium Calculator Plus (SCP), to address these limitations.

Methods: The SCP questions were developed and prioritized by examining the sources of sodium and portion sizes consumed in a nationally-representative Canadian nutrition survey. The sodium content (mg/100g) of foods and beverages that made the greatest contribution to sodium intakes were collated using the University of Toronto Food Label Information Program (FLIP) 2013/2017 and the Canadian Nutrient File (CNF) 2010/2015. Dietitians using a beta version of the SCP with clients completed a survey on usability and interface design of the SCP.

Results: The SCP contains 72 questions on intake frequency and portion sizes of sodium-containing foods, including sub-questions on sodium-reduced products (n=17) and restaurant foods (n=5). It took 10-15 minutes to complete. Users (n=118) liked the reported grouping of foods, options for frequency of consumption, concise instructions, and personalized feedback on sodium intakes. Users found the data to be accurate and indicated that the SCP led to increased awareness of sodium consumption and reading of food labels but indicated some areas for improvement including addition of foods or categories and separation of some categories; particularly making it user-friendly for users consuming a culturally-based diet; clarification of portion sizes with additional options, consideration of food form (e.g. canned/dry) and use of color and larger font. These data were used to modify the app, as part of the iterative development process.

Conclusion: The SCP provides users with rapid, detailed, personalized information on dietary sodium. The SCP can potentially track longitudinal changes in sodium intake and be integrated into e-Health platforms to support behaviour change and improved health outcomes.
Usage and usability of Intervention INC: A web-based interactive comic tool to decrease obesity risk among urban minority preadolescents

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E- & mHealth observational studies (Chair: Katrien de Cocker), Club D, June 6, 2019, 3:50 PM - 4:25 PM

Purpose: Web-based/mHealth interventions have the potential to engage youth around health messages and promote behaviors that decrease obesity risk. Intervention INC comprises an innovative interactive web-based tool (comprising a 6-chapter comic with tailored messaging and a goal-setting component) aimed at improving dietary behaviors among urban Black/African-American (AA) and Latino preadolescents, who are at risk of childhood obesity. As part of a two-group pilot randomized study, we assessed usability and usage of Intervention INC.

Methods: 89 Black/AA and Latino children (ages 9-12) were recruited in New York City (from August-November 2017) to participate in a 6-week intervention. Children were randomized to either the experimental (E) (n=45) group, who received the web-based tool, or the comparison (C) (n=44) group, who received online health newsletters. Usage data (tool access, goal selection/evaluation) were collected across the intervention period. Five usability domains (usability, usefulness, ease of use, ease of learning, satisfaction) were assessed via a 30-item online survey (responses on a 5-point Likert scale) at intervention mid-point (T2) and end (T3). Chi-square tests were conducted to compare differences between groups.

Results/Findings: Child demographics included: mean age=10.4±smn;1.0 years; 61% female, 62% Black/AA, 42% Latino, 51% overweight/obese, and 33% annual household income <$20,000. The E group reported greater overall usability compared to the C group (E: 120.2±smn;11.1 vs C: 114.3±smn;15.4, p=0.05) at T3. The domains, ease of use and satisfaction, tended to be higher in the E group (p<0.10). No other differences in usability domains were observed between groups. Though not statistically significant, the percentage who accessed the website weekly was consistently higher in the E vs. C group (5-19% greater). In the E group, nearly all participants (82-100%) who accessed the website weekly also read the entire comic chapter that had been issued that week. There were no statistically significant differences in the number of dietary-related goals chosen or evaluated between groups by week (overall goal selection was E: 27-69% vs. C: 27-82%).

Conclusions: Study results appear promising, however, the tool's effectiveness must be tested. These data will also inform improvements to the tool to enhance its usability and engagement.
Active Video Games: The Battle for Attention

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E- & mHealth observational studies (Chair: Katrien de Cocker), Club D, June 6, 2019, 3:50 PM - 4:25 PM

E- & mHealth (SIG)

Objective: Inactivity is a substantial global burden, economically and physiologically (Ding et al., 2016). Video games are a prominent contributor to inactivity. Active video games (AVGs) can alleviate video game related inactivity. However, AVGs perform consistently poorly on the commercial market, in terms of total volume and market share. Thus, the purpose of this study was to explore how AVGs compare to non-active video games (NAVGs), based on gameplay experience.

Methods: 32 participants (25 male, 7 female), completed a novel review-based survey that compared five AVGs to NAVGs, across 10 design constructs. Data analysis included paired-samples T-tests. 5 participants, all male, a sub-sample of the 32 participants also completed a semi-structured interview. The interview was conducted to build on the quantitative comparisons. Thematic analysis was conducted to identify themes.

Results: Findings from the review survey and semi-structured interviews indicated that participants perceived AVGs unfavourably to NAVGs. Mean scores for the five AVGs were low (3.97 out of 10), compared to NAVGs (the players personal 10 out of 10). Participants perceptions indicated that AVGs deliver lower quality world design (P < 0.01), characters (P < 0.05) and stories (P < 0.01), compared to the genre mean (3.97). These three design constructs were judged as essential components of video games via qualitative exploration. Qualitative exploration also highlighted several important issues; gamer motivation, the lack of quality and variety in AVGs, the stereotype in AVGs, and the practical limitations of the associated hardware. The findings support the Gamer Motivation Model. A mixed-reality platform idea, proposed as an innovative solution to these issues, was received positively by all five interviewees.

Conclusions: This study has provided novel insights into understanding why, given that AVGs work practically, they are not working commercially. These findings have implications for game developers including, but not limited to, applying the Gamer Motivation Model and improving the world design quality. AVGs that address limitations of current products have the potential to contribute to reduced sedentary behaviour, and thus, prevention of associated ill-health. An innovative mixed-reality platform solution was received positively by participants and should be the focus of future research.
SO09, SO09.4

Patterns of Financial Incentive Payouts in the Initial Two Months of an Online Behavioral Weight Control Program

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E- & mHealth observational studies (Chair: Katrien de Cocker), Club D, June 6, 2019, 3:50 PM - 4:25 PM

E- & mHealth (SIG)

Objective: Financial Incentives for weight loss are increasingly popular; however, previous research has largely focused on incentives for weight loss outcomes rather than for behaviors which support increased weight loss (e.g., self-monitoring). The current study undertook to define the costs of incentivizing both weight loss outcomes and behaviors in the early phase of a behavioral weight loss program to inform future policy.

Methods: Individuals randomized to the incentive arm of an RCT examining incentives as part of an established online, group-based behavioral weight control program were offered money for the self-monitoring of their diet and weight. Participants were given up to $15 US/week for 8 weeks if they monitored dietary intake and weight daily or $10 US/week if they reported these behaviors on 5 days during each week. Further, participants were offered $25 if they had lost >3% of baseline weight at the 2-month assessment and $35 if they had lost >5%. Objective weight measures were obtained in the clinic at baseline and 2 months.

Results: Two hundred and six individuals (91% female; M age=50 years), most of whom were obese (82%; M=96 kg at baseline; M BMI=35.5 kg/m2) were randomized to the incentive arm, and 95% were retained for 2-month data collection. Weight loss averaged 4.5+3.0%, with 44% losing >5% and eligible for the $35 incentive and 24% losing >3% but <5% (and thus eligible for the $25 incentive). On average, participants received weekly incentives in 7.2+1.7 weeks, with an average of $99+27 per participant received over 8 weeks ($155 possible) and 94% receiving >4 weekly incentives. Only 3% (N=6) never received a weekly incentive. Total incentive expenditures were $24,470 (weight loss bonuses [$4,170] + weekly behavior rewards [$20,300]) or an average of $119 per person (out of possible $155).

Conclusions: Actual costs for the first 2 months were 77% of the maximum payout. Policy makers will be interested in identifying the real economic costs associated with a weight loss incentive structure that reinforces both weight loss and weight loss-promoting behaviors to allow calculation of the likely financial exposure should they elect to offer a similar incentive structure.
Patient types of children and adolescents in obesity therapy – cluster and discriminant analyses of media use and physical activity patterns

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Introduction
Obesity represents a major challenge for patients and health systems. An improvement of existing therapy approaches is required as they show only small effects. Effective intervention approaches are required to combat obesity in adolescents. Interventions should particularly focus on behavior patterns, such as physical activity and media use, due to their associations with energy expenditure. To this end, intervention approaches, objectives and methods need to be tailored to the behavior patterns of the target group. The aim of this study is to identify distinctive patient types based on activity and media use as well as to analyze the relevance of certain characteristics for the allocation to clusters.

Method
The national multicenter study was conducted 2015. In total 432 participants were surveyed and their data used in a cluster and discriminant analysis, which considered 11-13- and 14-17-year-old therapy participants separately. Standardized instruments were used to assess physical activity, media use and socio-demographic factors.

Results
The analysis resulted in four patient clusters, each with divergent characteristics in each age group. Important characteristics for the allocation to clusters were outdoor physical activity among 11-13-year-olds and cellphone use among 14-17-year-olds. Only one cluster of 11-13-year-olds met WHO recommendations on physical activity. The analysis revealed high scores in media use across all clusters. Among 11-13-year-olds either TV or PC were used extensively. In comparison to reference studies, 14-17-year-olds showed low activity and high media use. Media preferences varied between clusters.

Discussion
Cluster analyses revealed specific behavior patterns and indicated in single clusters that media use and physical activity were either unrelated or that one substituted the other. Based on the results, obesity interventions should be conducted with patient groups of similar age. Physical activity training should remain the focus of therapy. As media use increases, the topic should be addressed in training of patients and parents. Considering the different patient types, differentiated intervention objectives and methods are recommended.
A systematic review of culturally-adapted interventions for early childhood obesity prevention

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Nutrition and physical activity research in childcare (Chair: Anne Martin), Club E, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Early interventions for obesity prevention have been shown to effectively reduce obesity-related behaviours in young children. With increasing obesity prevalence worldwide, an understanding of how to utilise existing evidence-based interventions among culturally and linguistically diverse populations is needed. The objective of this systematic review was to describe culturally-adapted interventions for early obesity prevention (including related behaviours: infant feeding, dietary intake, physical activity and sleep).

Methods: Nine electronic databases (Medline, Embase, ERIC, Global Health, PsycINFO, CINAHL, Scopus, Web of Science, ProQuest Dissertations and Theses) were systematically searched in October 2018. Hand searches of authors and reference lists of relevant review articles were also conducted. Included studies were culturally-adapted interventions with at least one component targeting obesity-related behaviour(s) among healthy children 0-5 years. Studies that directly translated intervention materials or developed new interventions were excluded. There were no limits placed on study design, publication language or date. This review was undertaken using the PROSPERO protocol (CRD42018105596) and PRISMA guidelines.

Results: After duplicates were removed, 3751 articles were identified. Each title/abstract was screened according to predefined eligibility criteria by one reviewer (SM) and independently by another reviewer (CR/LMW/PL/ST/ME). Discrepancies between the reviewers’ findings were resolved by two reviewers (SM/PL). Full text articles are being assessed for eligibility. Information to be extracted from the eligible articles includes culturally-adapted intervention characteristics (target culture or ethnicity, participants, setting, target behaviours, outcomes) and details of what and how the intervention was adapted. This work is currently in progress and will be completed for the conference.

Conclusions: The results will summarise processes used for cultural adaptation and guide effective cultural adaptation of obesity prevention programs targeting infants and young children.
17084

SO10, SO10.2

Increasing vegetable consumption among Norwegian 3-5-year-olds through targeting the kindergarten environment in a group-randomized controlled trial. The BRA-study.

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Nutrition and physical activity research in childcare (Chair: Anne Martin), Club E, June 6, 2019, 3:50 PM - 4:25 PM

Background: Early childhood represents a critical period for the establishment of healthy dietary habits. Interventions to increase vegetable consumption in this period of life may be effective in reducing the future risk of non-communicable diseases. The primary aim was to increase vegetable intake among preschool children in a kindergarten-based randomized controlled trial through changing the food environment and food-related practices in the kindergarten and the home (secondary aim).

Methods: The target group was preschool children born in 2010 and 2011, attending public or private kindergartens in the counties of Vestfold and Buskerud, Norway. Consent to participate was obtained for 73 kindergartens (response rate 15.2%) and 633 children (response rate 38.8%). Data about child vegetable consumption were collected by parental web-based questionnaires. In addition, among a sub-sample (n 481), trained researchers directly observed children's vegetable intake in the kindergarten.

Data about vegetables served in the kindergarten were collected by paper-based questionnaires answered by pedagogical leaders. In addition, kindergarten staff filled in a five-day weighted vegetable diary. For allocation of kindergartens to intervention and control groups, an independent stratified block randomization was used. Effect of the intervention from baseline (spring 2015) to follow-up 1 (spring 2016) was assessed by mixed-model analysis taking the clustering effect of kindergartens into account.

Results: Based on the direct observation, children's daily vegetable consumption showed a borderline significant increase by roughly 13 grams in favor of the intervention group (P 0.054). The parental reported vegetable intake showed no effects of the intervention. In favor of the intervention group in the kindergarten setting, daily amount of vegetables served increased by roughly 20 grams per person (P 0.002), while the variety of served vegetables increased by 1.5 types per month (P 0.014). No effects on frequency of vegetables served or on staff's food-related practices were found.

Conclusions: Positive effects of the intervention were seen within the food environment and child vegetable consumption in the kindergarten setting, while no effects were seen in the home setting. Research to fully understand how to influence food environments, food-related practices and child vegetable consumption in the kindergarten and the home setting is desirable.
Comparing the family child care provider food environment with dietary quality of children in their care.

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Purpose: To compare the assessments of the nutrition environment of family child care providers with healthy eating behaviors of children in their care.

Methods: Baseline two-day evaluation of: the food environment (Environment Policy Assessment and Observation (EPAO)) of 118 family child care providers and child Healthy Eating Index 2015 (HEI) as calculated from measures of dietary observation of children. Twelve food subscores of the EPAO nutrition score were grouped topically and compared in linear regression models with the 13 subscores of the 2015 HEI score based on the observations.

Results: The overall Vegetable EPAO score (p<0.01) was associated with Total Vegetable HEI score, but not other EPAO Vegetable scores. None of the Vegetable EPAO scores were associated with the Green and Bean HEI. The Total Fruit (p<0.01) and Fruit with No Sugar (p=0.02). EPAO were both associated with Total Fruit HEI, but only Total Fruit EPAO (p<0.01) was associated with Whole Fruit HEI. The Whole Fruit EPAO and HEI scores were significantly associated with one another (p<0.02). The Low Fat (LF) Meat EPAO (p<0.01) was associated with Total Protein HEI, but not with Fried Meat or High Fat (HF) Meat. None of the meat or fat EPAO scores were associated with HEI measures of Seafood/ Vegetable Protein and Healthy Fatty Acid Ratio. Also, the High Salt HF snack EPAO score was not associated with the Sodium (HEI), and the High Sugar HF and High Salt HF snack scores (EPAO) were not associated with Refined Grains (HEI). The EPAO High Sugar HF Snack score (p<0.01) was associated with Added Sugars (HEI). The EPAO Fried Potatoes (p<0.05) and LF Meat ((p<0.04) was associated with Saturated Fat (HEI), but other EPAO meat, snack or Whole Grains scores were not.

Conclusion: Overall, the HEI and EPAO scores seem to measure different, but somewhat overlapping concepts in observed foods served with detailed nutrient consumption.

Implications: Future research should continue to evaluate both healthy food-related behaviors among providers and child nutritional quality in a broad approach to evaluation of the family child care environment.
Correlates of outdoor play time at childcare centres among toddlers and preschoolers

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Nutrition and physical activity research in childcare (Chair: Anne Martin), Club E, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Children are more physically active when they are outside compared to inside. The correlates of outdoor play time within childcare centres are largely unknown. The objectives of this study were to examine: 1) whether outdoor play time differs between winter and non-winter months among toddlers and preschoolers in childcare centres and 2) the correlates of outdoor play time.

Methods: Participants were directors (n=238) of licensed childcare centres with programs for toddlers (19-35 months) and/or preschoolers (36-60 months) from Alberta, Canada. Directors completed a questionnaire based on the GO Nutrition and Physical Activity Self-Assessment for Child Care (GO NAP SACC) Outdoor Play tool, and best practices defined by the tool were applied. The questionnaire measured outdoor play time separately for toddlers and preschoolers and winter (December-March) and non-winter months (April-November). The questionnaire also measured demographic information, physical and sociocultural outdoor environmental features, and policy. Descriptive statistics and logistic regression models were conducted.

Results: A significantly higher percentage of centres met the outdoor play time best practice (toddlers: =60 min/day; preschoolers: =90 min/day) in the non-winter months (toddlers: 79.0%; preschoolers: 55.3%) compared to winter months (toddlers: 24.7%; preschoolers: 14.4%) for toddlers and preschoolers. Centres with =50% of educators with level 2 (one year certificate) or level 3 (two year diploma or higher) pre-service training, compared to those with a lower percentage, were more likely to meet the outdoor play time best practice in the winter months for toddlers (OR=2.6, 95%CI: 1.28-5.24). Accredited centres, compared to non-accredited centres, were less likely to meet outdoor play time best practice in the non-winter months for toddlers (OR=0.17, 95%CI: 0.04-0.82). Centres that had =8 play areas in the outdoor space, compared to those that had 1-2 areas, were more likely to meet the outdoor play time best practice in the non-winter months for toddlers (OR=4.95 95%CI: 1.5-16.1). The opposite association was observed for toddlers and preschoolers in centres with a policy on outdoor play professional development.

Conclusions: Interventions to increase outdoor play in childcare centres, especially in winter months, appears warranted. Educator pre-service training and variety in outdoor play spaces may be important intervention targets.
SO10, SO10.5

Factors affecting the implementation of environmental recommendations to encourage physical activity in centre-based childcare services: a systematic review

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Nutrition and physical activity research in childcare (Chair: Anne Martin), Club E, June 6, 2019, 3:50 PM - 4:25 PM

Objective
To identify the barriers of and facilitators to implementation of environmental recommendations to encourage physical activity among children attending centre-based childcare services, synthesise these factors according to the 14 domains of the "Theoretical Domains Framework (TDF)" and report any associations with implementation of such recommendations.

Methods
Six databases were searched (PubMed, EMBASE, PsycINFO, ERIC, CINAHL, and Scopus) to identify qualitative and quantitative articles that reported barriers and facilitators by childcare staff or any stakeholder that are responsible for childcare operations. Additional searches included Google Scholar, hand searches of relevant journals and references of selected articles. Screening of abstracts and full texts against inclusion and exclusion criteria were conducted independently by two reviewers.

Results
From 2164 citations identified across all sources, 19 articles met the selection criteria (11 qualitative, four quantitative, and four mixed methods). From the nine TDF domains found in this review, the largest proportion of reported barriers and facilitators across articles mapped to the 'environmental context and resources' domain (e.g. time, availability of equipment and space) (n=19) and 'social influences' domain (e.g. support from parents, colleagues/supervisors) (n=11) of the TDF.

Conclusions
Review findings provide guidance for the future design of interventions to improve the implementation of environmental recommendations in childcare services. Strategies to support the implementation of such recommendations will need to address environmental, resource and social barriers in centre-based childcare services.
The association between fast food restaurant density and dietary quality as measured on the Dutch Healthy Diet 2015 index in EPIC-NL: a cross-sectional study in the Netherlands

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Influence of the environment on nutrition or physical activity behavior (Chair: Erica Hinckson), Club H, June 6, 2019, 3:50 PM - 4:25 PM

Policies and environments (SIG)

Objective A high density of fast food restaurants (FFRs) in the residential neighbourhood may contribute to unhealthier diets. We examined the cross-sectional association between the density of FFRs around the home of residence and dietary quality in the Netherlands.

Methods A cross-sectional study was conducted among 8,313 Dutch participants of the European Prospective Investigation into Cancer and Nutrition cohort in the Netherlands (EPIC-NL). Dietary intake was assessed using a 160-item validated food-frequency questionnaire, and scores on the Dutch Healthy Diet 2015 index (DHD15-index, ranging from 0 to 120) were calculated, such that a higher score indicated higher dietary quality. Objectively measured data on the location of FFRs were obtained from a commercial database. FFR density in a 50, 100, and 400 meter street-network buffer around the home of participants was calculated. Within each buffer, four categories representing increasing FFR density were constructed (D1-D4). Multivariable linear regression analyses were adjusted for age, sex, cohort, energy intake, household educational level, and neighbourhood level socioeconomic status and generated beta coefficients and 95% confidence intervals for the association between categories of FFR density in the different buffer zones and DHD15-index.

Results Mean age of participants was 70 (SD=10) and 80% was female. The mean score on the DHD15-index was 74 (SD=16). There were a median of 1 (IQR: 0, 2), 4 (IQR: 2, 8), and 37 (IQR: 12, 84) FFRs in the 50, 100 and 400m buffers, respectively. We observed that after adjustment for all covariates, a higher FFR density category was associated with higher dietary quality in the 50m buffer (ßa;D4vsD1 = 1.13; 95% CI: 0.26, 2.01), 100m buffer (ßa;D4vsD1 = 1.21; 95% CI: 0.31, 2.11), and in the 400m buffer (ßa;D4vsD1 = 1.64; 95% CI: 0.65, 2.62).

Conclusions In this study among elderly Dutch adults, the presence of FFRs around the home was associated with a higher dietary quality. Further research is warranted to elucidate the nature of this association: it may be that residential areas with higher density of FFR also have higher density of shops selling relatively more healthy foods.
SO11, SO11.2

Spatial accessibility of food retailers, dietary patterns and type 2 diabetes incidence in four Dutch population-based cohorts: a GECCO study

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Objective: Socio-ecological models suggest that the built environment influences lifestyle behaviors and, subsequently, non-communicable diseases. However, current evidence for associations between the food environment and type 2 diabetes (T2D) is inconsistent. This study used an assembly of population-based cohorts in the Netherlands, to investigate whether spatial accessibility of food retailers is associated with T2D incidence, and how adherence to Dutch Healthy Diet index (DHD15-index) mediates the association.

Methods: Longitudinal data from four Dutch cohorts from the Geoscience and Health Cohort Consortium (GECCO) were used (n=44,657). At baseline, locations (x,y coordinates) of food retailers were obtained by environmental audit, and home addresses of participants as six-digit postcodes. Spatial accessibility to food retailers was defined as the distance to the closest food retailer from the participant’s home for three types of food retailers: supermarkets, fast-food outlets and green grocers. T2D incidence was assessed during follow-up with cohort specific measures, according to the WHO criteria 2011. T2D incidence ratios (IR) adjusted for demographics, lifestyle factors and the broader food environment were estimated, using Poisson regression stratified by cohort, and meta-analyzed with a random-effects model. Two cohorts (n=7,228) obtained dietary intake at baseline, using a validated food frequency questionnaire and mediation by adherence to DHD15-index (score: 0-130 points) was investigated using linear and Poisson regression analyses.

Results: Among 9,928 participants (nrange=899-5,572), 363 participants developed T2D (nrange=54-178) over a mean follow-up of 6 years (range=2-10). Mean age ranged from 41.1±smn;13 to 67.4±smn;7 years. No significant associations between accessibility to food retailers and T2D were observed, although a larger distance to supermarkets and green-grocers pointed towards a higher T2D incidence (highest vs lowest tertile distance to supermarket IRT3vs.T1=1.10(95%CI:0.84-1.45)) and green-grocers (IRT3vs.T1=1.29(95%CI:0.77-2.13)). Mediation analyses indicated that a 100 meter larger distance to fast-food outlets was associated with 0.12 point higher adherence to the dietary guidelines (ßa;per100m=0.12(95%CI:0.01-0.23)), for supermarkets and green-grocers no significant associations were observed. Higher adherence to dietary guidelines pointed towards a lower T2D incidence (IRper100m=0.95(95%CI:0.87; 1.04)).

Conclusions: This study could not provide evidence for an association between spatial accessibility of food retailers and T2D incidence or dietary pattern in population-based cohorts in the Netherlands.
SO11, SO11.3

Physical activity in parks mediates the effects of a park prescription intervention on physical activity and quality of life

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Influence of the environment on nutrition or physical activity behavior (Chair: Erica Hinckson), Club H, June 6, 2019, 3:50 PM - 4:25 PM

Policies and environments (SIG)

Purpose: This study is part of the Park Prescription Randomised-Controlled Trial. It investigated the effects of hypothesised mediators on achieved physical activity (PA) and health outcomes to understand the intervention's mechanisms of impact.

Methods: Participants (n=160) aged 40-65 years were recruited through Population Health Screenings in Singapore. They were randomly assigned to 1) intervention: a six-month multi-component Park Prescription program (n=80), or 2) control: standard PA promotion materials (n=80). Assessments of recreational PA and psychological quality of life outcomes at baseline, three- and six-months were via self-report questionnaires. Mediation analysis was conducted in three steps with mediation effects estimated through structural equation modelling (SEM). First, outcomes with a significant intervention effect (alpha = 0.05) were selected. Second, the effects of the intervention on hypothesised mediators including recreational PA and park exposure were evaluated. Both step one and step two were conducted via linear regression. Third, for each outcome and mediator pair a mediation model was applied. A 95% confidence interval (CI) of the mediating effect was obtained from bootstrapping with 10,000 iterations.

Results: In step one, the four outcomes selected for tests of mediation based on the corresponding effect sizes of the intervention (95% CI) were: recreational PA per week 46.19 minutes (0.46, 91.92), psychological quality of life score 4.05 (0.04, 8.05), time (minutes/month) spent in parks 151.92 (11.42, 292.42) and PA time in parks in a typical month 190.29 minutes (60.16, 320.42). In step two, hypothesised mediators which were significantly influenced by the intervention were selected for inclusion in the next step. In step three, SEM indicated that park PA time at three-months had a significant mediating effect on recreational PA per week 26.50 minutes (6.65, 49.37), psychological quality of life score 1.25 (0.19, 2.69), time (minutes/month) spent in parks 185.38 (45.40, 353.74) and PA time in parks in a typical month 165.48 minutes (33.14, 334.16).

Conclusion: Park Prescription has potential to be applied in community settings. The intervention effectively increased recreational PA, psychological quality of life, park use and PA in parks. Engaging in physical activity in parks may have been an important mechanism of the intervention's effectiveness.
 Associations of Local-Area Walkability with Inequalities in Residents’ Walking and Car Use

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Influence of the environment on nutrition or physical activity behavior (Chair: Erica Hinckson), Club H, June 6, 2019, 3:50 PM - 4:25 PM

Policies and environments (SIG)

Objective: Research has examined spatial distribution of physical activity, mostly focusing on between-area differences by examining how areas with different levels of walkability differ in physical activity. Within-area distribution of physical activity is also relevant, since larger disparities in physical activity within an area can contribute to greater inequalities in health. However, associations of within-area inequality in walking with walkability have been examined only at a large geographical scale (city level). We examined associations between local-area walkability measures and within-area inequalities in residents' walking and car use.

Methods: This cross-sectional study used data collected in the 2009 South-East Queensland Travel Survey in Australia. Participants reported their travel behaviors using a 24-hr travel diary. For each Statistical Area 2 (SA2, median size = 7.9 km2), we calculated Gini coefficients, an often-used indicator of inequality, for the duration of walking and car use among participants aged 18-84 years (n=15,895). Linear regression examined associations of population density, street connectivity, and Walk Score with the Gini coefficients for 196 SA2s.

Results: The mean Gini coefficient for walking duration was 0.91 (SD: 0.06) and that of car use was 0.53 (SD: 0.07), suggesting a large within-area inequality in walking. Higher walkability was associated with lower inequality in walking and higher inequality in car use, regardless of the measures used. Adjusted for covariates, each one-SD increment in population density, street connectivity, and Walk Score was associated with a 0.58, 0.45, and 0.64 lower SD in the Gini coefficient for walking and a 0.40, 0.29, and 0.50 higher SD in the Gini coefficient for car use, respectively (all at p<0.001). The associations were attenuated but remained significant after further adjusting for car ownership.

Conclusions: Our study suggests that there is more equity in walking in high-walkable areas. In contrast, low-walkable areas tend to have a larger inequality in walking but are more homogeneous in terms of car use. Higher walkability has been shown to be associated with more walking and less car use. This study extends previous knowledge by showing that higher local-area walkability is also associated with less inequality in residents' walking.
16825

SO11, SO11.5

The impact of living in urban vs. rural areas on children’s physical activity and sedentary levels: a nationally representative cross-sectional analysis.


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Influence of the environment on nutrition or physical activity behavior (Chair: Erica Hinckson), Club H, June 6, 2019, 3:50 PM - 4:25 PM

Policies and environments (SIG)

Objective: Living in urban versus rural environments may impact differently on children's levels of physical activity and sedentary behaviours. We know little about variations in the device-measured physical activity and sedentary levels of urban and rural children using nationally representative samples, or how these differences may be moderated by socioeconomic factors or seasonal variation. A greater understanding of these can better inform intervention strategies and policy initiatives at the population level. This paper explores this in a country-wide sample of 10-11 year old children in the UK.

Methods: Population based cross-sectional study in which children (n=1,096) wore an accelerometer for 8 days in 2015/16: 774 participants (427 girls, 357 boys) met inclusion criteria. Percentage meeting the physical activity guidelines; average total daily physical activity, time spent sedentary, light, and in moderate-to-vigorous physical activity (MVPA) were extracted for weekdays, weekend days, and all days combined. Regression analyses assessed the associations between physical activity outcomes and urban/rural residence, with interactions fitted for household equivalised income and for season of data collection.

Results: No urban-rural differences were found for time spent in MVPA, likelihood of meeting the physical activity guidelines, or in total levels of activity. However, rural children spent an average of 14 minutes less sedentary and 13 minutes more in light intensity activity per day than those from urban settlements. There were no interactions with household equivalised income, but there were urban/rural differences in seasonal variation; urban children engaged in significantly higher levels of MVPA in the spring months and lower levels in winter.

Conclusions: Rural children spent more time in light intensity activity and less time sedentary than urban children. Light activity is seldom reported in the urban/rural literature, yet our findings suggest that these differing environments may influence this specific component of PA. Extrapolated across one year, differences in light activity would total 79 hours or just over 3 days. The findings also add to a growing body of literature suggesting seasons impact children's activity levels; manifesting differently whether within urban or rural areas. Future work should prioritise exploring the patterns and context in which these differences occur.
THURSDAY JUNE 6 2019
SYMPOSIA SESSION 4
Built and Social Environments and Active Transport in Youth: Insights from Three Continents

Mandic S, Francisco Javier Huertas Delgado

University of Otago, Dunedin, New Zealand

Purpose: This session will discuss research findings examining the relationship between built and social environments and active transport in youth in different geographical settings from around the world. In addition, to three abstract presentations discussing diverse factors related to built and social environments, symposium participants will also engage in an interactive activity during this session. As a part of the interactive activity, participants will be reflecting on factors influencing youth active transport in their country/region and be exposed to insights from other countries/regions/continents. Gathered insights will be used to discuss implications for designing future effective interventions promoting active transport in youth.

Rationale: Active transport to different destinations, including school, is a convenient way to maintain or increase children and adolescents' physical activity. Encouraging active transport in youth has the potential to develop into a life-long, environmentally sustainable, economical practice. In addition to individual and policy factors, environmental factors (including both built and social environments) are correlates of active transport in youth. Favourable built and social environments have the potential to promote active transport and physical activity in young people. Conversely, non-supportive environments can be a barrier to active transport and physical activity behaviours.

Objectives: This symposium will present findings from studies conducted in Europe, North America and Oceania showcasing the influence of built and social environments on youth active transport and will engage audience in an interactive activity. Specific objectives are:

1. Engage audience to reflect on factors influencing youth active transport in their country/region and challenge delegates to consider insights from other countries/regions/continents
2. Discuss factors influencing youth active transport in urban, semi-urban and rural settings
3. Explore influences of parental neighbourhood selection on youth active transport, physical activity and independent mobility
4. Discuss social environment influences and unintended consequences of active transport in youth

Summary: This session will demonstrate the importance of understanding both, built and social environmental factors, in addition to individual and policy influences on youth transport behaviours in a local context. Understanding how the built and social environments influence young people's transport choices in different settings will enable the scientific community, policy makers, urban planners, and health promoters to address active transport barriers, reduce the reliance on motorised transport, increase physical activity and improve health of children and adolescents.

Format: The symposium will consist of three presentations and an interactive activity spread throughout the session to facilitate engagement of delegates with the symposium topic.
Travel to School Patterns in Urban, Semi-Urban and Rural Areas of the Otago Region, New Zealand

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Background: Most studies examining active transport to school (ATS) in adolescents have been conducted in main urban centers. Since ATS behaviour is context-specific, differences in travel behaviours and factors influencing ATS in rural versus urban environments are likely, even within a country. This study compared adolescents' travel to school patterns and perceptions whether distance and safety were travel concerns in a main urban center (Urban), small-to-medium urban areas (Semi-Urban) and rural settlements (Rural) across the Otago region, New Zealand.

Methods: Data were collected during the 2014/2015 BEATS Study in Dunedin city (12 schools; 1,663 Urban adolescents) and 2018 BEATS Rural Study in the rural areas of the Otago region (10 schools; 814 Semi-Urban and 179 Rural adolescents). Adolescents completed a questionnaire about their travel to school. Data were analysed using descriptive statistics and Chi-square tests.

Results: Overall, school travel (55.0% motorised transport, 29.8% ATS, 15.2% mixed modes; p=0.686) and optimal distance for walking to school (=2.25 km) were not different across settings, whereas median distance to school was greater in rural versus urbanised areas (Urban/Semi-Urban/Rural: 3.7/3.2/6.2 km; p=0.037). Among adolescents ineligible for subsidised school bus travel (i.e., living =4.8 km from school; Urban/Semi-Urban/Rural: 885/461/81 adolescents), rates of ATS (Urban/Semi-Urban/Rural: 38.7%/46.7%/58.5%; p<0.001), walking regularly (37.7%/32.8%/52.4%; p=0.013) and cycling regularly to school (1.3%/15.4%/9.8%; p<0.001) significantly differed across settings. Among adolescents living =4.8 km from school, adolescents' perceptions of the distance to school being too far to walk (Urban/Semi-Urban/Rural: 33.6%/19.9%/11.5%; p<0.001) and cycle (28.2%/8.0%/0.0%; p<0.001) differed across settings. The findings were similar for adolescents'/their parents' concerns that it was unsafe to walk (adolescents' concerns [Urban/Semi-Urban/Rural]: 11.9%/8.7%/0.0%; p=0.006; parental concerns: 13.2%/8.4%/3.3%; p=0.006) or cycle to school (adolescents' concerns: 40.3%/22.5%/4.9%; p=0.001; parental concerns: 31.4%/15.4%/3.3%; p<0.001).

Conclusions: Among adolescents residing =4.8 km from school, ATS rates were higher and distance and safety concerns were less common in rural and less urbanised areas compared to urban settings. However, motorised transport dominated adolescents' school travel across all settings. Therefore, different interventions and approaches to address context-specific barriers will be required to encourage ATS in both urbanised and rural areas.
Are the parental environmental preferences to choose a neighborhood associated with their offspring’s physical activity and active commuting?

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15905: Built and Social Environments and Active Transport in Youth: Insights from Three Continents (Convenor: Sandra Mandic), South Hall 2A, June 6, 2019, 4:35 PM - 5:50 PM

Policies and environments (SIG)

Purpose: Parents' perceptions of the environment are related to their offspring’s physical activity levels, mode of commuting and independent mobility (IM). However, there is limited evidence about how parental preferences to choose the residence are related to physical activity behaviors of their offspring. This cross-sectional study analyzed the association between the parental environmental preferences to choose the neighborhood of residence with the moderate-to vigorous physical activity (MVPA), the active commuting to school (ACS) and the IM of their adolescent.

Methods: Adolescents (n=373, aged 16.5±smn:0.78), and one of their parents, from Valencia (Spain) completed a questionnaire as part of the IPEN Adolescent Study in 2013-2015. Parents reported their preferences for choosing a neighborhood (e.g. neighborhood affordability/value). Adolescents reported their mode of commuting to school and IM. The adolescents' MVPA was assessed using accelerometer. Data were analyzed using linear regressions.

Results: Higher levels of adolescents' weekly MVPA (βa;=0.12 (0.06, 3.96), p=0.043) and weekday MVPA (βa;=0.17 (1.01, 5.48), p=0.004), were associated with parents giving more importance to the neighborhood affordability/value. In addition, higher levels of weekend MVPA were associated with parents giving more importance to ease of walking in the neighborhood (βa;=0.15 (0.02, 6.61), p=0.048), closeness to cultural and entertainment choices (βa;=0.17 (0.34, 7.19), p=0.031) and distance from busy street (βa;=0.13 (0.34, 5.35), p=0.026). A higher proportion of adolescents used ACS if their parents attributed more importance to the closeness of their home to the school (βa;=0.27 (0.38, 0.95), p<0.0001). A higher percentage of adolescents independently commuted if their parents gave less importance to the closeness to the school (βa;=-0.11 (-7.03, -0.05), p=0.028).

Conclusion: The parental preferences to choose the place to live were associated with adolescents' MVPA, ACS and IM. From a policy point of view, it is important to develop neighborhoods taking into account the closeness to the school, the cultural and entertainment choices, and also to develop more walkable neighborhoods i.e. less traffic and easier to walk) in order to increase adolescents' MVPA and ACS.
Unintended Consequences of Youth Active Transportation

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15905: Built and Social Environments and Active Transport in Youth: Insights from Three Continents (Convenor: Sandra Mandic), South Hall 2A, June 6, 2019, 4:35 PM - 5:50 PM

Policies and environments (SIG)

Purpose: There are many health advantages of active transportation (AT). However, social and environmental factors can negatively, and even lethally, impact the AT experiences of youth of color (YOC), particularly African Americans (AA). The expression "walking while black", a double entendre derived from the United States "driving while intoxicated" criminal offense, is a demonstration of the racial profiling endured by many AA pedestrians. While several studies have identified the negative influence of environmental (e.g., street trash) and social (e.g., parental rules) determinants of youth AT, there is a lack of research examining the impact of racial profiling on youth AT among AA. Furthermore, when racial profiling, intersects with adultification and sexualization, these sociological inequities can converge negatively on the AT experiences and independent mobility of AA youth.

Methods: Using data from the Physical Environment on Active Transportation (PEAT) Study, a qualitative analysis was conducted to examine the AT experiences of AA youth living within the Washington D.C. metropolitan area. From May-August 2016, gender-specific focus groups were conducted using a focus group guide until saturation was achieved. Data were digitally recorded, transcribed verbatim, manually coded, and analyzed using NVivo 11.

Results: Two female (15 participants) and two male (9 participants) focus groups (ages 12-15 years) were conducted. Over 90% of the participants were YOC and the majority were AA. As an avoidance tactic of racial profiling, the boys were instructed by their parents to not walk in "areas certain people live". Girls articulated their experiences with both racial hostilities and sexualization. For example, one female participant stated, "I don't feel safe cause of like cat-callers". Unlike the girls, adultification paralleled with independent mobility for the boys with statements such as, "my mom forces me to walk".

Conclusion: Our findings revealed that interactions and decision-making processes relating to youth AT and everyday life were complex and socially interconnected to racial profiling, as well as, stereotypical socializations of adultification and sexualization. Although AT benefits are well established in the literature, the impacts of these phenomena on the AT experiences of AA and other YOC have yet to be fully recognized.
The Utility of the Family Nutrition and Physical Activity (FNPA) Screening Tool for Child Obesity Prevention and Treatment in Clinical Settings.

Lanningham-Foster L, Nicky Ridgers

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Purpose: The purpose of this symposium is to discuss the integration of the Family Nutrition and Physical Activity (FNPA) screening tool into clinical settings for the prevention and treatment of childhood obesity. The FNPA screening tool is an evidence-based 20-item survey that assesses the family and home environment relative to ten domains: family meals, family eating practices, food choices, beverage choices, restriction/reward, screen time, healthy environment, family activity, child activity, and family schedule/sleep routine.

Rationale: Health care providers have an important role in the assessment and treatment of childhood obesity. However, conducting risk assessment, as well as counseling for obesity prevention and treatment, can be a challenge due to lack of time, training, and resources available to health care providers. The clinical models presented in this symposium will highlight the utility of the FNPA screening tool in overcoming these barriers. Objectives:

1. Describe the development and psychometric properties of the FNPA screening tool to evaluate home obesogenic environments
2. Describe clinical applications of the FNPA tool aimed at informing clinical decision support and guiding preventive counseling.
3. Describe clinical applications of the FNPA tool to enhance brief action planning and motivational interviewing for the treatment of child obesity.

Summary: The goal of the symposium is to introduce the utility and feasibility of the Family Nutrition and Physical Activity Screening Tool to enhance obesity prevention and treatment in clinical applications. The presenters have been leaders in facilitating the refinement and utilization of FNPA tool and have contributed to the online FNPA research network (www.myfnpa.org) designed to facilitate sharing and collaboration related to the tool. The symposium will summarize the overall utility of the FNPA tool but highlight recent applications in clinical settings.

Format: Dr. Lanningham-Foster (chair) will share a brief overview of childhood obesity prevention and treatment relative to the clinical setting and introduce the symposium presenters (15 minutes). Dr. Welk (presenter 1) will discuss the development of the FNPA screening tool and psychometric properties of a refined version for clinical applications (15 minutes). Dr. Kling (presenter 2) will share insights and ongoing work related to the integration of the FNPA into electronic medical records and clinical well-child visits. (15 minutes). Dr. Wolff (presenter 3) will discuss clinical applications of the FNPA aimed at promoting brief action planning and motivational interviewing for treatment of obesity. (15 minutes). Dr. Ridgers (discussant) will lead a discussion between presenters and symposium attendees (15 minutes).
Development and Psychometric Properties of the FNPA Scale for Clinical Obesity Prevention Programming

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Purpose: The Family Nutrition and Physical Activity (FNPA) screening tool was developed to identify obesogenic home environments that may predispose youth to childhood obesity. An advantage of the FNPA for obesity prevention is that it identifies risks that could be targeted and addressed before a child becomes overweight. Numerous studies have demonstrated the utility of the FNPA as a screening tool and it has increasingly been used in clinical settings as part of well-child visits to facilitate screening and referral to behaviorally based interventions. The purpose of this presentation is to summarize the development and applications of the FNPA for obesity prevention.

Methods: The FNPA Screening Tool was developed based on constructs identified in a comprehensive Evidence Analyses (EA) commissioned by the Academy of Nutrition and Dietetics. The EA was focused on identifying modifiable factors associated with childhood overweight. Five factors were identified for inclusion in the original review: dietary intake, dietary behaviors, physical activity, sedentary behaviors, and parental behaviors. The EA followed standard guidelines for identifying, analyzing, summarizing, and grading the evidence. Ten constructs (Family Meals, Family Eating Practices, Food Choices, Beverage Choices, Restriction/Reward, Screen Time, Healthy Environment, Family Activity, Child Activity, and Sleep Routine) had sufficiently strong evidence and a set of 20 items (2 per construct) were developed for the preliminary FNPA.

Results: The predictive utility of the instrument was demonstrated in a one-year longitudinal study that found FNPA scores explained unique variance in BMI change in a large cohort of over 1000 first grade youth (after accounting for baseline BMI%, parent BMI, and other demographic variables). Cognitive testing and a robust psychometric evaluation was recently completed to refine the items and response formats for clinical applications. No differences in mean score were found between the versions using objective and subjective variants of the response scale but the subjective version displayed higher test-retest reliability and internal consistency.

Conclusions: The updated FNPA using the subjective response scale displayed acceptable reliability and was deemed comprehensible by parents. Therefore, it should be preferred in future clinical studies examining obesogenic home environments that may predispose children to become overweight or obese.
Integration of the FNPA Tool in Electronic Health Records to Enhance Screening and Prevention of Childhood Obesity Prevention

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**Children and families (SIG)**

**Purpose**: Clinical obesity prevention and treatment guidelines recommend integrating behavioral risk assessment into routine care at well child visits (WCVs); however, this integration strategy has not been previously evaluated. Geisinger, an integrated healthcare system, integrated the Family Nutrition and Physical Activity (FNPA) tool into electronic health records as clinical decision support to support preventive counseling during WCVs.

**Methods**: Using a quasi-experimental design, the feasibility and utility of these innovations on change in body mass index z-scores between baseline and 1-year follow-up (ΔBMIz). Parents of patients ages 2-9-years-old electronically completed the FNPA prior to WCVs. FNPA scores, answers to questions, and parents' choice of top three topics to discuss, were instantaneously integrated into the child's electronic health record to provide clinical decision support and tailor preventive counseling. Children with FNPA assessments (intervention) were compared with those who had the opportunity but did not complete the FNPA (non-respondent) and those who received standard care (non-exposed). Generalized linear regression models were used to test for differences in ΔBMIz between groups.

**Results**: This study included 13,542 2-to-9-year-old children (2,724 Intervention, 3,324 Non-respondent; and 7,494 Non-exposed). Forty-five percent of parents completed FNPA risk assessments. On average, intervention and non-respondent children differed in ΔBMIz by -0.05 (CI:-0.08, -0.02, P=0.0013) but no difference was observed between intervention and non-exposed children. Children in the intervention group had a smaller increase in BMIz (0.07±smn;0.63) than non-respondent group (0.13±smn;0.63). For children with normal weight at baseline, the intervention versus non-respondent group differed in ΔBMIz by -0.06 (CI:-0.10, -0.02; P=0.0025). However, children with overweight at baseline in the intervention versus the non-exposed group differed in BMIz change (0.08 [0.2, 0.14], P=0.0069). Results were similar for 2-to 5-year-old children, but no significant differences in ΔBMIz were found for 6-to 9-year-old children.

**Conclusions**: Integrating risk assessment into the electronic health record as clinical decision support for obesity prevention is feasible and sustainable and has utility in promoting healthy weight among 2-to 5-year-old children. For some children, one exposure may not be enough to prevent obesity or unhealthy weight gain, and efforts to enhance the program will be discussed.
Applications of the FNPA Tool for Brief Action Planning and Motivational Interviewing Interventions

Wolff M, J Groos, J Richards Krapfl, L Lanningham-Foster

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Purpose: Childhood obesity treatment recommendations promote utilization of screening tools, motivational interviewing, and support staff to facilitate lifestyle behavior change. The purpose of the My Health, My Way! (MHMW) pilot study was to determine the effectiveness of a primary care practice-based framework for childhood obesity treatment on behaviors related to nutrition, physical activity, sleep, and screen time.

Methods: Families of patients at a primary care practice in the Midwest (United States) were invited to participate if the child was 5-12 years of age and had a body mass index (BMI) > 85th percentile. Participants were randomized to standard of care (control) or a six-month intervention, which involved monthly health coaching sessions utilizing the Family Nutrition and Physical Activity (FNPA) screening tool as well as motivational interviewing and brief action planning. Outcome measures included FNPA score, BMI percentile, and BMI z-score.

Results: Thirty-five participants enrolled and 28 (14 per group) completed baseline measures. The mean number of health coaching sessions completed prior to six months was 3.8 ±smm; 1.7 sessions. Participants most commonly selected the FNPA areas of food choices and child activity to create action plans. Out of the participants that completed the study, those in the intervention group had greater increases in FNPA scores compared to the control group, but was not significantly different (4.86 ±smm; 6.28 versus 0.38 ±smm; 4.6; p = 0.135). However, the effect size (d = 0.88) is considered to be large. There was a significantly greater mean change score on the FNPA subscale of family eating practices (intervention 0.57 ±smm; 0.54, control -0.13 ±smm; 0.41; p = 0.041). Change in BMI z-score was not significantly different between groups at six months (intervention -0.007 ±smm; 0.093, control -0.063 ±smm; 0.14; p = 0.33).

Conclusions: A primary care practice-based framework for childhood obesity treatment utilizing health coaching and the FNPA screening tool may be effective for facilitating lifestyle behavior change. Additional study is needed to further examine these findings in multiple primary care clinics and with additional objective measures of lifestyle behaviors.
S4, S.4.39

Transitioning high intensity interval training (HIIT) from the lab into the real world: Practical implications, barriers and facilitators to implementation

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Implementation and scalability (SIG)

Purpose: High-intensity interval training (HIIT) remains a popular topic in research literature and in the general public. This symposium will address the important question of "Can HIIT be transitioned and successfully implemented outside of the lab? And if so, how?" Examples from real world, school and community-based HIIT studies will be presented to address the feasibility, receptivity, and practical implications of prescribing HIIT outside of a research laboratory.

Rationale: There is robust evidence supporting the benefits of HIIT for physical and mental health. While the debate of whether we should or should not be promoting HIIT has occurred, to date there has yet to be a summative discussion on what engaging in HIIT outside of the lab might look like, and whether there is opportunity for scale-up.

Objectives: This session will address: 1) feasibility of delivering HIIT outside of laboratory settings, 2) barriers and facilitators to implementing HIIT in school and community settings, 3) HIIT prescriptions and implications for large-scale trials (e.g., recommended intensity/heart rate protocols), and 4) safety considerations and level of training required for those facilitating HIIT programs.

Summary: Leaders in the field of HIIT in school and community settings will discuss recent findings from a number of intervention studies.

Format: Dr. Jonathan Little (Canada), a leading expert in HIIT prescription, will chair the panel and begin by briefly introducing the evolution of HIIT research and present the four objectives above. This will be followed by three, 15-minute presentations: Dr. Nigel Harris (New Zealand) will present data on the feasibility of conducting HIIT interventions in school settings with adolescents, Dr. Nicholas Gilson (Australia) will present data from taking HIIT interventions on the road with time-pressured, high risk truck drivers, and Dr. Mary Jung (Canada) will present data from a community program of individuals with prediabetes who are prescribed HIIT. Using the Consolidated Framework for Implementation Research as a guide, discussant Dr. David Lubans (Australia) will provide a 10-minute overview of the major factors that need to be addressed to support the implementation of HIIT in school and community settings. Based on the work presented, Dr. Lubans will then facilitate a 15-minute discussion with the audience on: what are the major barriers and facilitators to the implementation of HIIT outside of laboratory settings? What are the commonalities in the work just presented? What needs to be done to support the scale-up of successful HIIT interventions?
The feasibility of a teacher delivered, curriculum-based high-intensity interval training program for young adolescents

Harris N, I Warbrick, D Atkins, S Duncan, A Vandal, D Lubans

1Auckland University of Technology, Auckland, New Zealand, 2The University of Newcastle, Callaghan, NSW, Australia

Objective: The aim of this study was to determine the feasibility of training generalist teachers to embed a high-intensity interval training (HIIT) exercise programme in the school health and physical education curriculum.

Methods: Two intermediate level schools (students 11-13 years) volunteered to participate; one decile 1 and one decile 10 (low and high socioeconomic areas, respectively). Two class groups within each school were nominated by curriculum leaders, then randomised to either intervention (N=55), or control classes (N=31) over one school term (~9 weeks). A total of 86 students (11.9±smn;0.8 years, M=51, F=35) volunteered to participate (recruitment rate 88%). The intervention class teachers participated in a one-day professional development workshop instructing them how to deliver twice weekly, brief HIIT sessions to their class groups, within usual class time. Teachers also received a class set of heart rate monitors (Polar H10) for monitoring of target intensity (target peak 90% of maximum), an iPad for recording and displaying heart rates on screen, instructional exercise videos, and a written resource. The control classes continued with their usual health and physical education curriculum. The acceptability of the intervention was assessed using small group interviews with participants and one-on-one semi-structured interviews with teachers in the intervention group.

Results: A total of 12 and 15 sessions were delivered by teachers in the two intervention schools; heart rate peaks on average over all sessions were 90.1 and 88.5 % (decile 1 and 10 respectively). The intervention teachers reported high levels of satisfaction with the HIIT programme, despite some reservations prior to commencement regarding their ability to deliver it effectively. Positive aspects of the intervention included the engagement of most students in sessions, simplicity, variety, and their perceptions of students' achievements with improved fitness, and personal health awareness. Almost all student participants were positive about participating in HIIT, identifying feelings of confidence and attainment as the term progressed despite some initial familiarisation with intensity. No adverse events occurred.

Conclusions: This teacher-delivered HIIT programme was feasible and acceptable to both teachers and student participants, suggesting that a larger efficacy trial is warranted.
Truck-Fit: A scalable high intensity interval training program to improve heart health, sleep quality and fatigue in high risk truck drivers.

Wilson N, J Coombes, G Wallis, M Duncan, P Morgan, W Brown
1University of Queensland, Brisbane, QLD, Australia, 2The University of Newcastle, Callaghan, NSW, Australia

OBJECTIVE: Heart disease, type 2 diabetes and obesity are endemic within the transport industry, and these health issues negatively impact driver sleep quality, fatigue and road safety. High intensity interval training (HIIT) may be an ideal and potent health and safety intervention for sedentary, time-poor blue-collar workers. This study will test the efficacy of 'Truck-Fit', a depot-delivered, 16-week HIIT program accessed by high risk drivers following compulsory medicals that must be completed as part of Australian licensing requirements.

METHODS: The study will be a cluster randomised controlled trial, conducted with long distance truck drivers based at a metropolitan transport hub. Following ethics approval, recruitment and clinical screening, approximately 8 depots (each with around 20 drivers who meet inclusion criteria; ≥2 chronic disease risk factors) will be allocated to the 'Truck-Fit' or control group (4 depots/group). Drivers in the 'Truck-Fit' group will complete three HIIT sessions/week over 16 weeks, with each session consisting of a three-minute warm-up, a high intensity four-minute bout of exercise (85-95% HRmax), and a one-minute cool down. HIIT sessions will initially be supervised by an accredited exercise physiologist, and undertaken at the depot in groups of 3-5 drivers. In supervised sessions, drivers will progressively be trained towards self-administration of HIIT, and helped to identify locations other than the depot (e.g. truck stops) where HIIT can occur. To assess program efficacy, we will administer laboratory health and fitness assessments at baseline and end-intervention, process evaluation of HIIT, and a post-intervention driver focus group and depot manager interviews to assess barriers and facilitators to implementation. Our main outcome will be cardiorespiratory fitness; secondary outcomes will be HIIT compliance, and impact on driver sleep quality and fatigue.

RESULTS: The trial was registered on July 8th, 2018 (ACTRN12618000971235p), with enrollment planned in early 2019. It is expected that the results will be available in 2019-20.

CONCLUSIONS: Our industry networks highlight a clear need for this research, in an underserved group, with limited access to health promotion services. Thus, the study findings will contribute valuable pilot data to support up-scaling of a program with the potential to improve driver health and safety.
Free-living exercise adherence and cardiorespiratory fitness improvements 12 months following a behaviour change counseling intervention incorporating high-intensity interval training (HIIT) versus moderate-intensity continuous training (MICT)

Jung M, S Locke, J Bourne, J Little
1University of British Columbia, Kelowna, BC, Canada, 2University of Bristol, Bristol, Great Britain

Objective: Exercise is a cornerstone in the prevention and treatment of type 2 diabetes (T2D) and its cardiovascular complications. Identifying effective strategies to increase exercise adherence is integral for those at risk for T2D. HIIT leads to equivalent, if not superior, improvements in cardiorespiratory fitness as compared to traditional MICT, but its potential as a long-term exercise option to adhere to has yet to be demonstrated. The purpose of this study was to compare free-living exercise adherence, weight, and cardiorespiratory fitness 6- and 12-months after a brief HIIT plus counselling to MICT plus counselling intervention.

Methods: Adults at risk of developing T2D were randomized to HIIT (10x1 min intervals at 80-90% HRmax; n=47) or MICT (50 min at 55-65% HRmax; n=52). All participants received the same 70 minutes of behaviour change counselling targeting self-efficacy, outcome expectations, affect, goal-setting, and relapse prevention over a 2-week period. After 7 sessions of supervised exercise training, all participants were encouraged to continue with their prescribed exercise modality 3/week for the next year. Adherence was assessed using 7-day accelerometry at 6- and 12-months. Cardiorespiratory fitness was assessed on a maximal cycle test to exhaustion.

Results: Both HIIT and MICT significantly increased in cardiorespiratory fitness (+2.1 ml/kg/min, SD=5) and decreased weight (-4 kg, SD=14) from pre-intervention to 6- and 12-months post-intervention (ps<.001) with no difference between groups. Similarly, both conditions significantly increased total time spent in MVPA10+ from pre-intervention to 6- and 12-months post-intervention (ps<.001), but greater increases were observed in MICT (+35 minutes, SD=75) compared to HIIT (+25 minutes, SD=76) over time.

Conclusions: The behaviour change intervention was efficacious to increase free-living exercise adherence, cardiorespiratory fitness, and reduce weight up to one year after program conclusion in both conditions. Despite being prescribed twice as many minutes of exercise and accumulating significantly more minutes of MVPA10+ in MICT, improvements in cardiorespiratory fitness were similar between MICT and HIIT. Modality of exercise prescribed should consider clinical outcomes desired, as well as preference, motivation, and variety factors. Implications on number of minutes of exercise prescribed between HIIT and MICT, and overall tolerability of HIIT will be discussed.
Use of Behavioural Big Data and Citizen Science to enrich scientific data on (un)healthy behaviours. From the Individual to Public Health actions

Löf M, Monica Mars

Karolinska Institute, Stockholm, Sweden | Linköping University, Linköping, Sweden

E- & mHealth (SIG)

Purpose: To confer the use of ICT-technologies for the collection of behavioural Big Data on dietary and physical activity habits for individual and population level analyses. To discuss different deployment options of such methodologies and eventually to examine their usefulness as tools assisting Public Health Authorities to design, deploy and evaluate pragmatic, context-based interventions and policies.

Rationale: ICT-assisted methodologies create opportunities for behavioural Big Data collection, resulting in larger and more diverse datasets, often combining automatic analysis of behavioural and contextual data (eg, living environment analysis parallel to dietary/activity behaviour monitoring). An interesting way for the deployment of such methodologies are citizen-science initiatives, since ICT-based methodologies create opportunities for the general population to be involved in community health research, while facilitating more active participation of affected populations. However, to date, population health science has not relied heavily on ICT-collected citizen contributions. Although community-based actions democratize science and increase the breadth and the volume of the available scientific evidence, the uptake of such methodologies is limited by Public Health stakeholders.

Objectives:
1. To showcase two research initiatives, integrating ICT methodologies for Dietary and Physical Activity behavioural monitoring targeting childhood and adult obesity.
2. To present and discuss the attitudes of Public Health Authorities towards the validity of Behavioural Big Data for population monitoring and for the design of interventions and policies.
3. To showcase already developed technologies and inspire the exchange of knowledge among the participating experts.

Summary:Presenter 1, Ioannis Ioakeimidis, Karolinska Institute, Sweden will introduce an international effort involving 5 countries, supported by an EU project, creating a technological platform for the collection of behavioural and environmental Big Data from European Schools and Clinics, assisting Public Health Authorities to tackle childhood obesity. Presenter 2, Anna Ek, Karolinska Institutet, Sweden, focuses on the use of a smartphone app to promote active transportation in an adult population. Presenter 3, Gerardine Doyle, University College Dublin, Ireland, will report on the findings of a Delphi panel study, in regards to the attitudes of international Public Health stakeholders towards behavioural Big Data used for population monitoring, community intervention design and policy making against childhood obesity.

Format: The Chair will introduce the speakers and provide a 10-minute overview of the symposium. The three presenters will each be provided 15-minutes to present the findings from their studies. The Discussant will close with presenting her views on the topic and moderate questions from the audience (20 minutes).
BigO: Big Data against childhood obesity; Translating citizen science to Educational, Clinical and Public Health actions.


1Karolinska Institute, Stockholm, Sweden, 2Mando Clinics, Stockholm, Sweden, 3Biomedical Research Foundation of the Academy of Athens, Athens, Greece, 4Aristotle University of Thessaloniki, Thessaloniki, Greece, 5University College Dublin, Dublin, Ireland, 6Mysphera, Valencia, Spain, 7Internationella Engelska Gymnasiet Södermalm, Stockholm, Sweden, 8Ekpaideutiri Mpakogianni, Athens, Greece, 9COSMOTE Kinites TILEPIKOINONIES, Athens, Greece, 10National Food Agency, Sweden, Uppsala, Sweden, 11Wageningen University, Wageningen, Netherlands, 12Royal College of Surgeons in Ireland, Dublin, Ireland, 13Ellinogermaniki Agogi, Pallini, Greece

15996: Use of Behavioural Big Data and Citizen Science to enrich scientific data on (un)healthy behaviours. From the Individual to Public Health actions (Convenor: Marie Löf), Terrace 2A, June 6, 2019, 4:35 PM - 5:50 PM

E- & mHealth (SIG)

Background: BigO is an EU project aiming at creating a technological platform for behavioural and environmental parameter monitoring in order to assist Public Health Authorities in their efforts to tackle childhood obesity across Europe.

Objectives & Methodology: BigO will develop a platform for:
A) The collection of behavioural Big Data from European children (accelerometry, geolocation, photographs, self-rating parameters), using smartphones and smartwatches.
B) The extraction of indicators for the dietary, physical activity and sleep habits of the monitored children.
C) The analysis of the collected behavioural data together with online data (eg, maps, socioeconomic registries, GIS), referring to local community conditions.
D) The creation of obesity dependence models, associating community conditions, behaviours and obesity prevalence, in order to identify important local obesogenic factors.
E) The creation of data visualisations for Schools, Clinics and Public Health and Educational Authorities, supporting the use of the system in School health education, the behavioural monitoring of patients in Clinics, the pragmatic deployment and evaluation of intervention actions in local communities and the scientific analysis of local childhood obesity confounders.

During its 4-year duration, the system will be used by 9,000 volunteer students and 2,000 age-matched patients, who will contribute behavioural data, acting as citizen scientists (9-18 years; from Greece, Sweden and Ireland).

Project status, results: During 2017-2018, the first version of the BigO mobile app has been used by more than 300 children in Schools and Clinics and the first version of the data analytics and visualisation tools are already online. Last year’s School actions supported Physical Education and Home Economy school projects in Sweden and Greece, together with a project for the quantification of
food-advertisements (collecting more than 6,000 pictures) in two separate neighbourhoods in Stockholm, differing in regards to their socioeconomic parameters.

During the running year, the project has plans for data collection from an additional 3,000 students and patients, as well as for the release of the first version of the Public Health Authority analysis and visualisation tools.

Discussion: The presentation will entail the technical progress and evaluation results obtained through the use of the first version of system.
The Smart City Active Mobile Phone Intervention (SCAMPI) study to promote physical activity through active transportation using GPS data in healthy adults: a randomised controlled trial

Henriksson P, A Ek, C Alexandrou, C Delisle Nyström, M Löf

Karolinska Institutet, Stockholm, Sweden

Use of Behavioural Big Data and Citizen Science to enrich scientific data on (un)healthy behaviours. From the Individual to Public Health actions (Convenor: Marie Löf), Terrace 2A, June 6, 2019, 4:35 PM - 5:50 PM

E- & mHealth (SIG)

Background: The global pandemic of physical inactivity represents a considerable public health challenge. Active transportation (i.e. walking or cycling for transport) can contribute to greater total physical activity levels. Mobile phone-based programs can promote behaviour change, but no study has evaluated whether such a program can promote active transportation in adults.

Objective: The Smart City Active Mobile Phone Intervention (SCAMPI) aims to evaluate whether a smartphone application (app) can increase physical activity through active transportation.

Study design and methods: A two-arm parallel randomised controlled trial have been conducted in Stockholm County, Sweden. Two hundred fifty-four adults aged 20-65 years have been randomised to either monitoring of active transport via the TRavelVU app (control), or to a 3-month evidence-based behaviour change program to promote active transport and monitoring of active travel via the TRavelVU Plus app (intervention). Outcomes include moderate-to-vigorous intensity physical activity (MVPA in minutes/day) (ActiGraph wGT3x-BT) and time spent in active transportation measured via the TRavelVU app. Assessments were conducted at baseline, after the completed intervention (after 3 months) and 6 months post randomisation.

Trial status and results: Data collection 6 months post randomisation will be finalised 31st October 2018. At the symposium we will present the results for whether the intervention has had an effect on active transportation. We will also present novel data on travel behaviour and physical activity in Stockholm from the TravelVU app utilising the baseline data. These data will be extracted and aggregated to determine how people move around Stockholm, typical places visited (e.g. parks), as well as when and where bouts of activity are undertaken.

Discussion: SCAMPI will determine the effectiveness of a smartphone app to promote active transportation and physical activity in an adult population. If effective, the app has potential to be a low-cost intervention that can be delivered at scale. It has be potential to be scaled up nationally to complement existing travel planners within large and medium-sized cities in Sweden as part of the Smart Cities concept to support citizens to a healthier lifestyle.
Public Health and key Expert opinions on the usefulness of a technological platform for the quantification of key behavioural and environmental indicators associated with physical activity and dietary habits of European student populations; Results from an international Delphi Panel study


1Insight Centre for Data Analytics, School of Computer Science, University College Dublin, Dublin, Ireland, 2Michael Smurfit Graduate Business School, UCD College of Business, University College Dublin, Dublin, Ireland, 3Department of Psychology, Royal College of Surgeons in Ireland, Dublin, Ireland, 4School of Physiotherapy, Division of Population Health Sciences, Royal College of Surgeons in Ireland, Ireland., Dublin, Ireland, 5Department of Agrotechnology and Food Sciences, Wageningen University, Wageningen, Netherlands.

Use of Behavioural Big Data and Citizen Science to enrich scientific data on (un)healthy behaviours. From the Individual to Public Health actions (Convenor: Marie Löf), Terrace 2A, June 6, 2019, 4:35 PM - 5:50 PM

E- & mHealth (SIG)

Background: This study is linked to the BigO project, aiming at leveraging the potential of Big Data to assist with monitoring and evaluation of public health interventions that address childhood obesity. Additionally, the project aims at engaging Public Health Authorities throughout Europe as part of its development process, with a view to supporting decision making in the execution of relevant policies.

Objective: This study aimed to develop consensus surrounding key indicators in the monitoring of childhood obesity and evaluating population-level prevention approaches.

Methods: An expert panel with remit in childhood obesity prevention (including policymakers, academics and advocates) participated in a three-round Delphi Panel study. In round one, panelists answered a series of open-ended questions to identify the most relevant indicators concerning the evaluation and subsequent monitoring of interventions against childhood obesity, focusing on three main domains: the dietary and built environments and health inequalities. In subsequent rounds, panelists rated the importance of each of the identified indicators and the responses were then analyzed quantitatively. Only indicators rated as either 'very' or 'extremely important' on a 5-point Likert Scale, by at least 70% of participants, were deemed to have reached consensus.

Study status and results: The analysis of the final round results is expected in November 2018. During Round 2, consensus has been reached for two indicators in the built environment (i.e. Availability of open spaces in neighborhood and Availability of safe cycling paths), one in the dietary environment (Availability of fresh fruit and vegetables) and three related to health inequalities (Employment status or socio-economic status of family; Relative income poverty and Consistent income poverty). A further 12 indicators are likely to reach consensus in Round 3.

Discussion: This study will directly affect further developments of the BigO system, aiming at optimizing it for use in Sweden, Greece, Ireland and The Netherlands and, later, across Europe. During the presentation, based on the presented results, the public discussion will focus on the gained experiences about the attitude of international Public Health stakeholders towards a novel Big Data toolset for assisting population monitoring, community intervention design and policy making against childhood obesity.
S4, S.4.41

Doing Digital Reality-Based Nutrition Education Research: The Good, Bad, and the Ugly

Wong S, Karen Davison

Oregon State University, Corvallis, OR, United States

Implementation and scalability (SIG)

Purpose: This session aims to share the truth, the good, bad, and ugly about integrating digital reality technology with nutrition education across all ages in the U.S. and Canada. The session is innovative because the speakers will present first-hand lessons learned and best practices in pioneering cutting-edge research, and provide a real-time, interactive question and answer activity with the audience.

Rationale: When conducting implementation science, it is the principal investigators' responsibility to be transparent in sharing their project challenges and operational adaptations with peers and sponsor(s), and ultimately equip health science researchers with skills to collaborate effectively and efficiently with technology experts.

Objectives:

The audience will learn about best practices in:

1. Pre-intervention: idea generation, finding shared interest, vision, and fund dispersion, writing the proposal, and locating funding sources (e.g., foundations, government, industry).

2. During intervention: Research and development (include target audience to co-design), pivot in project management (operational adjustments), budget - sub-awards and contracts (e.g., when to cut losses when people don't deliver the product/service), communications with funders/sponsors, and what to look for in "Tech" collaborators.

3. Post-intervention: Celebration and reflection, resource dissemination with a 'lean' team, and sustainability (negotiation and new proposal application).

Summary: The session as a whole will present best practices about specific projects that are completed and are ongoing.

Format:

1. Session Chair welcomes the audience and introduces the speakers [5 min].

2. Each speaker (Siew Sun Wong, Karen Davison, and Joan Cowdery) presents their project [5 min x 3 = 15 min]

3. Panel speakers share their best practices [30 min].

4. Audience submit/vote their favorite questions using their mobile phone during the session. The Chair will select the top questions to ask and answer together with the panel. [20 min]

5. Closing [5 min]
Nutrition and Physical Activity Education for Young Adults Using Virtual World Technology

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Purpose: The purpose of this study was to explore the use of virtual world technology to deliver a nutrition and physical activity health education intervention to college students. Primary study outcomes included participant perceptions regarding the usefulness and relevance of health education received via an online virtual world, participant perceptions of a health educator avatar, and changes in health behavior theory constructs as a result of participation in the intervention.

Methods: This longitudinal mixed-methods study included 40 college students all of whom were first time users of the technology. Quantitative assessment included the use of pre and post surveys which measured theoretical constructs of behavior change such as readiness to change, motivation to change, and self-efficacy, in addition to measures of intention to improve health behaviors, participant satisfaction and usability. The brief intervention led by a health educator avatar, was conducted entirely within the virtual world of Second Life. Participants were invited to participate in a focus group discussion held in Second Life or in person.

Results: The mean age of participants was 22 years, 62.6% were female, and 57.5% were Caucasian. The majority of participants (80%) found the information useful, and personally relevant (92.5%). Self-efficacy increased for items related to both physical activity and nutrition behavior change. Participants agreed that the technology was easy to use (87.5%) and that they would be interested in experiencing other health relation program in Second Life (82.5%). Results showed a high level of intent continue to use Second Life (62.5%). Key focus group themes were that information was useful and informative, the intervention was creative, and the health educator was professional and credible. Participants appreciated the anonymity and perceived confidentiality of the format and felt that the intervention encouraged them to think about their own behaviors.

Conclusions: Overall conclusions were that participants were receptive to receiving health information in Second Life, and that even within a virtual world they prefer a more traditional intervention method with a credible source. The potential for the delivery of health education interventions to effect behavior change using virtual world technology was demonstrated.
Nutrition and Physical Activity Education for Young Adults Using Virtual World Technology

Wong S
College of Public Health and Human Sciences School of Biological and Population Health Sciences Family and Community Health, Corvallis, United States

Purpose: The purpose of the WAVE Project was to explore the use of virtual world to prevent unhealthy weight gain among high school soccer players (HSSP) through sport nutrition education and life skills building. The innovative element of this research was a mixed-reality experiential learning in both the physical world and virtual world.

Methods: Six-hundred-and-twenty HSSP aged 14-19 from 13 schools in Oregon, USA, enrolled in a 2y integrated (research, education and Extension) obesity prevention intervention. The intervention group (n=448) received age-specific, face-to-face sports nutrition lessons, physical activity (PA) assessments, life skills building workshops, and experiential learning in a virtual world (VW) environment (OpenSimulator) to reinforce these lessons. The WAVE educational objectives were to teach sports nutrition education and life skills (e.g., meal planning, shopping on a budget, food preparation/cooking skills, and gardening) to support sustainable healthy eating and adequate PA among high school soccer players. Data was collected over 2y via mixed-method: 1) Quantitative - surveys about demography, parental support, nutrition knowledge, life skills, dietary intake/behavior, PA, sleep, injury, and bowel health; 2) Qualitative - interviews (process evaluation with staff, volunteer, and soccer coaches) and focus groups (youth VW user experience). The comparison group did not receive any intervention but only completed quantitative assessments.

Results: Among 388 HSSP who completed all assessments over 2y, 58% were females, 38% were Latino, mean age was 15.3±smn;1.1 years, and 38% received National School Breakfast/Lunch Program. Nearly 40% youth felt the VW experiential learning met their expectation, and ~20% felt it exceeded their expectation. The intervention group decreased mean added sugar intake by 12.1g/day, CI (7.4, 16.8), p=0.02. At baseline, Latino youth had significantly higher added sugar intake (+14g/day, p<0.01) than non-Latinos. For both treatments groups, PA was significantly higher in-soccer season (9937 steps/day) vs. out-of-soccer season (8117 steps/day), emphasizing the contribution of organized sports to youth daily PA.

Conclusions: Targeting active youth in a diet/PA intervention improves diet, but out-of-soccer season, youth need engagement to maintain PA. This feasibility study demonstrated that a VW experiential learning to enhance sport nutrition and life skills building is acceptable to active youth.
Purpose: The overall objectives of this study are to: 1) develop digital reality-based personalized nutrition resources targeted to emerging adults; 2) foster positive dietary intake changes in emerging adults using personalized nutrition education provided via digital-reality technology; and 3) leverage results from eye-tracking analysis to advance knowledge and maximize the derived benefits of nutrition education using digital reality technologies. The study is currently in progress and this session will report on key lessons to date.

Methods: This is a sequential explanatory mixed methods investigation that includes: 1) a 9-week randomized trial to compare differences between personalized nutrition approaches using digital reality technology versus a standard personalized nutrition intervention; and 2) qualitative data collection that includes usability analyses, eye tracking analysis and focus group interviews, to examine participant responses to content provided in digital reality technology. Participants (n=76; 18 to 25 years) are being recruited from the Southwest region of British Columbia, Canada. Outcome measures include pre/post and group differences in diet quality, food and nutrition literacy, self-efficacy, and quality of life. Two-way repeated measures ANOVA and binomial tests of two proportions will compare pre/post differences of the outcomes. Interpretive thematic analysis will be conducted on textual data.

Results: The novel components of this study include the use of different digital reality technologies to provide nutrition education, peer approaches in nutrition education, the co-creation of content with end-users (emerging adults) and industry partners in augmented and virtual reality, and the use of eye tracking to assess participant responses to nutrition education content delivered through digital technology.

Conclusions: The results of this study will be used to: 1) guide the development of nutrition education products and content using digital reality technology; and 2) provide guidance about best practices in nutrition education using digital reality technology.
Activity-related behaviours and salient proximal outcomes in adolescents and young adults: interpretation, challenges and future research needs

Corder K, Eleanor Winpenny

MRC Epidemiology Unit, University of Cambridge, Cambridge, United Kingdom

Other

Purpose: To explore the association of multiple activity-related behaviours with important short-term outcomes among adolescents and young adults. Speakers will report on experiences from studies examining associations between activity-related behaviours (including activity, sleep, TV viewing) and outcomes (including academic achievement, mental health, weight status) providing recommendations for analysis, interpretation and future research needs.

Rationale: Obesity, mental health and academic achievement during adolescence and young adulthood have major impacts on long term health and life chances. Evidence suggests activity-related behaviours may be protective of mental health, obesity and academic performance, but more research is warranted to explore associations between related behaviours and with important short-term outcomes to represent the diversity of co-occurring behaviours and outcomes in real life.

This symposium presents research examining associations of multiple activity-related behaviours with important short-term outcomes in adolescents and young adults. Presentations include (1) discussion of activity, sleep and TV viewing as predictors of academic achievement, (2) adolescent lifestyle and risk behaviours and associations with obesity, mental health and attainment and (3) joint trajectory modelling and links to physical and mental health outcomes. This range of analysis strategies, including guideline-based categories and trajectory modelling, allows discussion of issues surrounding analysis and interpretation of research including multiple behaviours, specifically:

- Rationale and research needs
- Strengths and limitations of different analytical approaches
- Challenges in making optimal use of complex data

This symposium will be of particular interest to those conducting research into multiple activity-related behaviours, observational and outcome-focused research in adolescents and young adults, and those working in policy and practice.

The discussant will consolidate key points from the presentations, and discuss analytical and methodological considerations for future work including planning, analysis and interpretation of studies aiming to elucidate associations between multiple outcomes and behaviours.

Objectives: This symposium will aim to:

- Provide insight and recommendations for future research by reflecting on analytical strategies for examining multiple behaviours or outcomes
- Evoke discussion and open dialogue between those conducting similar research and encouraging future collaboration
- Discuss the importance, challenges and complexities of working with complex data from adolescents and young adults
Summary:
The symposium will feature three presentations of 12 minutes each, with an additional five minutes allocated for clarifying questions:
- Dr Ryan Burns
- Dr Kirsten Corder
- Dr Joanne McVeigh

The discussant, Dr Eleanor Winpenny, will then comment on the presented work and lead audience discussion (20 minutes).
Relationship between health behaviors and academic achievement in a sample of middle-school students

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Objective: There is a paucity of research examining correlates of academic achievement across multiple health domains in young adolescents. The purpose of this study was to examine the relationships among various health behaviors and academic achievement in a sample of middle school students recruited from the US State of Nevada.

Methods: A two-stage cluster random sampling method was used to recruit Nevadan middle school students (N=5,019; 51.2% girls). The first sampling stage grouped 16 school districts into 8 sampling regions and the second sampling stage involved randomly selecting required English classes to complete the 2015 Nevada Middle School Youth Risk Behavior Survey. Health behaviors included meeting at least 60 minutes of physical activity per day, watching less than 3 hours of television per day, attaining at least 8 hours of sleep per night, specific dietary behaviors, and no recent history of cigarette smoking and/or drug use. Weighted multilevel logistic regression models were employed to examine the relationships among health behaviors and academic achievement, controlling for potential confounders of age, sex, BMI percentile, and race/ethnicity. Additional analyses were employed to examine the relationship between meeting multiple health behavior criteria with academic achievement.

Results: Meeting at least 60 minutes of physical activity per day associated with a student attaining mostly A's and B's over the past academic year (OR=15.6, 95% C.I.: 13.4, 18.1, p<0.001). Additionally, watching 3 or more hours of television per day (OR=0.32, 95% C.I.: 0.24, 0.44, p<0.001), not consuming breakfast everyday (OR=0.34, 95% C.I.: 0.20, 0.57, p=0.002), and smoking more than 10 cigarettes within the past month (OR=0.80, 95% C.I.: 0.72, 0.90, p=0.002) associated with lower odds of attaining mostly A's and B's over the past academic year. For each additional health behavior criterion met, there was higher odds of a middle schooler attaining A's and B's over the past academic year (OR=1.11, 95% C.I.: 1.04, 1.18, p=0.015).

Conclusions: Multiple health behavior criteria relates to academic achievement in middle school students. Health behavior interventions may need to address multiple health domains to elicit significant improvements in cognitive functioning in young adolescents.
Adolescent health behaviours and longitudinal associations with weight, psychological distress and academic achievement in emerging adulthood

Corder K, E Winpenny, A Atkin, E van Sluijs, H Sweeting

1 MRC Epidemiology Unit, University of Cambridge, Cambridge, Great Britain, 2 School of Health Sciences, University of East Anglia, Norwich, Great Britain, 3 MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, Glasgow, Great Britain

Objective: Little is known about associations between a range of adolescent health behaviours and outcomes in emerging adulthood. We examined whether health behaviours at 15y (sports, fruit/vegetable consumption, TV viewing, smoking, substance use, alcohol) were predictive of BMI z-score, psychological distress and academic achievement at 19y; and whether behaviours predicted change in BMI z-score and psychological distress (15y-19y).

Methods: Data were from the West of Scotland 11-16/16+ Study (n=1258). Health behaviours were self-reported at 15y (in 1999) and dichotomised. Weight/height were measured (15y,19y); psychological distress (15y,19y) and academic achievement were reported (19y). Backward stepwise regression (adjusted for sex, deprivation, parental social position) investigated whether each behaviour (15y) predicted BMI and attainment (linear), psychological distress (logistic) at 19y. Prediction of changes in BMI z-scores and psychological distress (15y-19y) was also assessed.

Results: Unhealthy behaviours were prevalent at 15y. Smoking at 15y was positively associated with psychological distress at 19y OR (95%CI) 1.76 (1.29, 2.42), and in multiple variable models, fruit/vegetable consumption and alcohol use were positively, and smoking and drug use negatively associated with achievement at 19y. In multi variable models, greater alcohol consumption at 15y was associated with weight gain B (95% CI) 0.16 (0.07, 0.25), and less TV viewing with reduced psychological distress OR (95% CI) 0.60 (0.41, 0.87), between 15y and 19y.

Conclusions: Results suggest the importance of preventing a range of risk behaviours throughout adolescence, considering alcohol in weight-related adolescent health promotion and understanding associations between contemporary screen use and mental health. Results reinforce the importance of preventing multiple risk behaviours throughout adolescence and perhaps suggest the need for further research on how screen based behaviours and fruit and vegetable consumption can be incorporated into public health programmes targeting various outcomes. More work is needed to assess whether interventions targeting single or a range of behaviours are most effective in improving health in emerging adulthood. As academic attainment may set the stage for lifelong health and wellbeing for young people, efforts to prevent smoking and drug use, and to encourage healthy lifestyle behaviours in young people, may be especially relevant for health promotion among emerging adults.
Longitudinal trajectories of multiple activity behaviours and health outcomes in young adults.

McVeigh J, E Howie, A Smith, P Eastwood, L Straker

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15840: Activity-related behaviours and salient proximal outcomes in adolescents and young adults: interpretation, challenges and future research needs (Convenor: Kirsten Corder), Club A, June 6, 2019, 4:35 PM - 5:50 PM

Objective
Activity behaviours (including TV watching, sports participation and sleep) over critical developmental periods such as childhood and adolescence have been shown to be related to important health outcomes. However, the interplay between these multiple activity and health outcomes in young adulthood is not well understood. In this symposium we will discuss novel longitudinal trajectory data on three activity behaviours and the association between these trajectories and health outcomes in young adults.

Methods
Participants for this study were part of The Western Australian Pregnancy Cohort (Raine) Study. Using latent class analysis, we developed trajectories of TV watching, sports participation, and sleep in 1181 participants. Participants were classified into one of 3 TV-watching trajectories; 3 unique sex-specific trajectories of organized sport participation and 2 classes of sleep trajectories. General linear models tested associations between activity behaviours (trajectories) and mental health (DASS-21); body composition measures (lean and fat mass) and bone mineral content (BMC) measured at age 20 years using dual-energy X-ray absorptiometry.

Results
Participants with low levels of TV watching in childhood had a lower amount of body fat in young adulthood, whereas participants in the high TV watching trajectory had reduced bone mass (BMC) at age 20 years. Participants with consistent sport participation had more preferable health outcomes (including higher lean mass) at the age of 20 years. Trajectories of poor sleep behaviour over childhood and adolescence were related to poorer mental health in young adulthood.

Conclusions
Trajectories of positive activity behaviours (low TV watching, sustained sports participation and healthy sleep behaviours) during childhood and adolescence are related to preferable health outcomes at the age of 20. Identification of the characteristics of people who develop and follow negative trajectories of activity behaviours will enable targeted health promotion strategies to be developed with the intent of encouraging the early adoption of less TV watching, sports participation and the establishment of healthy sleep patterns.
Purpose: This symposium aims to present and discuss findings about the potential benefits and risks of e-bike use across the life course.

Rationale: Electrically-assisted bicycles (e-bikes) are gaining popularity in several countries. E-bikes provide a healthy and non-polluting alternative for motorized transport. They may also provide an alternative for conventional bicycles by lowering typical cycling barriers (e.g., long distances, effort and hilliness). This may especially stimulate groups who typically have low levels of cycling (e.g., older adults, women). Some studies have shown that e-biking is sufficiently intensive to provide health benefits and that e-bike use may lead to increases in cycling levels. However, research has also shown that e-bikers have an increased risk for crashes and associated (severe) injuries. To justify e-bike promotion, e-bikes' benefits should outweigh their risks. Such a benefit-risk analysis may differ between age groups (e.g., older adults more prone to crashes) and countries (e.g., different cycling cultures, infrastructure and weather conditions). It is currently unknown whether the benefits of e-bikes outweigh the risks. Therefore, this symposium presents and discusses research findings on the benefits and risks of e-bike use in different age groups and three different countries.

Objectives
This symposium aims to:
1. present research about the potential benefits of e-bike use in different age groups and countries,
2. present research about the potential risks of e-bike use in different age groups,
3. engage the audience for a plenary discussion about whether e-bike use should be promoted,
4. engage the audience for a plenary discussion about future research directions.

Summary: This symposium will start with the chairperson introducing general information about e-bikes (definition, prevalence, potential benefits and risks). The first speaker, Helga Birgit Bjørnarå, will present a study about the potential benefits of e-bikes among Norwegian families with children. Secondly, Benedicte Deforche will present a study focusing on the benefits of e-bikes for Belgian and Dutch older adults' activity spaces. The third presenter, Hanne Beate Sundfør will talk about a Norwegian study on the prevalence and risk factors of e-bike crashes. The symposium will end with a plenary discussion focusing on the question whether it is desirable to promote the use of e-bikes and on future research directions.

Format:
1) Introduction by chair (5 minutes)
2) Three presentations (each 12 minutes + 3 minutes for questions)
3) Brief reflection by discussant (5 minutes)
4) General discussion moderated by the discussant (20 minutes)
E-bikes for family transportation – project From cars to bikes

Bjørnarå H, S Berntsen, SJ te Velde, A Fyhri, B Deforche, LB Andersen, E Bere

1University of Agder, Kristiansand, Norway, 2Institute of Transport Economics, Oslo, Norway, 3Ghent University, Ghent, Belgium, 4Vrije Universiteit Brussel, Brussels, Belgium, 5Western Norwegian University of Applied Sciences, Sogndal, Norway

Objective: E-bikes and cargo bikes could advantage the transport of children and gear by bike. Despite assistance from an electric engine, cycling with an e-bike is found to reach moderate-to-vigorous intensity physical activity (3 to 9 METS). Therefore, cycling for transport may be a time efficient way to integrate physical activity (PA) into everyday life. The objective of the present study is to investigate whether providing an e-bike and a cargo (longtail) bike among parents with children attending kindergarten influence cycling amount and overall PA level.

Methods: In total 36 parents (18 females), not cycling at study start, were recruited. Participants were stratified according to sex and cardiorespiratory fitness prior randomization into intervention (n=18) or control group (n=18). The intervention group was in random order equipped with an e-bike with trailer (n=6), a longtail bike (n=6) and a traditional bike with trailer (n=6), each bike type for three months, following the autumn, winter and spring seasons. Cycling distance (km) and time (min) was measured with a bicycle computer (daily recordings of data), cycling frequency to work, kindergarten and grocery store during the autumn, winter and spring season was assessed with a questionnaire, and total PA level with the monitor SenseWear Armband. Statistical analyses were performed using IBM SPSS Statistics version 24.0.

Results: For the intervention group, a significant change (p=<0.05) in cycling frequency from baseline to post measures was found for all destinations and seasons, but to the grocery store, during winter (p=0.16). Change in frequency ranged from 0.11 days per week (Grocery store, winter) to 2.00 days per week (Work, autumn) E-bikes obtained the greatest cycling amount compared with longtail bikes and traditional bikes, especially during winter, yet differences were not statistically significant. Despite increased cycling in the intervention group, overall PA level did not differ between intervention and control group participants after the intervention.

Conclusion: Access to different bike types resulted in increased cycling frequency, with the greatest cycling amount found for e-bikes. For parents with children attending kindergarten, providing access to e-bikes might increase cycling, also during the winter season, without resulting in decreased overall PA levels.
Do older e-bikers cover greater life space areas than conventional cyclists and non-cyclists?

Deforche B, J Van Cauwenberg, P Schepers, B de Geus

1Ghent University, Ghent, Belgium, 2Research Foundation Flanders (FWO), Brussels, Belgium, 3Utrecht University, Utrecht, Netherlands, 4Vrije Universiteit Brussel, Brussels, Belgium, 5Ghent University, Ghent, Belgium | Vrije Universiteit Brussel, Brussels, Belgium

15775: E-bikes across the lifespan (Convenor: Jelle Van Cauwenberg), Club B, 4:35 PM - 5:50 PM

Ageing (SIG)

Objective: Conventional and electric bicycles (e-bikes) offer a non-polluting and physically-active alternative to cars to support older adults' mobility. Mobility can be operationalized as moving through different life spaces, ranging from one's bedroom, house, neighborhood and city to the world. We aimed to examine the relationship between cycling status (non-cyclist, conventional cyclist or e-biker) and life space area. Additionally, we examined whether this was moderated by sex, functional health and car driving.

Methods: Cross-sectional survey data were collected among 1,333 Dutch and Flemish older adults through several recruitment strategies (i.e. a research panel, online and paper surveys spread via senior organizations). Participants self-reported socio-demographics, health characteristics, transport behavior and life space area. The relationships between cycling status and life space area were analyzed using generalized linear models. Since higher educated older adults were overrepresented in our sample, a sensitivity analysis with probability weights based on education was performed.

Results: Conventional cyclists (b= 1.40, SE= 0.29, p< 0.001) and e-bikers (b= 1.59, SE= 0.29, p< 0.001) had larger life space areas compared to non-cyclists. The difference in life space area between conventional cyclists and e-bikers was non-significant (b= 0.19, SE= 0.28, p= 0.49). The relationship between cycling status and life space area was not significantly moderated by sex (chi²;= 0.82, p= 0.66), functional health (chi²;= 1.61, p= 0.45) and car driving (chi²;= 1.96, p= 0.38). The analysis weighted for education yielded similar findings.

Conclusions: Initiatives aimed at promoting conventional cycling as well as e-biking may offer an effective strategy to expand older adults' life space area. Future longitudinal and experimental research is warranted to examine the objectively-assessed life space benefits associated with conventional cycling and e-biking.
Collecting data about the 24-hour day: Advances in time use and physical activity recall methods.

Chau J, Karen Milton
1Macquarie University, Sydney, NSW, Australia

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: This symposium will present recent advances in the application of different time use based tools and analytic methods for physical activity and sedentary behaviour research. Rationale: Growing awareness of the importance of the complete 24-hour day, including sleep, sedentary time and physical activity, for a sustainable healthy lifestyle has led to an emerging emphasis on measurement tools that can accurately capture a more complete set of activities than traditional health survey instruments. Time use surveys provide a rich source of data about the activities that make up daily life with the ability to capture contextual information about those activities. Time use surveys, developed by sociologists over 50 years ago, have demonstrated utility for health behaviour research and their application to studying activities of daily living is being continually refined. Recent advances include adaptation to different collection modes, linkage with health outcomes, and analysing data with compositional data analysis.

Objectives:
1. To review health behaviour research using time use methods; and
2. To demonstrate the application of different 24-hour time use tools in physical activity research.

Summary: This symposium brings together researchers from the USA, Germany, UK and Australia to showcase the use of 24-hour time use instruments for studying physical activity and sedentary behaviour. (1) Josephine Chau will chair the session and introduce the speakers. She will also provide a brief overview of time use research related to studying health behaviours based on a systematic review. (2) David Berrigan will discuss the validation and features of an improved 24-hour physical activity recall instrument (ACT24). (3) Andrea Hillreiner and Michael Leitzmann will present on measurement of physical activity and sedentary behavior in the German National Cohort using a computer-based time use instrument (cpar24). (4) Sjaan Gomersall will present a 24-hour recall instrument applicable across the lifespan, the Multimedia Activity Recall for Children and Adults (MARCA). (5) Karen Milton will summarise the session and lead a discussion of key issues related to using time use tools for physical activity research. We welcome active engagement from attendees and there will be opportunities to ask questions throughout the session.

Format: Introduction (10 mins) followed by 3 x 15-minute presentations (45 mins) and discussion plus Q&A session (15 mins).
An updated 24-hour physical activity recall (ACT24) for smart phone and computer: features, validation and progress in MET score linkage

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Purpose: The primary purpose of this presentation is to describe the validity, reliability and development of a 24-hour physical activity recall (PAR) instrument (ACT24) and its adaptation for use on both smart phones and via computer. Additionally, we focus on challenges of linking metabolic equivalent of task (MET) scores for estimation of energy expenditure to PARs and time-use surveys with examples from ACT24 and from the American and Multinational Time use Surveys (ATUS and MTUS).

Methods: Validation studies were completed to compare ACT24 based estimates of energy expenditure with device-based measurement of movement and doubly labeled water estimates of energy expenditure on 932 US adults aged 50-74. MET score linkage with ACT24, ATUS and MTUS categories were determined by matching activity categories from the Adult Compendium and the specific surveys. Face validity of MET score linkages were addressed by examining estimates of energy expenditure in different intensity categories, overall, and via comparisons of the US, Poland and the United Kingdom.

Results: ACT24 is a valid and reliable approach to measuring activity levels and estimating energy expenditure with nearly comparable performance to accelerometry. Freely available data collection tools along with remote storage, automated data processing and a user-friendly study management system linkable to REDCap increase the utility of ACT24. Matching MET scores to activities in ACT24, MTUS and ATUS result in several challenges identified by our teams. These included diverse perspectives on energy expenditure levels for sedentary and many light activities, counter-intuitive values for common activities such as transportation, lack of detailed reporting and measurement concerning energy expenditure during work, assigning MET scores to time use activity categories that group different intensity activities and differing objectives of time-use and 24-hour recall data.

Conclusions: The ultimate goals of ACT24 and our MET score linkage projects are to improve and facilitate collection of more complete activity data, capturing the full range of activities and activity intensities and to further enhance the utility of time use survey data for large scale historical and international comparisons of trends in time use, physical activity and energy expenditure.
Measurement of physical activity and sedentary behavior in the German National Cohort using a computer-based time use instrument

Hillreiner A, M Leitzmann

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Purpose: Despite the important role physical activity (PA) plays in the prevention of major chronic illnesses, inadequate PA levels are widespread. Time use surveys provide detailed information on PA and sedentary behavior (SB) that can be used to identify high risk groups and to implement intervention programs.

Methods: We developed a computer-based 24-hour physical activity recall (cpar24) for use in the German National Cohort (GNC), a population-based prospective study of 200,000 men and women aged 20-69 years that was initiated in 2014. The cpar24 was designed to represent an interactive calendar that inquires about all activities performed during the previous day, along with their start and end times. Participants are guided to select from 262 activities from different contexts (e.g., work, leisure, transportation) or to choose a specific activity using a search function. For selected activities, body position (sitting/standing) and intensity level (low/moderate/high) can be specified. The cpar24 can be completed independently at home via the internet, and completion takes 30 minutes or less for most study participants. All activities are linked to the corresponding metabolic equivalent of task (MET) values from the 2011 Compendium by Ainsworth et al. This allows calculation of time spent sedentary or in light, moderate, or vigorous activities, as well as estimation of energy expenditure.

Results: Initial analyses show that 71% of cohort members participated in the cpar24 and of these, 91% provided complete data. On average, participants reported engaging in 24.0 (SD=10.2) activities per day. Study subjects spent 8.0 (SD=1.6) hours sleeping, 8.2 (SD=3.5) hours in SB, 5.2 (SD=2.8) hours in light activity, 2.1 (SD=2.5) hours in moderate activity, and 0.5 (SD=1.1) hours in vigorous activity per day, and they accumulated 42.0 (SD=8.6) MET-hours per day.

Conclusions: The cpar24 provides comprehensive information on duration, frequency, and types of PA and SB that can be used as exposure, covariate, or endpoint variables in large-scale epidemiologic studies. Furthermore, contextual information can be used for detailed analyses of PA and SB patterns.
24 h recall of physical activity across the lifespan: Properties and utility of the Multimedia Activity Recall for Children and Adults

Gomersall S, K Ridley, T Olds

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15891: Collecting data about the 24-hour day: Advances in time use and physical activity recall methods.
(Convenor: Josephine Chau), Club C, 4:35 PM - 5:50 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: The Multimedia Activity Recall for Children and Adults (MARCA) is a computer-administered, 24-hour self-report recall tool utilising a time use approach that has broad application in physical activity research. The purpose of this symposium presentation is to describe the MARCA, its psychometric properties, and to provide examples of its utility for public health research.

Methods: The MARCA has established reliability (ICC=0.98-1.00) and validity (rho = 0.45-0.70 compared to accelerometry and doubly-labeled water) in children, adults and older adults. Typically administered via computer-assisted telephone interview, the MARCA asks participants to recall their previous day from midnight to midnight using meal times as anchor points in a segmented-day format. Participants are asked to recall activities in the order that they were performed in time slices of 5 minutes or more, by choosing from a compendium of over 520 activities, each identified by a unique activity code, a metabolic equivalents (METs) value, and allocated to a number of hierarchically structured time use domains. Since 2003, 65,000 days of data have been collected on participants aged from 9 to 95 years.

Results: Main outcomes from the MARCA include time spent in activity across the spectrum, based on intensity (METs) or posture and time spent in domains of time use more broadly. However taken together, data from the MARCA combined with visualisation techniques allow us to plot changes in time use across the lifespan, and contrast time-use patterns of people of different ages and socio-economic groups; overlay heat maps for health outcomes such as adiposity and inflammation, with a view to locating the optimal pattern of time use; and track individuals in a population across the course of a day to generate an agent-based analysis of time use.

Conclusions: Time-use diaries and recalls are an under-exploited resource in physical activity epidemiology. They provide much richer data than simpler aggregate questionnaires focused on one or two health behaviors alone, with reliability and validity comparable to device-based measurement. They are consonant with the move towards construing the 24-hour day as the appropriate public health target.
Feasibility and effectiveness of sedentary behaviour interventions in older adults

Gardiner P, Sebastien Chastin
Centre for Health Services Research, Faculty of Medicine, University of Queensland, Queensland, Australia

Purpose: The purpose of this symposium is to present the latest evidence on the feasibility and effectiveness of sedentary behaviour interventions in older adults.

Rationale: The population of older adults is expected to increase considerably in the coming decades. This increase poses a major public health challenge, as aging is associated with a reduction in physical and cognitive functioning and health-related quality-of-life. Two behaviours that are important to promote healthy aging are physical activity and sedentary behaviour. Both behaviours have been shown to be significantly and independently related to detrimental health effects. To date, the majority of efforts to facilitate healthy aging have been focused on increasing moderate-to-vigorous physical activity. However, older adults face many barriers to being sufficiently physically active at moderate-to-vigorous intensity. Therefore, replacing sedentary behaviour by standing and light-intensity physical activity might be a more feasible alternative, and thus the ideal first step towards a more healthy lifestyle.

Objectives:
To explore the older adults' perceptions towards sedentary behaviour interventions.
To identify successful intervention strategies to reduce sedentary behaviour in older adults.
To gain insight into the health impact of sedentary behaviour interventions in older adults.

Summary: Three different studies that have collected data, using a mix of methods, on sedentary behaviour interventions in older adults will be presented and discussed. The first presentation will discuss the results of a qualitative study conducted among post-menopausal Latinas. The aim of this study was to adapt an existing sedentary behaviour intervention, based on older Latinas' needs, to improve appropriateness and adherence. The second presentation will provide the results of a meta-analysis on the effectiveness of using self-monitoring as a behavioural change technique in sedentary behaviour interventions. The final presentation will discuss a sedentary behaviour intervention and examine cardio-metabolic health effects in US older adults which was based on a series of pilot studies.

Format:
Introduction by Paul Gardiner (AUS) 5'
Dr. Michelle Takemoto (USA) Improving program fit through end-user design to adapt a sedentary behaviour intervention for post-menopausal Latinas 12' (+ 3' questions)
Dr. Sofie Compernolle (Belgium) Self-monitoring based intervention to reduce sedentary behaviour in adults and older adults: a meta-analysis 12' (+ 3' questions)
Dr. Dori Rosenberg (USA) Protocol of a randomized controlled trial to reduce long-term sitting in older adults 12' (+ 3' questions)
Discussion led by Sebastien Chastin (UK) 25'
Improving program fit through end-user design to adapt a sedentary behavior intervention for post-menopausal Latinas

Takemoto M, A Herweck, A Nguyen, M Allison, G Talavera

1University of California, San Diego, La Jolla, CA, United States, 2University of Miami, Coral Gables, FL, United States, 3San Diego State University, San Diego, CA, United States

15765: Feasibility and effectiveness of sedentary behaviour interventions in older adults (Convenor: Paul Gardiner), Club D, 4:35 PM - 5:50 PM

Ageing (SIG)

Background: Sedentary behavior is associated with a number of negative health outcomes. Previous settings for sedentary behavior interventions have included schools or worksites and few interventions have focused on older adults. Importantly, no interventions have targeted post-menopausal Latinas who have high rates of sitting and struggle to meet physical activity recommendations. The purpose of our study was to describe the adaptation of a previous intervention in non-Hispanic Whites to a population of post-menopausal Latinas to increase appropriateness and acceptability.

Methods: We used principles of end-user design to include the target participants in intervention development. We purposively recruited seven post-menopausal Latinas (age 55+ years) to participate in a pilot sedentary behavior intervention for two weeks. Following the final visit, participants completed an exit interview to discuss the intervention and suggestions for adaptation. All interviews were audio-recorded, transcribed, and translated into English if originally conducted in Spanish. A team of three researchers coded each transcript independently and then the team discussed and compared codes in collaboration to identify key themes.

Results: Six themes emerged from the qualitative analysis. Sitting opportunities and norms included insights into common sitting behaviors such as knitting and watching television that could be targets for intervention content. Barriers to standing included cultural and age norms such as respecting one's elders and encouraging them to sit and rest. Few facilitators to standing emerged, but examples were that participants were not embarrassed to stand around others. Overall, there was high program satisfaction and participants reported the goal to increase standing was feasible. Participants identified a number of strategies to stand including adapting previous sitting behaviors into standing, such as watching television while standing, external prompts or cues, and social and environmental supports. Finally, participants reported health benefits associated with increased standing including more energy and less pain and dizziness.

Discussion: We incorporated feedback from the formative work into the adapted intervention to ensure program fit within the target population. Including end-users in intervention development is a key step to improve uptake and adherence. Prior to implementation, researchers must understand the needs of the target population to ensure appropriateness and fit.
Self-monitoring based interventions to reduce sedentary behavior in adults and older adults: a systematic review and meta-analysis

Compernolle S, A DeSmet, G Crombez, I De Bourdeaudhuij, G Cardon, D Van Dyck

1Department of Movement and Sport Sciences, Ghent University, Ghent, Belgium, 2Department of Experimental Clinical and Health Psychology, Ghent University, Ghent, Belgium

Objective: Existing sedentary behavior interventions have just like physical activity been largely informed by social-cognitive models of behavioral change. However, most of these models are based on an expectancy-value framework in which behavior is determined by expected outcomes and the value that is placed on them. As such, these models do inadequately capture processes underlying unintentional and habit-like behavior. Given that we believe that a large part of sedentary behavior is habitual, specific strategies are needed to control sedentary behavior. Chief among these strategies is the conscious awareness of the automated behavior, which might be achieved by means of self-monitoring. The present study systematically reviews self-monitoring based interventions to reduce sedentary behavior in adults and older adults, and the meta-analyses determine the overall effectiveness of the interventions.

Methods: Four electronic databases (PubMed, Embase, Web of Science, and The Cochrane Library) were searched in September 2018 by two independent reviewers. Studies were eligible if they were assessing the effectiveness of self-monitoring-based interventions on adults' or older adults' sedentary behavior by means of a controlled trial. Data were extracted using standardized forms, and the methodological quality was assessed using the Cochrane's risk of bias tool. We calculated pooled effects (Hedges'g) using Comprehensive Meta-analysis software and conducted moderation analyses.

Results: Twelve controlled trials have been identified as eligible for inclusion. Meta-analyses are currently being undertaken to gain insight into the overall effectiveness of self-monitoring based interventions aimed at the reduction of sedentary behavior in adults and older adults, and moderation analyses will be conducted to test whether the heterogeneity can be explained by differences in methodological variables. Meta-analysis results and the quality of evidence of the included studies will be presented.

Conclusions: The number of self-monitoring based interventions aimed at the reduction of sedentary behavior in adults and older adults has increased substantially during the past two years. The contribution and implications of the meta-analysis findings will be discussed.
15769

S4, S.4.45

Protocol of a randomized controlled trial to reduce long-term sitting in older adults

Rosenberg D, M Greenwood-Hickman, J Cooper, J Zhou, J Kerr, B Green, D Arterburn, A Cook, J McClure

1Kaiser Permanente Washington Health Research Institute, Seattle, WA, USA, 2Grant doctor, San Diego, CA, USA

15765: Feasibility and effectiveness of sedentary behaviour interventions in older adults (Convenor: Paul Gardiner), Club D, 4:35 PM - 5:50 PM

Ageing (SIG)

Background: Older adults with obesity have high levels of sitting time and struggle to be physically active. We have shown that sitting reduction is feasible in this population in a series of pilot studies. There is a need to test in larger and longer trials whether these sitting reductions can impact health. This presentation will provide the background and protocol for an on-going trial of sitting reduction in older adults.

Methods: We will conduct a randomized controlled trial with 284 older adults with a body mass index greater than 30 kg/m2. Participants will receive either a sitting reduction intervention (i-STAND) or a healthy living attention control condition for 6 months and will be followed for 12 months total. The i-STAND group will receive 10 health coaching contacts, workbooks, portable standing desks and inactivity prompting devices to reduce their sitting. The attention control group will receive 10 health coaching contacts, a workbook, and content on various healthy living topics. At 6 months those in i-STAND will be re-randomized to receive 5 booster sessions or no further contact. The primary outcomes are activPAL measured sitting time and blood pressure. Additional outcomes include standing time, steps, fasting glucose, and HbA1c.

Results and conclusion: This will be the first long-term study of sitting reduction in older adults with an ability to examine how sitting reductions are maintained and whether the approach impacts cardiometabolic health.
New Frontiers in Mobile Health Technology: Capitalizing on real-time data capture to tailor dietary intervention messages

Pollard C, Megan Rollo

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Intervention feedback from self-report questionnaires limits the scope and relevance of dietary feedback. Real-time images and/or tailored prompts may facilitate translation to better address eating behaviors, tailoring intervention messages, and assess effectiveness of interventions. Tailoring uses characteristics unique to the person to make messages more acceptable thereby improving behavioral outcomes.

Rationale: New cost-effective approaches to improving dietary intakes and physical activity of the population are needed as adherence to dietary and physical activity (PA) guidelines are poor. Self-monitoring is well recognized as an effective strategy in behavioral interventions to improve dietary intakes and PA. Using mobile phones to gather salient information can aid in generating personalized feedback which may enhance adoption of positive lifestyle changes to assist with improvements in body weight, ectopic fat, and overall positive outlooks.

Objectives:
1) Outline mobile methods for capturing dietary intake, including the advantages and challenges of real-time data capture;
2) Describe examples of dietary interventions using real-time data capture methods for the provision of tailored feedback;
3) Summarize limitations to be overcome and outline future directions for real-time data capture.

Summary: The Chair will provide an overview of mobile methods for capturing real-time dietary data and will outline the power of these methods in their ability to provide tailored feedback. Underpinning this is the need for accurate dietary assessment and strong behavioral theory to inform message content and delivery. Approaches to applying these novel concepts will be covered using the experiences and results from speakers representing three different countries. Further, the approaches, the outcomes, and the behavioral models differ; however all use real-time data capture to inform messages and interaction with the intervention participants. The discussant will direct the closing discussion summarizing key issues arising from the symposium and future directions for improving real-time data captures methods.

Format: The Chairperson will speak for 10 minutes and three oral presenters will present for 15 minutes each. The symposium will conclude with 20 minutes for discussion of the presentations and the associated issues raised.

Chairperson: Dr Christina Pollard, Curtin University, Australia;
Oral Presentation 1: A/Professor Carol Boushey, University of Hawaii Cancer Center, USA;
Oral Presentation 2: Professor Britta Renner, University of Konstanz, Germany;
Oral Presentation 3: A/Professor Deborah Kerr, Curtin University, Australia;
Discussant: Dr Megan Rollo, University of Newcastle, Australia.
Novel constructs for dietary interventions informed by real-time data capture.

**Boushey C, K Yonemori, C Panizza, L Le Marchand, U Lim, E Delp, FM Zhu, D Kerr**

1. University of Hawaii Cancer Center, Honolulu, HI, United States, 2. Purdue University, West Lafayette, IN, United States, 3. Curtin University, Perth, Western Australia, Australia

15920: New Frontiers in Mobile Health Technology: Capitalizing on real-time data capture to tailor dietary intervention messages (Convenor: Christina Pollard), Club E, 4:35 PM - 5:50 PM

**Disease prevention and management (SIG)**

Purpose: Provide an overview of using images and additional context to tailor intervention dietary messages, enhance cooperation and retention, and assess dietary adherence to interventions using the mobile Food Record (mFR™) app.

Methods: The Healthy Diet and Lifestyle (HDL) pilot study aimed to reduce visceral adipose tissue among 35-55 y East Asian men and women. Participants were randomized to intermittent energy restriction + Mediterranean diet (IER+MED) (n=30) or Dietary Approaches to Stop Hypertension (DASH) diet (n=30) as an active comparator. HDL used food images captured by the mFR™ to guide telephone coaching sessions. Dietary intakes included 4-days mFR™ at baseline, midpoint, and 3 months.

Results: The overall retention was 90%. Both study arms recorded similarly 4 complete days over the 3 time points, i.e., mean±SEM; 11.6±0.17 days for IER+MED and 11.7±0.12 days for DASH. Adherence to the dietary prescriptions could be assessed using the results from the mFR™, e.g., the protein goal of 25% of energy intake for the IER+MED group was assessed as 24.9% at midpoint and 25.6% at 3 months. The DASH goal for protein was 18% of energy and was assessed as 18.7% and 18.9%, respectively.

Conclusions: Images from the mFR™ can address the criticism of lacking detail to tailor feedback. In the HDL, tailored dietary feedback informed by images appeared to be effective. The high level of engagement and sustained participation may partially be due to the high usability of the app. The data generated from the app appears to provide usable information to assess and monitor dietary intakes relevant for interventions.
15929

S4, S.4.46

SMARTACT: Mobile assessment & interventions for behavior change: Boosting experienced eating with the “happy eater” app

Renner B, K Villinger, D Wahl, L König, K Ziesemer, G Sproesser, S Butscher, J Müller, H Reiterer, H Schupp

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15920: New Frontiers in Mobile Health Technology: Capitalizing on real-time data capture to tailor dietary intervention messages (Convenor: Christina Pollard), Club E, 4:35 PM - 5:50 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Most behavioral interventions targeting health behavior emphasize the need to self-regulate and to sacrifice short-term pleasure for long-term health benefits. However, restrained eating or dieting is a great challenge for most people and may even enhance the risk of long-term weight gain. A promising new perspective entails a shift from self-regulation and long-term health goals to a more positive centered perspective aiming at boosting human capacities and strengths. Mobile devices, delivering cues and prompts just in time, that is, in the eating situation, might be particularly promising for creating boosting interventions.

Methods: As part of the Research Consortia SMARTACT, we developed and utilized a mobile (near) real-time intervention tool called 'Happy Eater' based on individual, event-based assessed eating emotions and eating behavior profiles.

Results: In the present intervention study (N = 150), participants were asked to take a picture of each meal over a 3-5-week period using a smartphone. The intervention group received feedback about emotional nourishment for single meals and snacks (meal-level) as well as over the course of the day (daily consumption level) displayed in different formats on the mobile device across two weeks. Compared to the control group, the intervention group showed a significant increased experienced eating happiness. This difference in experienced eating happiness was significant after a three-week washout phase.

Conclusion: Hence, a "boosting" approach, making behavior easier and more fun to do by building on individual strengths and capacities might be a promising avenue for behavior change interventions.
Impacting when and what do people eat? Targeting messages in nutrition intervention research using the Mobile Food Record


1 Curtin University, Perth, WA, Australia, 2 Purdue University, West Lafayette, IN, United States, 3 University of Hawaii Cancer Center, Honolulu, HI, United States

Objective: Identifying both the timing of eating and types of food groups consumed throughout the day may allow improved targeting of nutrition messages. Advancements in dietary assessment methods, such as the mobile food record (mFR), has made extraction of this data more readily available. The purpose was to examine the time and frequency of food group intake occasions in overweight and obese adults over a 24-hour period.

Methods: Diet was captured using an image-based mFR in 157 adults (BMI 25-40). A single day of the mFR was analysed for food group serves (fruit, vegetable, grains, protein, junk, calcium-rich foods). Energy-dense nutrient-poor (EDNP) food and beverages were separated into sugar-sweetened beverages (SSB), alcoholic beverages and Junk foods (high fat/high sugar foods e.g. fries, cakes). Time of eating was taken from the image metadata. The distribution of the food groups, was expressed as a percentage of total serves over 24 hours.

Results: The peak alcohol intake was between 1800 to 2000hrs (47.5%). The peak Junk food serves (20-22%) and SSB (23-26%) were between 1200 and 1400 hrs, and between 1800 to 2000 hrs. Most junk food serves were consumed during meal times with 26% consumed between 1200 to 1400 hrs and 29% between 1800 to 2000 hrs. Similarly, peak vegetable serves occurred at meal times, with between 1200 to 1400 hrs (29.7%) and 1800 to 2000 hrs (47%). Fruit serves showed a more even distribution throughout the day with 78.6% consumed by 1500 hours. Similarly, 76.6% of calcium-rich foods were consumed by 1500 hours.

Conclusions: The results show most EDNP food and beverages were consumed at two main time points (traditional lunch and dinner times). This was also the time where vegetables were mostly consumed. These profiles provide valuable information on the timing and food group consumption of overweight and obese participants. Findings increase the salience of messages thus improving the effectiveness of nutrition interventions.
In-store supermarket interventions to improve healthier food purchasing: Real life experiments

Poelman M, Coosje Dijkstra

1 Utrecht University, Utrecht, Netherlands

Policies and environments (SIG)

Purpose: Across many countries, supermarkets are the primary source of food for most people. Supermarkets therefore offer an important setting to stimulate healthy food choices. Supermarkets have recently become more willing to 'open up' their stores to scientists, facilitating evaluations of in-store interventions. In this symposium, we will share and discuss an international perspective of the results of studies in national supermarket chains (the Netherlands, UK, Australia). If scaled up, these supermarket interventions could increase healthy food purchases and may subsequently lead to healthier diets on a population level.

Rationale: Supermarkets represent a key food-environment for individuals and therefore influence the food purchasing behaviors of many people simultaneously. Increasing research and policy attention is being applied to altering supermarket environments to improve the healthfulness of food purchasing, yet evidence from real life studies remains limited.

Objectives:

1. To describe the importance of conducting real life research interventions in supermarkets that aim to increase healthy food purchasing.
2. To share the evidence of how in-store interventions conducted in supermarkets located in three different countries 1) influence purchasing behavior and 2) are evaluated by customers.
3. To discuss the implications and challenges of conducting in-store interventions that are scientifically robust in real life supermarkets.

Summary: This symposium will feature research and perspectives on different types of in-store supermarket interventions from three countries. The role of supermarkets in food choices will be introduced by the chairperson. Thereafter three presentations will follow. First, Huitink will present the findings of a social-norm 'nudging intervention' in shopping trolleys to promote vegetable purchases in the market-leading supermarket chain in a disadvantaged area in Amsterdam, the Netherlands. Second, Vogel will present the results a cluster matched-controlled study in a national UK discount supermarket chain that targeted the placement of healthy and unhealthy food products had on purchasing and dietary behaviors. The final presentation by Blake will outline the insights into the implementation of a 12 month supermarket intervention, including among others shelf tags, trolley signs and shelf wobblers to promote healthy eating. The discussant will highlight main findings, implications, and directions for future research from the three presentations, and actively facilitate discussion and debate by engaging the audience and inviting contributions from the presenters.

Format: Following a 5-minute symposium introduction by the chairperson (Poelman), presenters Huitink, Vogel and Blake will each give a 15-minute presentation. The discussant (Dijkstra) will facilitate the discussion in the time remaining.
15814

S4, S.4.47

Descriptive social norms and placement communication in shopping trolleys to promote vegetable purchases: a supermarket experiment in a deprived urban area in the Netherlands

Huitink M, MP Poelman, E van den Eynde, JC Seidell, SC Dijkstra

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15796: In-store supermarket interventions to improve healthier food purchasing: Real life experiments (Convenor: Maartje Poelman), Club H, 4:35 PM - 5:50 PM

Policies and environments (SIG)

Purpose: Supermarkets are a key point of purchase for groceries and therefore can have a considerable influence on eating behaviors. Evidence suggests that descriptive social norms and placement communication in shopping trolleys can be effective in stimulating vegetable purchases in supermarkets. Therefore, the aim of this study was to determine the effectiveness of two nudges in shopping trolleys ([1] social norms about vegetable purchases [2] a place to put vegetables) on the amount of vegetables purchased in a supermarket in a disadvantaged urban area in Amsterdam, the Netherlands.

Methods: A quasi-experimental study was conducted, including two conditions: 1) intervention days on which the shopping trolleys in the supermarket had a green nudge inlay indicating a place for vegetables and a normative message and 2) control days on which the regular shopping trolleys (no inlay) were used in the supermarket. During the intervention and control days, vegetable purchases were measured by means of the cash receipts collected from customers at the checkouts. Also, individual and purchase characteristics were assessed by means of short surveys at the checkout.

Results: In total, 244 customers participated in the study. There were more women (61.1%) than men included and all customers were 18 years and/or older. Ordinal logistic regression analyses showed that customers on the intervention days (n=123) were in a higher tertile for purchasing grams of vegetables compared to the customers on the control days (OR: 1.66, 95%CI: 1.03-2.69), especially those that bought groceries for less than three days (OR: 3.24, 95%CI: 1.43-7.35). Sensitivity analyses also showed that intervention customers who noticed the green inlay were even more likely to purchase more vegetables (OR: 1.86, 95%CI: 1.06-3.25).

Conclusions: The results indicate that a social norm nudge and placement communication with respect to vegetables resulted in increased vegetable purchases among supermarket customers.
Implementing healthier product placement strategies in discount supermarkets can improve purchasing and dietary patterns of disadvantaged customers

Vogel C, S Crozier, C Cooper, J Baird

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15796: In-store supermarket interventions to improve healthier food purchasing: Real life experiments (Convenor: Maartje Poelman), Club H, 4:35 PM - 5:50 PM

Policies and environments (SIG)

Purpose: Discount supermarkets have less healthy environments than other supermarkets and are frequently used by disadvantaged families. Implementing placement strategies that support healthy eating in discount supermarkets could help to improve the dietary behaviours of those with poorest dietary quality.

Methods: This study had a prospective matched controlled cluster design and involved three intervention and three comparison stores located in England. The intervention had three components: i) positioning an expanded fresh fruit and vegetable section at the store entrance, replacing smaller display at the back of the store ii) positioning frozen fruit and vegetables in the first aisle, and iii) removing confectionery from checkouts and end of aisle opposite. The control condition was the previous layout with fresh produce at the back of the store and confectionery at checkouts. Women customers aged 18 to 45 years, with a store loyalty card, who regularly shopped at a study store were recruited. Data on women's diet quality and demographic characteristics were collected via telephone survey before the intervention, and three months after. Weekly loyalty card sales data were analyzed for the 12 weeks prior to the intervention and 24 weeks after.

Results: 150 women were recruited and there were no significant differences in demographic characteristics between intervention and control groups (all p<0.05). Participants' median age was 36 years, 91% were white British and 55% had low educational attainment (=16 years of age). Linear regression models showed that diet quality was higher among intervention than control participants at three months, equivalent to six additional portions of green salad vegetables per week ßa=0.25SD (95% CI 0.01, 0.49). This relationship weakened only slightly after adjustment for confounding variables. Analysis of weekly purchasing data indicated that intervention participant's fresh fruit and vegetable purchases increased from baseline to six months compared to control participants (p=0.09), but there was no difference in confectionery purchases over the same time (p=0.4).

Conclusions: This study provides evidence to support government initiatives for healthier product placement strategies in retail outlets in an effort to improve population diet and help reduce dietary inequalities.
Insights into the implementation and scalability of a 12 month supermarket intervention to promote healthy eating

Blake M, J Marshall, G Sacks, A Brown, A Cameron

1 Deakin University Global Obesity Centre, Melbourne, Vic, Australia, 2 City of Greater Bendigo, Bendigo, Vic, Australia

Purpose
The ongoing poor dietary behaviours in most countries highlights the need for novel approaches to improve healthy eating. Supermarkets are the setting for the majority of food purchases and often use marketing techniques to promote less healthy foods. The purpose of this study was to explore the barriers and enablers to the implementation and scalability of a one year multi-component intervention in supermarkets to improve sales of healthy food.

Methods
Eat Well @IGA was a 12 month, randomized controlled trial conducted between May 2017 and May 2018 (with a 12 month baseline period) in 5 intervention and 6 control supermarkets in regional Victoria, Australia. Interventions included shelf tags (highlighting all products with a 4.5/5 health star rating), trolley/basket and floor signs, shelf wobblers, local area promotion (flyers), social media, a public launch and in-store banners and posters. A process evaluation was conducted to explore mechanisms of intervention effects (currently being analysed), and complement sales data investigating impact on sales of core and discretionary foods. The fidelity of the intervention was assessed via regular store audits, with customer intercept surveys conducted mid-intervention (n=476) and a full process evaluation (including staff surveys (n=109) and in-depth interviews with key stakeholders (n=18)).

Results
Customers strongly supported the intervention, with 94% believing that IGA should continue its efforts to encourage healthy eating, 53% more likely to shop at IGA and 8% saying they shop there more often as a result. Customers felt shelf tags and shelf wobblers were the biggest influences on purchasing, with 51% reporting change in purchases because of shelf tags, and 31% changing because of wobblers. Staff support for the intervention was also positive, with 89% who believed it would be maintained in their store. Results from stakeholder interviews will also be presented. The fidelity of the intervention varied by intervention component and store, however shelf tags were consistently maintained by store monitors.

Conclusions
Process evaluation results highlight the shared benefits and demand for the promotion of healthy eating in the supermarket setting. Further development and uptake of healthy eating initiatives in supermarkets should be explored.
FRIDAY JUNE 7 2019
SYMPOSIA SESSION 5
S5, S.5.49
Policy, Systems, and Environmental Improvements to Worksites' Physical Activity and Nutrition

Racine E, Jennifer Coffeng
1University of North Carolina, Charlotte, North Carolina, United States

Policies and environments (SIG)

Purpose:
The purpose of this symposium is to identify policy, systems, and environmental (PSE) strategies that have been successful in improving physical activity and/or nutrition at worksites.

Rationale:
Most interventions at worksites target individuals and individual behaviors, generally with weak results. The PSEs in which people work influence their health behaviors. However, there is limited research on PSE strategies that are successful in altering individuals' or groups' behaviors at worksites. This symposium offers cutting-edge PSE interventions that lead to improvements in physical activity and nutrition at worksites.

Objectives:
As a result of attending this symposium, delegates will be able to:
1) Describe the effectiveness of a system-level dietary modification on employees' dietary intakes, nutrition knowledge and health status.
2) Discuss the cost-effectiveness of a PSE nutrition intervention from the perspective of healthcare providers and employers.
3) Describe the components of a comprehensive physical activity promotion program for university employees.
4) Identify which PSE interventions at worksites that can increase the likelihood of employees meeting health-enhancing physical activity recommendations.

Summary:
Dr. Geaney will discuss the comparative effectiveness of a workplace dietary intervention involving nutrition education and system-level dietary modification both alone and in combination versus a control workplace on employees' dietary intakes, nutrition knowledge and health status.
Prof. Seghers will discuss a comprehensive physical activity program for university employees called, 'UniefActief.' This program was based on the socio-ecological model and included health assessments, consultation with physical activity coaches, education sessions led by health professionals, recruitment of physical activity ambassadors, and a mass physical activity event.
Dr. Ablah will discuss how worksites that have a flex-time policy for employees to engage in physical activity are associated with employees' reporting of sufficient physical activity to be categorized as health-enhancing physical activity (HEPA) active.

Format:
In our 75 minute session,
(10 minutes) The Chair, Elizabeth Racine, DrPH, RD, professor in the Department of Public Health Sciences at the University of North Carolina in Charlotte, will open the symposium with an introduction to the topic.

(15 minutes) Fiona Gearney PhD MPH BSc (Ireland) will present her research.

(15 minutes) Jan Seghers PhD (Belgium) will present his research.

(15 minutes) Elizabeth Ablah PhD MPH (US) will present her research.

(5 minutes) Discussant, Jennifer Coffeng PhD, MBA, VUmc/EMGO+ Amsterdam Public Health Research Institute, to make initial comments.

(15 minutes) Dr. Coffeng will facilitate questions and answers in addition to facilitating a meaningful conversation with delegates and speakers.
Taking Nudge Digital with Food Choice at Work: From Evaluation to Practical Application in Everyday Workplace Settings

Fitzgerald S, F Geaney AP Fitzgerald, I Perry

University College Cork, Cork, Ireland

Objective: Evidence on effective workplace dietary interventions is limited. The FCW trial assessed the comparative effectiveness of a workplace dietary intervention involving nutrition education and system-level dietary modification both alone and in combination versus a control workplace on employees' dietary intakes, nutrition knowledge and health status. An economic evaluation assessed the cost-effectiveness of the FCW intervention from the perspective of healthcare providers in terms of QALYs and employers in terms of monetary benefits (reduced absenteeism).

Methods: Four manufacturing workplaces in Ireland were allocated to control, nutrition education (Education), system-level dietary modification (System-level) and nutrition education and system-level dietary modification (Combined). Nutrition education included group presentations, individual consultations and detailed nutrition information. System-level dietary modification included menu modification, fruit price discounts, strategic positioning of healthier alternatives and portion size control. Data on dietary intakes, nutrition knowledge, health status, QALYs and absenteeism were obtained at baseline and at 7, 9 months follow-up. Multivariate analysis of covariance compared changes across the groups. The economic evaluation included cost-utility and cost-benefit analyses.

Results: Follow-up data were obtained for 541 employees (18-64 years) (64% of 850 recruited). There were significant positive changes in intakes of saturated fat (p=0.013), salt (p=0.010) and nutrition knowledge (p=0.034) between baseline and follow-up in the combined intervention versus the control. Significant changes in BMI (µs; 1.2 kg/m² (p=0.047) were also observed in the combined intervention. System-level modification yielded the highest additional QALYs (£101.37/QALY) and annual net benefit for employers (£56.56/employee).

Discussion: Combining nutrition education and system-level dietary modification is an effective approach for promoting healthy eating at work. The FCW intervention is a sustainable cost-effective model and wide-scale implementation is underway at local, national and international workplaces. Specific elements will be digitally automated to increase the reach of the FCW intervention. The purpose of our next related study is to develop, implement and assess the effectiveness of digitalising the FCW intervention. The results of this study will determine the effectiveness and user engagement of a theory-based, multidimensional, web platform and smartphone nutrition intervention to support healthier food choices and better health status for employees in their workplaces.
S5, S.5.49

UniefActief! A comprehensive physical activity promotion program for university employees

Seghers J, A Bogaerts

1Department of Movement Sciences, KU Leuven, Leuven, Belgium, 2HSE Department, KU Leuven, Leuven, Belgium

Objective: A survey among a representative sample of 1630 KU Leuven employees in 2013 showed that 74% of the university staff wants to be more physically active in the near future. As a consequence, KU Leuven launched a comprehensive physical activity program for university employees, called "UniefActief". "UniefActief" is a collaboration between the Human Resources Department, the Communications Department, the Health, Safety and Environment (HSE) Department, the University Sports Centre and the Faculty of Movement and Rehabilitation Sciences of the KU Leuven and funded by the Executive Board of the KU Leuven since 2013. "UniefActief" aims to promote and deliver health and well-being benefits for the University community through the promotion of physical activity.

Methods: The "UniefActief" project was developed by experts in physical activity promotion at the KU Leuven. The RE-AIM framework (Reach, Effectiveness, Adoption, Implementation and Maintenance) (Glasgow et al., 1999) will be used to evaluate the impact of the comprehensive physical activity program.

Results: The development of the "UniefActief" project was based on the socio-ecological model of health behaviour (Sallis et al., 2002) and includes activities targeting the individual (health assessments and physical activity counselling), the social environment (physical activity ambassadors), the physical environment (specific physical activity programs for inactive employees, mass physical activity event) and policy environment (participation rewards, KU Leuven is offering a city bike to every employee who commits to using the bike to travel to and from work). Results of the RE-AIM analysis will be presented during the symposium.

Conclusions: Since 2013, KU Leuven offers a comprehensive physical activity program for university employees, called "UniefActief". Since 2018, "UniefActief" is embedded in the wider health promotion policy of the KU Leuven. This illustrates the success of the physical activity program and its contribution to the development of a "healthy university".
Worksite Physical Activity Policies and Employees’ Physical Activity at Work

Ablah E, E Grilliot, H Okut, A Honn, V Barnes

1University of Kansas School of Medicine, Wichita, Kansas, United States, 2Blue Cross Blue Shield of Kansas, Topeka, Kansas, United States

Objective: This study sought to describe the relationship between employer physical activity policies and employee self-reported physical activity while at work.

Methods: Those at worksites with knowledge of company policies and worksite wellness efforts were asked to complete a worksite-level assessment from June 2017 to September 2018. In addition, employees at each of these worksites completed an International Physical Activity Questionnaire (IPAQ) Short Form to assess physical activity from August 2017 to October 2018. Wilcoxon rank-sum test was used to test of the hypotheses for different between independent groups in terms of individual level of physical activity variables.

Results: A total of 2,227 of 4,914 employees at 35 worksites completed the assessment, for a 45% response rate. A total of 20% (n=7) of the worksites reported having a policy in place for flex-time, and 20% (n=7) reported having a policy in place for being active 'on the clock.' Employees at worksites with a policy providing a flexible work arrangement (flex-time) for employees to engage in physical activity were more likely to self-report enough physical activity to meet the cut point for health-enhancing physical activity (HEPA) as outlined by the IPAQ (accumulating 1500 MET minutes/week of vigorous-intensity activity or accumulating at least 3000 MET minutes/week of any combination of walking, moderate, or vigorous-intensity activity), z=1.975; p = 0.024. The presence of a worksite policy that allows employees to be physically active while 'on the clock,' offering at least a cumulative 30 minutes of each work day to exercise, was not associated with meeting either a minimally active or HEPA cut point as outlined by the IPAQ.

Conclusions: Worksites that had a flex-time policy for employees to engage in physical activity were associated with employees reporting enough physical activity to be categorized as HEPA active. Worksites that had a physical activity policy promoting being active on the clock was not associated with meeting IPAQ physical activity recommendations. Implementing a policy such as flex-time is relatively low risk in that the same work and number of hours are expected. However, it appears that such a policy can allow for health-enhancing physical activity.
Global Matrix 3.0 on Physical Activity for Children and Youth: Insights from Report Card Grades from European, African, Latin-American, and Asian Countries

Aubert S, John Reilly

1HALO, CHEO Research Institute, Ontario, Canada

Purpose
Accumulating sufficient moderate-to-vigorous physical activity is a key determinant of physical, physiological, developmental, mental, cognitive, and social health among children and youth (5-17 years). The Global Matrix 3.0 of Report Card grades on physical activity was developed to achieve a better understanding of the global variation in child and youth physical activity. This symposium presents the Global Matrix development process, compares findings across diverse countries, and discusses future directions of this initiative.

Rationale
Report Cards were prepared concurrently in 49 countries from six continents, using 10 common indicators (Overall Physical Activity, Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviour, Physical Fitness, Family and Peers, School, Community and Environment, and Government) following a harmonized development process and a standardized grading framework. Variations and patterns of grades were observed across the countries and regions, research and surveillance gaps and strategic priorities to improve the grades were identified.

Objectives
1. Presenting the Global Matrix 3.0 initiative and development process.
2. Presenting main findings from Europe, Africa, Latin-America, and Asia.
3. Discussing similarities and differences between countries and regions.
4. Offering insights to improve grades globally and in specific regions.

Summary
This session deliberately engages participants from around the world and across seniority levels. Salomé Aubert (senior PhD student) will Chair the session and provide a brief overview of Global Matrix 3.0 development process and the aggregation of 10 common Report Card grades from 49 different countries. Her presentation will then summarize the results from 20 European countries. Taru Manyanga (senior PhD student) will present main findings of the Global Matrix 3.0 focusing on six African countries. Silva Gonzalez (senior PhD student) will present highlights from seven Latin-American countries. Eun-Young Lee (Assistant Professor) will highlight findings from 12 Asian countries.
Format
Chair: Salomé Aubert (France) - Global Matrix 3.0: Report Card Grades on the Physical Activity of Children and Youth in 49 Countries: background, methods, and highlights from European countries (20 minutes)
Presenter 1: Taru Manyanga (Zimbabwe) - Highlights of Report Card grades from African countries that participated in the Global Matrix 3.0. (13 minutes)
Presenter 2: Silva Gonzalez (Colombia) - Highlights of Report Card grades from Latin-American countries that participated in the Global Matrix 3.0. (13 minutes)
Presenter 3: Prof. Eun-Young Lee (South Korea) - Highlights of Report Card grades from Asian countries that participated in the Global Matrix 3.0. (13 minutes)
Discussant: Prof. John Reilly (Scotland) (16 minutes)
Highlights of Report Card Grades from six African Countries that participated in the Global Matrix 3.0.

Manyanga T, S Aubert, SA Gonzalez, EY Lee, JJ Reilly, MS Tremblay

1HALO, CHEO Research Institute, Ottawa, Ontario, Canada, 2School of Kinesiology and Health Studies, Queen’s University, Kingston, Ontario, Canada, 3Physical Activity for Health Group, University of Strathclyde, Glasgow, Scotland

15987: Global Matrix 3.0 on Physical Activity for Children and Youth: Insights from Report Card Grades from European, African, Latin-American, and Asian Countries (Convenor: Salomé Aubert), South Hall 2B, 8:30 AM - 9:45 AM

Purpose: The purpose of this presentation is to examine and discuss Report Card grades on the Physical Activity of Children and Youth from African countries that participated in the Active Health Kids Global Alliance (AHKGA)'s Global Matrix 3.0. The secondary objective explores possibilities for improving grades and interrogates the utility or effectiveness of applying universal or context-specific benchmarks, when assigning Report Card Grades.

Methods: Report Cards from 49 countries were prepared following harmonized processes orchestrated by the AHKGA. For Global Matrix 3.0, grades were assigned for ten common indicators (Overall Physical Activity, Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviour, Physical Fitness, Family and Peers, School, Community and Environment, and Government Strategies). The aggregation of findings from all 49 countries resulted in the Global Matrix 3.0. Six (Ethiopia, Ghana, Botswana, Nigeria, South Africa and Zimbabwe) African countries participated in the Global Matrix 3.0. We compared and contrasted findings from the six country report cards using qualitative and quantitative analyses of the assigned grades and contextual information provided in each country's Report Card.

Results: Overall, the six African countries had average grades of C or D across nine indicators. All six countries assigned incomplete grades for Physical Fitness. In general, the countries performed 'better' on behavioural indicators (Overall Physical Activity, Active Transportation and Organized Sport and Physical Activity) than supports and influencers (Family and Peers, School, Community and Environment, Government Strategies). Active Transportation (C to A-), School (D- to C) and Government (D- to B) were the only 3 indicators to be assigned grades by all six African countries. Of the possible 60 grades from the African countries, 26.7% were incomplete.

Conclusions: The overall 'better' grades for behavioral indicators for the African countries may not reflect contextual some factors (chores, habitual or household activities) that positively contributed, but could vanish with the rural-urban migration and lifestyle transitions. Accurately accounting for these unique circumstances, may require context-specific benchmarks for assigning grades or may challenge us to develop, pilot, and validate a universal instrument specifically designed to reflect and capture contextual and cultural variations between participating countries and regions.
Highlights of Report Card grades from Latin-American countries that participated in the Global Matrix 3.0

Gonzalez S, S Aubert, EY Lee, T Manyanga, JJ Reilly, MS Tremblay
1HALO, CHEO Research Institute, Ottawa, Ontario, Canada, 2Physical Activity for Health Group, University of Strathclyde, Glasgow, Scotland, 3School of Kinesiology and Health Studies, Queen’s University, Kingston, Ontario, Canada

15987: Global Matrix 3.0 on Physical Activity for Children and Youth: Insights from Report Card Grades from European, African, Latin-American, and Asian Countries (Convenor: Salomé Aubert), South Hall 2B, 8:30 AM - 9:45 AM

Purpose: The purpose of this presentation is twofold. First, to discuss Report Card grades on the Physical Activity of Children and Youth from the Latin American countries involved in the Active Healthy Kids Global Alliance (AHKGA)'s Global Matrix 3.0. And second, to highlight common challenges for improving the grades and the physical activity surveillance in the region.

Methods: Seven Latin-American countries (Brazil, Chile, Colombia, Ecuador, Mexico, Uruguay, and Venezuela) developed Report Cards to summarize the best evidence available for 10 common indicators related to physical activity among children (Overall Physical Activity, Organized Sport and Physical Activity, Active Play, Active Transportation, Sedentary Behaviour, Physical Fitness, Family and Peers, School, Community and Environment, and Government). The development of the report cards followed a harmonized process, with common benchmarks and grading schemes proposed by the AHKGA. Grades and findings from the seven countries were compared and based on these, we identified the main challenges and research gaps for the region.

Results: The average grades for the Latin-American countries in the Global Matrix 3.0 were low, ranging from D (Chile, Ecuador, Uruguay and Venezuela) to C- (Colombia). Overall, the grades for the behavioural indicators as well as the sources of influence indicators were low. Specifically, the Overall Physical Activity ranged from D- to D among the seven countries. Of the possible 70 grades from this group of countries, 27% were incomplete, due to insufficient national data. Only Overall Physical Activity and Active Transportation were graded by all the countries. Active play was the indicator with the greatest proportion of incomplete grades (85%). The greatest variability in grades was observed in Active Transportation (ranging from F in Chile to B in Colombia), Community and Environment (ranging from D- in Venezuela to B in Chile), and Government (ranging from F in Venezuela to B in Colombia).

Conclusion: A very low proportion of Latin-American children are meeting the physical activity guidelines, and sedentary behaviours are highly prevalent in the region. Urgent actions are needed to provide more opportunities to improve the grades and avoid the unintended consequences of economic growth in developing countries.
S5, S.5.50

Highlights of Report Card grades from 12 Asian countries that participated in the Global Matrix 3.0

Lee E, S Aubert, SA Gonzalez, T Manyanga, JJ Reilly, MS Tremblay

1School of Kinesiology and Health Studies, Queen’s University, Kingston, Ontario, Canada, 2HALO, CHEO Research Institute, Ottawa, Ontario, Canada, 3Physical Activity for Health Group, University of Strathclyde, Glasgow, Scotland

15987: Global Matrix 3.0 on Physical Activity for Children and Youth: Insights from Report Card Grades from European, African, Latin-American, and Asian Countries (Convenor: Salomé Aubert), South Hall 2B, 8:30 AM - 9:45 AM

Purpose: 1) To discuss Report Card grades on the Physical Activity of Children and Youth from Asian countries that participated in the Active Healthy Kids Global Alliance (AHKGA)'s Global Matrix 3.0 and 2) to highlight research gaps and needs to improve benchmarks to empower the movement to get kids moving in Asian countries.

Methods: As part of the Global Matrix 3.0, Report Cards grades on behaviours (Overall Physical Activity/Organized Sport and Physical Activity/Active Play/Active Transportation/Sedentary Behaviour/Physical Fitness) and sources of influence (Family and Peers/School/Community and Environment/Government Strategies) were reported among 12 Asian countries (Bangladesh, China, Hong Kong, India, Japan, Lebanon, Nepal, Qatar, South Korea, Taiwan, Thailand, and United Arab Emirates [UAE]). Final grades from each country were collated for quantitative and qualitative analyses by country and among countries.

Results: Of the possible 120 grades from 12 Asian countries, 37 items were not graded due to insufficient data (incompletion rate: 30.8%). Collectively, the average grade of behavioural indicators and sources of influence indicators was C- and C, respectively. By indicator, grades ranged from B-(Active Transportation) to D (Overall Physical Activity) across all countries. By country, the average grade ranged from B- (Japan) to D- (China) across all indicators. Overall prevalence of physical inactivity (<60 min of moderate-to-vigorous physical activity/day) and recreational screen time >2hr/day was 74.1% and 54.7%, respectively, with Bangladesh performing the best in both indicators (58.6% and 15.3%) while South Korea (94.7%) and China (92.9%) performing the worst in physical inactivity and screen time, respectively.

Conclusions: With the world's fastest economic growth and urbanization, children's physical activity opportunities may be in jeopardy in the Asia region. A relatively high grade for Active Transportation is attributable to the countries with high population density and subsequent urban design that maximizes proximity (e.g., Hong Kong, Japan, South Korea). However, unfavourable and persisting patterns of physical inactivity and screen time, in combination with lack of governmental and institutional support, are concerning. Sustainable urban planning that facilitates habitual physical activity while protecting children's right to play in different settings (e.g., school, neighbourhood/community, indoors/outdoors, urban green, nature) should be a priority for the region.
S5, S.5.51

Implementation Science in Nutrition and Physical Activity Large-scale Community-Based Health Interventions – Novel Strategies for Capturing and Monitoring Dissemination

Olfert M, Rachel Wattick, Steve Allender
1West Virginia University, Morgantown, WV, United States

Implementation and scalability (SIG)

Purpose: There are many steps involved in the implementation, monitoring, evaluation, and dissemination of a health intervention in a community. This session will draw upon experts in using novel approaches to program implementation, monitoring, and dissemination to optimize health outcomes.

Rationale: There are many challenges faced in the process of successfully implementing community-based interventions. Engaging stakeholders, encouraging community members to participate, actively monitoring the progress of an intervention, and capturing results of the intervention and disseminating this information are all of equal importance in improving the health of the community.

Objectives: This session will achieve the following aims: 1) Educate attendees on innovative ways to use technology in program implementation. 2) Educate attendees on innovative ways to effectively monitor the progress of an intervention as it occurs. 3) Educate attendees on how to capture data in a meaningful way for stakeholders. 4) Educate attendees on ways to disseminate results of an intervention to community members.

Summary: This symposium will discuss strategies for successful implementation of programs, including identifying need, engaging the community, using innovative strategies for maximum participation and useful data collection, capturing the results of the program, and disseminating program results. Dr. Clare Collins will be speaking on her Just Beat It project, which utilizes information technology to deliver nutrition and healthy lifestyle interventions and facilitate access to effective programs. Dr. Rachel Novotny will be speaking on development of the (Children's Healthy Living (CHL) Center and Network for ongoing Training and Monitoring of the CHL program, which successfully decreased child overweight and obesity in remote underserved minority populations in the pacific region. Rachel Wattick will speak on eB4CAST, a dissemination and implementation tool that evaluates the impact of community programs and captures the data into an easy to read report for researchers and the general public.
Format:
1) Overview by Chair: Dr. Melissa Olfert will provide an overview of dissemination and implementation science as it pertains to community-based research and introduce speakers. (~10 minutes)
2) Dr. Clare Collins will discuss using technology to disseminate nutrition advice. (~15 minutes)
3) Dr. Rachel Novotny will discuss the strategies used to monitor her Children's Healthy Living programs progress and success. (~15 minutes)
4) Rachel Wattick will discuss the use of the EB4CAST framework to capture the results of interventions and place them into reports meant for stakeholders and the general public for dissemination. (~15 minutes)
5) Discussant closing (15-20 minutes)
S5, S.5.51

Just Beat It - Boosting Education And Training with IT to disseminate nutrition interventions.

Collins C, L Kheng Chai, L Ashton, R Haslam, T Burrows, M Rollo

University of Newcastle, Callaghan, New South Wales, Australia

Implementation and scalability (SIG)

Purpose: There is an imbalance between prevalence of diet-related risk factors for chronic disease and access to effective and sustainable nutrition intervention programs. Yet systematic reviews highlight that there is a reduced risk of disease specific and all-cause morbidity and mortality amongst those with better diet quality. One way to overcome some issues relating to access is through information technologies to deliver nutrition and heathy lifestyle interventions and facilitate access to effective programs and nutrition expertise. The challenges and opportunities in translating results from efficacious nutrition interventions to effective programs using technologies will be discussed.

Methods: This presentation will share experiences from the adaptation and translation of results from in-person randomised trials into accessible online programs targeting improved nutrition. Examples include adaptation of: 1) A validated brief diet quality index into a freely available online tool, the Healthy Eating Quiz (HEQ) with personalised feedback; 2) A personalised dietary intervention using online dietary assessment with system-generated assessment and behaviour change techniques; 3) an efficacious face-to-face program for children with obesity into an afterschool care cooking program and 4) an online healthy family lifestyles program that uses a website, tele-dietetics, closed Facebook group and text messages.

Results: There is strong interest from both individuals and organisations in accessing nutrition advice using these technologies into a range of modes, levels of feedback and interaction types. Challenges faced include securing funding, buy-in from relevant organisations and partners, access to software development and technology expertise, validity of data capture, support for maintenance in terms of expertise and costs, issues related to managing intellectual property, partner organisation and participant/patient expectations. Opportunities include innovations in healthcare, potential cost savings, reduced waiting times, and enhanced engagement, impact, and program reach.

Conclusions: Online nutrition programs can incorporate a range of components and are a practical way to target improvements in diet-related health in Australia. Challenges remain in terms of funding required to maintain and update technology-based programs and scalability. Further research is required to evaluate cost-effectiveness relative to current models of health care delivery, while exploring new models of care.
Approaches to Sustainability in the Children’s Healthy Living (CHL) program - CHL Center and Network for ongoing Training and Monitoring

Novotny R, J Butel, MK Fialkowski Revilla, J Davis, M Esquivel, A Yamanaka, T Aflague, RL Guerrero, P Coleman, T Fleming, L Shallcross

1 Human Nutrition, Food and Animal Sciences Dept, College of Tropical Agriculture and Human Resources, Honolulu, United States, 2 University of Guam, TBC, TBC, 3 Northern Marianas College, TBC, TBC, 4 American Samoa Community College, TBC, TBC, 5 University of Alaska at Fairbanks, Fairbanks, United States

16018: Implementation Science in Nutrition and Physical Activity Large-scale Community-Based Health Interventions – Novel Strategies for Capturing and Monitoring Dissemination (Convenor: Melissa Olfert), North Hall, 8:30 AM - 9:45 AM

Implementation and scalability (SIG)


Methods: Through partnering with colleges in the region, and a variety of other institutions and organizations in each jurisdiction, CHL implemented trained key role models in each jurisdiction for intervention research and ongoing prevention and monitoring of child obesity.

Results: The CHL trial succeeded in decreasing community level of child overweight and obesity by 4%. The CHL program is sustained by the establishment of a Center and Network with data management capacity, and ongoing training through an online CHL summer institute and ongoing training in and monitoring of child BMI. Data analysis and reporting of the CHL intervention continues, to better understand specific combinations of intervention activities and settings that yielded the most positive change.

Conclusion: Development of sustainable infrastructure for sustaining interventions is key for meaningful community change.
Purpose: There are many steps involved in the implementation, evaluation, and dissemination of an intervention. It is difficult for the results of community-based programming to be captured and shared with the community. eB4CAST is a community-based research study that focuses on assessing the impact of evidence-based programming on the implementation and dissemination of interventions, developed from other dissemination and implementation (D&I) tools. This project will be presented as part of an Implementation symposium to show researchers a tool to evaluate their evidence-based interventions and disseminate results to their communities.

Methods: eB4CAST captures and transforms research findings into a dissemination report that shows program need and impact. The Capture step examines the impact a project has on individuals, program leaders, and communities in real-world environments by looking at the entire social setting. The Assemble step examines data regarding the function and effectiveness of the programming, identifies unexpected setbacks, and identifies challenges in implementation to make adjustments in future programming. The Sustainability step accounts for facility and environmental factors that affect the ability of leaders and participants to adhere to the program curriculum. The Timelessness step gathers direct feedback about participant's feelings regarding program longevity and impact to help researchers understand the future forecast of a community's capability and desire to continue the project.

Results: This information is used to generate reports presented as infographics to create a visual story of the effects of community programs. This framework has been used in two community-based programs to date. In a five-state childhood obesity prevention intervention, eB4CAST reports were made for each of the five states and sent to 14 communities, with reviews indicating they were beneficial to overcome barriers in D&I. In a college campus intervention to increase healthy lifestyles of students, data was collected on 66 colleges about the health of their campus and generated into reports, with positive feedback received on the reports.

Conclusions: The eB4CAST framework provides a systematic method to capture justification of program need and impact of community-based research that can be modified to fit diverse public health interventions providing a necessary D & I tool.
Cross-national trends in energy-related behaviours among adolescents from an international perspective – Findings from the Health Behaviour in School-aged Children (HBSC) study

Bucksch J, Ronald J Iannotti
1Heidelberg University of Education, Heidelberg, Germany

Purpose:
There is lack of cross-national comparative data on energy-related behaviours among adolescents. The international Health Behaviour in School-aged Children (HBSC) study is conducted by an international alliance of researchers from 48 countries across Europe and North America. With its standardized methodological approach and nationally representative samples for 11, 13 and 15 year-olds across a diverse sample of countries, HBSC provides unique and important insights into secular trends in adolescent health and health behaviours over the last 15+ years.

Rationale objectives:
Since the early 1980s, HBSC has collected data on a range of self-reported energy-related behaviours in four year survey cycles. Since 2002, this includes standardized assessments of moderate-to-vigorous physical activity (MVPA), screen time, sweets and softdrink consumption, sleeping difficulties, and active commuting to school with a sample size of approximately half a million adolescents. This unique trend data covers different energy-related behaviours that are important to inform the scientific and policy community.

Objectives:
· To describe recent cross-national trends in energy-related behaviours
· To describe patterns of behaviour by gender, age and geography
· To improve visibility and use of HBSC findings
· To share experiences of researchers from different countries

Summary:
The session will start with a short introduction to the aims of HBSC and the standardized methodological approach. Three presentations followed by questions from the audience will show secular trends in different energy-related behaviours. The number of included countries and survey waves vary according to the availability of data with comparable assessments. The primary focus of the presentations is on identifying change in prevalence of behaviours over time. Presentations will include: trends in the prevalence of active commuting to school as well as obesity-related behaviours as (M)VPA, sweets/soft drink/vegetable and fruit consumption by gender and age; trends in sleeping difficulties and its association with PA and screen time. The discussant will summarize important findings, indicate implications/limitations, and facilitate further discussion between the audience and presenters.
Format:
The order of presenters and their tasks are given in the following:

Jens Bucksch, Germany: introducing into HBSC study and chairing (5 Minutes)
Ellen Haug, Norway: presenting on trends in active travel behaviour (15)
Jo Inchley, Scotland; Zdenek Hamrik, Czech Republic: presenting on trends in obesity-related behaviours by age and gender (20)
Bart De Clercq; Benedicte Deforche, Belgium: presenting on trends in sleeping difficulties and its association with PA and screen time (15)
Ronald J. Iannotti, USA, Discussant (20)
S5, S.5.52

Cross-national trends in active travel to school among adolescents – Findings from the Health Behaviour in School-aged Children (HBSC) study

Haug E, D Sigmundová, Z Hamrik, J Bucksch, C Roberts, F Mathisen, H Nalecz, J Inchley

1University of Bergen, Bergen, Norway, 2Palacký University, Olomouc, Czech Republic, 3Heidelberg University of Education, Heidelberg, Germany, 4Welsh Government, Cardiff, Great Britain, 5The Jozef Pilsudski University of Physical Education, Warsaw, Poland, 6University of St Andrews, St Andrews, Great Britain

Objective: Active transportation has been highlighted as a priority area within the Physical activity strategy for the WHO European Region 2016, 2025. Walking or cycling to and from school represents a sustainable form of transportation which has the potential to substantially contribute to daily levels of physical activity and be beneficial for young people's health and wellbeing. This study examines trends (2006, 2010, 2014) in pupil's active travel to school across four European countries.

Methods: Nationally representative samples from The Health Behaviour in School-aged Children Study (HBSC) included 54918 pupils (49% boys) aged 11 years (n=17747), 13 years (n=18623) and 15 years (n=18548), from the Czech Republic, Norway, Scotland and Wales. Active travel was assessed with two items: "On a typical day is the main part of your journey to/from school made by... ?" Country-specific time trends for the active travel options walking or bicycling (both ways) was assessed with logistic regression, while differences in time trends by family affluence (FAS), age and gender were evaluated with chi square test.

Results: The prevalence of pupils active commuting varied considerable across countries and was highest in the Czech Republic in 2006 (71%) and in Norway in 2014 (62%). For all countries combined there was an overall linear decrease in active commuting for both genders (p<0.001). However, cross-national differences were observed with less clear patterns in the specific countries and with no change from 2006-2014 in Scotland and among Norwegian girls. There was a tendency that active commuting was most common among the youngest pupils and those with low family affluence for all countries combined, and no decrease from 2006-2014 was observed for girls aged 11- and 15 years with low family affluence.

Conclusions: Large cross-national differences in active commuting to school and differential time trends highlight the need to identify structural, cultural and social factors that can account for our findings. These factors should get public attention and should inform intervention planning as active travel to school, being a sustainable mode of transportation, is likely to be beneficial for young people's health and will contribute to a healthier planet.
Cross-national trends in obesity-related behaviours among adolescents in Europe.

Hamrik Z, J Inchley, J Bucksch, D Currie, C Kelly, T Torsheim

1 Palacky University Olomouc, Faculty of Physical Culture, Olomouc, Czech Republic, 2 University of St Andrews, School of Medicine, St Andrews, Great Britain, 3 Heidelberg University of Education, Department of Natural and Human Sciences Prevention and Health Promotion, Heidelberg, Germany, 4 National University of Ireland Galway, School of Health Sciences, Galway, Ireland, 5 University of Bergen, Faculty of Psychology, Bergen, Norway

Purpose: Childhood obesity is a major public health challenge. Obesity increases the risk of chronic diseases and is associated with sleep problems, poorer quality of life, as well as emotional and behavioural problems. Eating behaviours and physical (in)activity are major contributors to overweight and obesity. This study presents trends in eating behaviours and physical activity among European adolescents between 2002 and 2014.

Methods: Data from four survey cycles of the Health Behaviour in School-aged Children (HBSC) study across 36 countries were analysed. HBSC is an international school-based survey of 11, 13 and 15 year olds, conducted using standardised methodology. Adolescents self-reported eating behaviours (consumption of sweets, soft drinks, fruit, vegetables) and physical activity (MVPA, VPA). Trends were estimated using logit regression models adjusted for clustering. Separate models were fitted for each gender and age group within each country to estimate the linear trend in prevalence (expressed as relative risk and 95%-CI).

Results: Overall, daily consumption of fruit and vegetables increased slightly between 2002 and 2014 but overall prevalence remained low (fruit: 38%, vegetables: 38%). Daily consumption of sugary soft drinks and sweets decreased significantly but remained high (soft drinks: 19%, sweets: 26%). Large cross-national differences were observed, for example, daily sweet consumption in 2014 ranged from 56% among girls in Armenia to 2% among girls in Finland and Iceland. MVPA remained relatively stable over time in most countries but levels were low and declined with age during the adolescent years. In contrast, participation in leisure time VPA was relatively high and levels remained stable after 2002 with a slight positive trend among girls.

Conclusions: Some improvements have been observed in eating behaviours over time, but daily consumption of sweets and soft drinks remained high in many countries highlighting the need for further action to reduce adolescent's sugar intake. The lack of improvements in MVPA and stabilisation of VPA over time in most countries suggest that public health measures to increase physical activity have had only limited success. Further efforts are required to improve healthy lifestyles and minimise the risk of obesity and associated health consequences.
Trends in sleeping difficulties among adolescents: are these associated with physical inactivity and excessive screen time?


1Ghent University, Ghent, Belgium, 2University of St Andrews, St Andrews, Great Britain, 3University of Lisbon, Lisbon, Portugal, 4University of Torino, Torino, Italy, 5Riga Stradins University, Riga, Latvia, 6University of Jyväskylä, Jyväskylä, Finland

Purpose: Sleep has been largely neglected in the past as an important health behavior. The 24-hour approach emphasizes the need to better understand how waking behaviors such as physical activity and sedentary behavior are associated with sleep, as it is hypothesized that these behaviors are interrelated. First, we aimed to describe the prevalence of sleep-onset difficulties, physical inactivity and excessive screen time between 2002 and 2014. The second aim was to examine the associations of physical inactivity and screen time with sleep-onset difficulties and whether these associations have changed over time.

Methods: We used data from the last four survey waves of the Health Behavior of School-aged Children (HBSC) study (2002: N=155300, 2006: N=167656, 2010: N=172729, 2014: N=175399). Questionnaires were completed in schools by adolescents aged 11, 13 and 15 years from 33 countries. Sleep-onset difficulties, moderate-to-vigorous physical activity (MVPA) and sedentary behavior were assessed using validated questions and dichotomized to conform with the current international health guidelines. Multilevel logistic regression analyses were conducted to explore associations between frequency of sleeping difficulties (i.e. about every day/more than once a week), excessive screen time exposure (i.e. >2h daily) and being physically inactive (i.e. < 60 min of MVPA daily).

Results: Findings indicate an increase in the prevalence of sleep-onset difficulties and in excessive screen time exposure, and a small but significant increase in MVPA. Additionally, adolescents exceeding 2h daily screen time had 20% (95% CI=1.178-1.225) higher odds of reporting sleep-onset difficulties, while no association was found for MVPA. The strength of the association between screen time and sleep-onset difficulties increased over time.

Conclusions: This pioneering study presents an international overview of secular trends in sleep-onset difficulties in a large international sample of adolescents, highlighting an emerging health problem which has often been neglected in past health behavior studies. The increased association between screen time and sleep difficulties may reflect a change in type of screen time use (i.e., increased use of easily accessible screens such as smartphones and tablets). Findings suggest that effective strategies to reduce screen time are key to reversing the detrimental trend in sleep-onset difficulties among adolescents.
Considerations for designing, conducting and evaluating implementation interventions that aim to improve healthcare professional’s provision of nutrition and physical activity support for pregnant women

Hollis J, Nicola Heslehurst
1Hunter New England Population Health, Wallsend, NSW, Australia | Priority Research Centre in Health Behaviour, University of Newcastle, Newcastle, NSW, Australia | Hunter Medical Research Institute, Newcastle, NSW, Australia

Implementation and scalability (SIG)

Purpose: There is a substantial body of evidence demonstrating the importance of improving women's nutrition and physical activity behaviours during pregnancy. The challenge is identifying effective and innovative approaches to sustain evidenced-based pregnancy programs, policies, and clinical practice guidelines in the real world to make a population level impact on the health and healthcare of women and their children.

Rationale: This symposium will present research on implementation interventions that aim to change healthcare professional's practices relating to nutrition, physical activity and/or weight gain in pregnancy. Undertaking research to inform the design, adoption (i.e. intention or action to employ evidenced-based practice) and evaluation of these interventions may help to facilitate success and further translation.

Objectives:
1) To describe processes undertaken to develop and refine implementation interventions in pregnancy,
2) To outline implementation strategies used to facilitate adoption and sustainability,
3) To report the implementation outcomes of the implementation interventions,
4) Reflect on the experiences and lessons learnt from pregnancy implementation research.

Summary: This symposium will outline implementation concepts, principles and research that can be considered when designing, conducting, and evaluating pregnancy implementation interventions. The session will use examples of research from Australia (Planning for antenatal service support initiatives), the UK (Healthy Conversation Skills training programme, partnership with Health Education England, and the SPRING RCT) and Canada (ENRICH and Alberta Health Service partnership). Presentations will describe the process undertaken to design and refine the interventions, including assessing need; developing stakeholder interrelationships (e.g. frontline clinicians, public health units, government, and policy makers), patient/public involvement and engagement; use of implementation theories and frameworks; and identification of determinants (i.e. barriers and facilitators) to implementation. Two speakers from the UK and Canada will describe the implementation strategies (e.g. training, resources, prompts/reminders, executive support, and audit/feedback) used to overcome local barriers to care.
provision, facilitate adoption, and maximise sustainability post study completion. The research findings will be reported including service, patient and implementation outcomes. Speakers will describe rollout of the program and translation of their research to clinical practice or policy and reflect on contextual factors that facilitated successful implementation.

**Format:**
- Introduction by Chair (Dr Jenna Hollis) - 10 minutes
- 1st speaker: Dr Jenna Hollis - 15 minutes
- 2nd speaker: Dr Wendy Lawrence - 15 minutes, including interactive sessions and demonstration of Healthy Conversation Skills
- 3rd speaker: Professor Rhonda Bell - 15 minutes
- Discussion moderated by Discussant (Dr Nicola Heslehurst) - 20 minutes
Planning for antenatal service support initiatives: clinician’s provision of and barriers to providing guideline recommended care for gestational weight gain.

Hollis J, J Daly, B Tully, J Wiggers, M Kingsland

1Hunter New England Population Health, Wallsend, NSW, Australia, 2Priority Research Centre in Health Behaviour, University of Newcastle, Newcastle, NSW, Australia, 3Hunter Medical Research Institute, Newcastle, NSW, Australia, 4School of Medicine and Public Health, University of Newcastle, Newcastle, NSW, Australia, 5Hunter New England Population Health, Wallsend, NSW, Australia | Priority Research Centre in Health Behaviour, University of Newcastle, Newcastle, NSW, Australia | Hunter Medical Research Institute, Newcastle, NSW, Australia

16015: Considerations for designing, conducting and evaluating implementation interventions that aim to improve healthcare professional’s provision of nutrition and physical activity support for pregnant women (Convenor: Jenna Hollis), Terrace 2B, 8:30 AM - 9:45 AM

Implementation and scalability (SIG)

Purpose: Many international antenatal guidelines recommend that at the initial and subsequent antenatal visits all pregnant women are: weighed, provided with a gestational weight gain (GWG) target, given advice on nutrition and physical activity, and offered referrals for further support. However, the intended benefits of these guidelines are unlikely to be achieved if they are not routinely implemented in antenatal care. This study aimed to assess current levels of, and barriers and facilitators to, guideline recommended care for GWG.

Methods: A cross-sectional survey was conducted with 156 antenatal clinicians (midwives and obstetricians) working in public antenatal services within the Greater Newcastle Sector (NSW, Australia). Clinicians were recruited through email, and attendance at antenatal ward meetings and in-services. Data were collected on the provision of, and barriers and facilitators to (based on the Theoretical Domains Framework), guideline recommended care for GWG. Data were summarised using descriptive statistics (N, %).

Results: 123 clinicians completed the survey (79% response rate). Half of the clinicians (55%) reported that they always measured weight and height during the initial visit, and 8% reported that they measured weight for all women at subsequent visits. Only 13% and 20% of clinicians reported that they provided all women with a GWG target and discussed healthy eating and physical activity, respectively. Most clinicians knew that there is a strong rationale for all women to be advised on appropriate GWG (82%; knowledge). However, few felt that they had received adequate training in GWG (23%; skills). Many identified culturally appropriate care as a barrier; few reported feeling competent in having 'sensitive conversations' (45%; skills) and were aware of culturally appropriate referrals (34%; environmental context and resources). Preferred strategies were: clear referral pathways (66%), pamphlets (66%), GWG trajectory charts (59%), face-to-face training (51%), and culturally appropriate resources (51%).

Conclusions: Although guideline recommended care for GWG is highly acceptable to antenatal clinicians, provision of such care is suboptimal and inconsistently provided. Skills and environmental context and resources are priority barriers that need to be addressed through practice-change strategies to best meet the needs of local maternity clinicians, particularly for culturally appropriate care provision.
How Healthy Conversation Skills supports change at all levels – organisation, practitioner and service-user

Lawrence W
MRC LEU, University of Southampton, Southampton, United Kingdom

Purpose: Healthy Conversation Skills (HCS) is a training programme developed by a multi-disciplinary research team in Southampton to support change, including dietary and physical activity behaviours in pregnancy. It has been rolled-out widely with projects in the UK, New Zealand, Australia, China, South Africa and Canada. This presentation will cover the development of HCS, and the implementation process and outcomes in different contexts.

Methods: A range of stakeholders were involved in HCS development, implementation and evaluation, including workforce education leads at Health Education England (HEE), health service commissioners and providers, and front-line practitioners. An implementation tool kit, training courses of different lengths, online and paper resources, and tools for practising and reflecting on skills were developed. A Train-the-Trainer programme has been rolled-out, and more recently Super Trainer training piloted to build capacity to sustain the programme to meet the UK Government's Making Every Contact Count agenda. Mixed methods were used to collect data on reach, feasibility, acceptability and effectiveness including pre- (T1) and post-training (T2) measures.

Results: Post-training Health Education England data (n=1,005 trainees) showed that confidence, importance and usefulness of having healthy conversations all increased (p<0.01), and there was a change in staff practice from Telling/Suggesting (T1=2240; T2=330) to asking Open Discovery Questions (T1=875; T2=3249) (p<0.01). Interviews with a sub-sample of participants (n=30) from the Southampton PRegnancy Intervention for the Next Generation (SPRING) RCT showed that women who had behaviour change conversations with midwives trained in HCS (n=20) were satisfied with the approach and all set dietary and/or physical activity goals, compared with the control group (n=10) that set no goals. Early process data indicate that the intervention is delivered per protocol, with midwives fully adopting the HCS approach and finding it feasible, appropriate and acceptable (to them and the participants). Midwives feel it could be incorporated into standard care.

Conclusion: Delegates will be introduced to the HCS philosophy and key elements within the training that support the engagement and implementation activities. Its relevance to supporting optimum health in pregnancy and the early years will be explored. A demonstration of the key skills will be incorporated into the session.
Designing, implementing and scaling up tools for health care providers to support healthy pregnancy weight gain in women in Alberta, Canada

Bell R, M Jarman, J Graham, T Miller

1Department of Agriculture, Food and Nutrition Science, University of Alberta, Edmonton, Alberta, Canada, 2Reproductive Health, Healthy Children and Families, Alberta Health Services, Alberta, Canada

Purpose: There are few tangible strategies for health care providers (HCPs) to support women's healthy weight gain, nutrition, and physical activity in pregnancy. The ENRICH project partnered with Alberta Health Services (AHS) to explore facilitators and barriers to healthy gestational weight gain (GWG) from the viewpoints of HCPs and women. Sustainable strategies to support HCPs and pregnant women were developed, scaled up, implemented, and evaluated.

Methods: Surveys and interviews were completed with HCPs including Obstetricians, Nurses, Midwives, and Family Practitioners, to explore their practices with pregnant women with respect to weight-related behaviours. Postpartum women took part in focus groups to share their experiences of interactions with HCPs about GWG and related behaviours. The use of a counselling technique, Healthy Conversation Skills (HCS), by HCPs to support healthy GWG and related behaviours was trialled and evaluated using mixed methods in an RCT.

Results: Few (21% of 508) HCPs reported that they discussed individualized GWG, and related behaviours with pregnant women. Interviews highlighted that barriers included appointment length and perceived skills in nutrition, physical activity and weight-related counselling. Women (n=26) highlighted they wanted discussions with their HCP about weight and related behaviours in pregnancy as reputable sources of information about these were lacking. Pregnant women (n=35) who interacted with HCPs trained in HCS felt better supported, improved dietary and reduced sedentary behaviours compared with those (n=35) who saw a HCP not trained in HCS (p=0.001 and p=0.007, respectively), indicating that upskilling HCPs in conversation techniques may be an effective strategy. Integrated knowledge translation of these results with AHS partners resulted in: an online learning module for HCPs focused on relevant, targeted information and on developing communication skills around weight-related behaviours in pregnancy; and a digital media campaign aimed at women to direct them to provincial evidence-based resources focused on supporting weight-related behaviours in pregnancy. The evaluation of the implementation of these is ongoing.

Conclusion: This presentation will reflect on our experience with stakeholder partnerships to develop and implement sustainable approaches to supporting weight-related healthy behaviours in pregnancy. We will share the challenges, facilitators and next steps in this ongoing process.
Prehabilitation in cancer: developing sustainable interventions

Saxton J, Anderson A

Northumbria University, Newcastle Upon Tyne, Great Britain

Cancer prevention and management (SIG)

Purpose: Evidence suggests that fitter and well nourished patients tend to have better surgical outcomes. Increasingly healthcare professionals and the research community are exploring the potential for optimising patients for surgery through multimodal prehabilitation in order enhance their recovery. This symposium will discuss the opportunities and challenges of working with community sector partners to develop and implement sustainable interventions within existing treatment pathways. Methods for enhancing patient engagement and long-term behaviour change will also be addressed.

Rationale: Enhancing understanding of the challenges of implementing prehabilitation programmes across secondary care and community organisations, and how to optimise patient engagement, has the potential to bring meaningful change in clinical practice and lasting improvement in patient’s health and quality of life.

Objectives:
We aim to:
Explore the pros, cons and challenges of varying approaches to physical activity, exercise and nutritional interventions in the pre-operative setting.
Discuss opportunities for embedding health behaviour change interventions in clinical pathways and linking with community organisations.
Discuss priority setting for future research to optimise health behaviours from the point of diagnosis of cancer for the longer term.

Summary:
Two papers will be presented. One will describe theoretically informed physical activity interventions that partner with third sector and community organisations to enable implementable and sustainable programmes. The second paper will provide an overview of some important questions for exercise prehabilitation studies, reflecting on experiences from a large-scale UK-based multi-centre randomised controlled trial, which is investigating the effects of pre- and post-operative hospital-supervised and home-based exercise (versus standard care) on post-operative morbidity and longer-term quality of life in colorectal cancer patients. A facilitated discussion will follow to explore experiences of delivering interventions and supporting behaviour change at this crucial time in a patient’s treatment pathway.

Format:
Anna Roberts, will chair the symposium. Two presentations will follow from Chloe Grimmett, and John Saxton. Our discussant Annie Anderson will then briefly describe her experiences from a recent multimodal prehabilitation intervention targeting physical activity, smoking, alcohol diet and weight management and lead a facilitated audience discussion. The audience will be encouraged to debate the optimal setting and methods for supporting behaviour change during this period in the treatment pathway and prioritise key questions for future research.
The Wessex Fit-4-Cancer Surgery Trial – physical and psychosocial prehabilitation in cancer patients

Grimmett C, S Jack, M West, A Bates, J Varkonyi-Sepp, S Leggett, M Grocott

1School of Health Sciences, Southampton, Great Britain, 2Department of Critical Care Research, Southampton, Great Britain, 3Department of Surgery, Southampton, Great Britain, 4NIHR Southampton Biomedical Research Centre, Southampton, Great Britain

15964: Prehabilitation in cancer: developing sustainable interventions (Convenor: Anna Roberts), Club A, 8:30 AM - 9:45 AM

Purpose: Fitter patients have better surgical outcomes. Poor physical fitness has been associated with increased length of hospital stay, increased morbidity and mortality in many patient cohorts undergoing major cancer surgery. Chemotherapy and radiotherapy have detrimental effects on physical fitness, which may in turn have a detrimental effect on the patients' ability to withstand surgery. Research also suggests psychological factors including depression and low self-efficacy (confidence to self-manage) prior to surgery predict poorer recovery of health-related quality of life (QoL) in the years following surgery. Intervening immediately after diagnosis by providing both physical and psychosocial prehabilitation may therefore improve patient outcomes.

Methods: The Wessex Fit for Surgery Study (WesFit) is a multicentre four-armed pragmatic randomised controlled trial, target sample N=300 adults undergoing elective major intra-cavity cancer. WesFit will investigate the impact of exercise and/or psychological prehabilitation on post-surgical outcomes including length of hospital stay, disability adjusted survival, physical activity behaviour and QoL with follow-up immediately prior to surgery, 3, 6 and 12 months post-surgery. Working in collaboration with the Wessex Cancer Alliance and supported by National Health Service England Transformation Funding, this unique funding model means WesFit is designed with the rigour of a randomised controlled trial but with the nimbleness of a clinical service evaluation. As such the trial is designed to fit with current clinical pathways. With instrumental patient engagement informing its design the trial offers personalised and patient centred care through bespoke training programmes delivered by personal trainers with expertise in Health Conversation Skills in order to support long-term engagement in physical activity. WesFit has partnered with local cancer charity organisations and leisure providers to deliver the interventions in order to assess the potential for large scale implementation.

Results: Lessons learnt from the development and delivery of this innovative trial will be presented, as well as data from our preliminary process evaluation including interviews with participants and individuals involved in the delivery of WesFit.

Conclusion: Presenting one of very few trials that have embedded behavioural science within a prehabilitation programme we will discuss the challenges faced developing this scalable intervention as well as opportunities for service implementation.
Outdoor physical activity in the early years across the socioecological framework

McCrorie P, Cardon G

1MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, Glasgow, Great Britain

Rationale: Physical activity (PA) is associated with positive physical and psychological outcomes during the developmental stages of early childhood (=5 years). There is also a recognition of the outdoor environment as a setting where PA can be experienced through play. This however sits against a backdrop of risk-averse cultures and policy frameworks, making it difficult to intervene. To maximise change, we need:
- to better understand the barriers and facilitators within families
- to know how to modify our environment to attract young children and families
- to drive change within the wider policy framework.

Purpose: We will showcase the important international work being conducted to reverse the downward trend of outdoor PA in the early childhood. The innovation is our systems-based approach, encouraging thinking and action across multiple interdependent levels of the socio-ecological framework (SEF): children and families, the built/natural environment, and policy.

Objectives:
1. To describe the importance of outdoor PA and active play in the early years.
2. To identify the importance of thinking from a systems-based approach in early childhood.
3. To learn how research evidence can be translated and used to influence policy
4. To maximise the opportunities to think critically about this field of research.

Summary: Traditionally, we work in individual silos with little population impact. A more profitable approach is to place our research within a wider complex systems framework. Scott Duncan (New Zealand) will present work on the lower levels of the SEF; specifically the individual and family levels. Moving further upstream, Fredrika Martensson (Sweden) will then present her work creating a tool to evaluate outdoor space for play. Rachel Cowper (Scotland) will discuss a piece of policy work demonstrating the important process from evidence-policy-practice. Finally, Greet Cardon (Belgium) will engage attendees in a thought-provoking discussion.

Format: 5 minutes - Welcome and Introduction (chair: Dr Paul McCrorie)
3 x (15 minutes + 1 min changeover), speaker presentations 22 minutes, discussion
1st presentation: Play perceptions and practices in New Zealand 2015-2018: The State of Play Surveys, Associate Professor Scott Duncan, Auckland University of Technology
2nd presentation: Outdoor Play Environment Categories (OPEC) - a landscape configuration with potential for play - Associate Professor Fredrika Martensson, Swedish University of Agricultural Sciences
3rd presentation: A policy-level initiative to promote outdoor play and learning in Scotland, Rachel Cowper, Inspiring Scotland
Discussant, Professor Greet Cardon, Faculty of Medicine and Health Sciences, University of Ghent
Play perceptions and practices in New Zealand 2015-2018: The State of Play Surveys

Duncan S, C Jelleyman, J McPhee, M Brussoni

School of Sport and Recreation, Auckland University of Technology, Auckland, New Zealand, School of Population and Public Health, The University of British Columbia, Vancouver, Canada

Purpose
New Zealand (NZ), like many countries, is undergoing rapid changes in the way children are raised. Many believe that children are becoming increasingly sedentary, with less adventure and more limited play opportunities than their parents experienced when they were younger. The aim of this study was to compare parental perceptions of children's play and play-related activities using two cross-sectional surveys conducted in 2015 and 2018.

Methods
The 2015 and 2018 State of Play Surveys collected data from 4,000 parents or caregivers aged 18+ years randomly selected from one of NZ's largest research panels. Email invitations were sent to active panel members (return rate approximately 20% for each survey) with at least one dependent child younger than 18 years. Participants completed a web-based survey using a typical point-and-click interface. While some questions were developed specifically for these surveys, others were taken from existing scales relating to play practices and parental tolerance of risk.

Results
Results from the 2018 survey indicate that most parents continue to recognise the potential developmental benefits of risky/unstructured play, such as climbing trees, using repurposed objects, engaging in rough-and-tumble play, and using adult tools. One notable difference between surveys was that the 2018 participants believed children should be playing with loose parts and using adult tools at a younger age when compared to the 2015 participants. However, it is also evident that the majority of children do not regularly participate in a range of unstructured play activities. In both the 2015 and 2018 surveys, the greatest influence on children's participation in unstructured play and exploration was the degree of parental risk tolerance.

Conclusion
While there is some evidence that parents have become more accepting of managed risk and less structure certain aspects of play, NZ children's participation in risky, unstructured play has remained relatively low between 2015 and 2018. We believe that these results will help us to determine the best approach for generating widespread improvements in children's play opportunities.
Outdoor Play Environment Categories (OPEC) - a landscape configuration with potential for play

Martensson F

Department of Work science, Business economics and Environmental psychology, Swedish University of Agricultural Sciences (SLU), Alnarp, Sweden

15694: Outdoor physical activity in the early years across the socioecological framework (Convenor: Paul McCrorie), Club B, 8:30 AM - 9:45 AM

Policies and environments (SIG)

Purpose: Planning departments need to know what types of ground are suitable for children's play and how play environments can be designed and furnished to be made more useful. The presentation offers an investigation into the empirical and conceptual underpinnings of an evaluation tool for creating health promoting outdoor settings for children: The Outdoor Play Environment Categories (OPEC). The tool was developed to be used by researchers, practitioners and planners when evaluating environments and selecting land with high play value, or refurbishing outdoor facilities for children.

Methods: The OPEC tool was developed using results from a range of studies including video-recordings of outdoor stay in Swedish preschools for children 1-5 years, as well as cross-correlational comparisons of outcomes on sleep, attention and physical activity in Swedish and US children having access to different types of outdoor environments.

Results: The overall landscape configuration should offer flow, be spacious, green, and varied. The OPEC tool consists of three environmental categories: (1) the total size of the outdoor area; (2) the proportion of surfaces with trees, shrubbery, or hilly terrain; and (3) the integration between vegetation, open areas, and play areas.

Conclusions: The OPEC tool evaluates the physical attributes contributing to physically active play among children in the outdoor environment of pre-school settings. Its applicability across contexts, including geographical zone and social factors as attitudes to children’s play and nature, will be discussed.
A policy-level initiative to promote outdoor play and learning in Scotland

Cowper R

1Inspiring Scotland, Edinburgh, Great Britain

15694: Outdoor physical activity in the early years across the socioecological framework (Convenor: Paul McCrorie), Club B, 8:30 AM - 9:45 AM

Purpose
The non-profit organisation, Inspiring Scotland, promotes and delivers outdoor play for children and works in partnership with charities, local authorities and the Scottish Government. The aim of this presentation is to describe the processes, content and importance of a high-level position statement for promoting outdoor play and learning.

Methods
In 2018, a round table discussion and a series of workshops were developed. These were split into four phases: i) Round table discussion with 14 officials invested in child health and well-being (February 2018); ii) Creation of 'Scotland's Outdoor Play and Learning Coalition', bringing together leaders in government, health, education, academia, and the environment (June 2018); iii) Production of a 'Position Statement', drawing on the input and expertise of the coalition group, to formalise commitments that can be used to support cross-sector action and collaboration/partnership (July-September 2018); iv) Launch of the Position Statement (October 2018).

Results
50 people and organisations became active members of the coalition and signed a national pledge on outdoor play and learning. The position statement included 5 key commitments: 1) widening access to high quality, diverse greenspaces and natural environments; 2) increasing communal and publicly-managed spaces for play and learning outdoors; 3) Enhancing and enriching accessible urban greenspace and built environments to be inviting and play-friendly; 4) empowering every adult involved in the lives of children with the confidence, enthusiasm, and skills to support play and learning outdoors; 5) Generating and sharing knowledge and evidence-based research to promote better understanding of the benefits of playing and learning outdoors.

Conclusion
Producing the position statement was important to drive multi-sector action by integrating scientific evidence, expert opinion, and policy translation from all relevant organisations involved in outdoor play and learning. This work contributed to challenging the prevailing risk averse approach within the wider outdoor policy framework. This is further evidenced by the significant investment of the Scottish Government in outdoor nursery provision in eight local authorities. This work must be taken forward to maximise momentum and begin the cultural shift required to see significant change in health and well-being across the early years and beyond.
S5, S.5.56

Food Insecurity, Socio-Demographic Characteristics and Weight-Related Outcomes: A Multiple Country Collaboration from Members of the ISBNPA Society Mentorship Program

Fulkerson J,
University of Minnesota, Minneapolis, MN, United States

Socio-economic inequalities (SIG)

Purpose: This symposium will describe associations between food insecurity, sociodemographic characteristics and weight-related outcomes, compare and contrast findings across three studies from three different countries (USA, Finland, Australia) and discuss social and environmental contextual differences across countries. Findings will be discussed to further understand important country-specific contextual factors associated with poverty and weight in an attempt to facilitate cross-country collaborations.

Rationale: Obesity is a global health problem and socioeconomic disparities are found world-wide. Yet, there are important contextual differences across countries that may influence associations between socioeconomic disadvantage and weight-related outcomes that are often not discussed, limiting cross-country collaborations to geographically-similar regions. To facilitate global collaborations, particularly among the next generation of behavioral scientists, three members of the society's mentorship program will present research findings and participate in discussion of the social environments and policies associated with poverty that may influence weight-related outcomes. The three presenters are mentees at different career stages (i.e., one American PhD student beginning the dissertation phase, one Finnish PhD student completing her dissertation, and one Australian early career researcher). Objectives:

- Describe associations between food insecurity, sociodemographic characteristics and weight-related outcomes in three studies from three different countries (USA, Finland, Australia).
- Compare and contrast findings across studies to describe how country-specific social and environmental contextual differences influence how poverty and weight are associated.
- Discuss how a greater understanding of cross-country differences can facilitate collaborations among the next generation of behavioral scientists.

Summary: In this symposium, three mentees from the society's mentorship program will present research findings of associations between food insecurity, sociodemographic characteristics and weight-related outcomes from three geographically-diverse countries. Their mentor will facilitate a discussion of country-specific sociodemographic contextual factors that influence these associations and the future of collaborations among the next generation of behavioral scientists. Format: 1) PhD candidate, Christie Martin (University of Minnesota, USA) will present findings from the Type 2 Diabetes Prevention in Families study; 2) PhD candidate, Elina Järvelä-Reijonen (University of Eastern Finland, Kuopio, Finland) will present findings from the StopDiabetes study; 3) Dr. Holly Harris (University of Queensland, Australia) will present findings from the Mums and Dads (MAD) for Mealtime study; 4) Dr. Jayne Fulkerson (University of Minnesota, USA) will chair the session and be the discussant who will facilitate discussion comparing and contrasting the presented research and identifying future research needs.
S5, S.5.56

Associations Between Food Insecurity and Sociodemographic Characteristics and Weight-Related Outcomes in a Sample of Parents with Type 2 Diabetes or a History of Gestational Diabetes

Martin C, B Gregorich, M Sunni, J Fulkerson

1University of Minnesota, Minneapolis, MN, United States

Purpose: Very little is known about food insecurity among adults with type 2 diabetes or a history of gestational diabetes. The purpose of this study was to determine if food insecurity is associated with weight-related outcomes and demographic characteristics in this population in order to inform future behavior change research and public health interventions.

Methods: Data were collected from a cross-sectional study conducted at the Minnesota State Fair (an annual agricultural and recreational gathering) that aimed to gather a variety of data to inform a future family diabetes prevention trial. Participants included 74 female and 31 male parents with either type 2 diabetes (n=44; 41%), a history of gestational diabetes (n=57; 54%), or both (n=5; 5%). The average age was 45.2±7.0 years and the average body mass index (BMI) was 32.6±7.6; and 24 participants (23%) described themselves as ethnically- and racially-diverse or non-white. The study measured household food insecurity status ('high or marginal food security', 'low food security/very low food security'); weight-related outcomes (i.e., BMI and body fat %); and demographic characteristics (i.e., age, race/ethnicity, marital status, education level, and poverty indicators such as receipt of public assistance and free or reduced-lunch). Chi-square and t-tests were used to test associations.

Results: Food insecurity was significantly associated with receiving public assistance (p=.0025), free or reduced-lunch (p=.0002), and not being married (marital status; p=.0273). Food insecurity was not associated with any weight-related outcomes.

Conclusion: The study findings indicate that public health interventions need to address economic disadvantage, particularly among unmarried individuals, in the study design, implementation, and evaluation to better serve people with type 2 diabetes or a history of gestational diabetes.
Material and Psychosocial Disadvantages Associated with Type 2 Diabetes Lifestyle Risk Factors

Järvelä-Reijonen E, T Tilles-Tirkkonen, L Karhunen, J Pihlajamäki

1University of Eastern Finland, Kuopio, Finland

Purpose: To describe associations between material and psychosocial disadvantages and lifestyle factors in a sample of adults at high risk for type 2 diabetes and provide information regarding Finnish-specific sociodemographic context that may influence this association. In Finland, 40% of food insecure people perceive themselves disadvantaged on both economic, social and health aspects. Thus, it is important to further investigate, which material and psychosocial factors are related to certain lifestyle factors.

Methods: Adults at high risk for type 2 diabetes participated in baseline measurements of the StopDiabetes intervention study. Altogether 3160 participants (mean age 55 years, 79% females, 89% overweight/obese, 99% of Finnish background) had BMI measured by a study nurse and answered online questionnaires about food insecurity (running out of money for food during the previous year), material and psychosocial factors (e.g., education, perceived loneliness), and lifestyle factors (diet, physical activity, sleep, smoking, alcohol consumption).

Results: Food insecure participants (10%, n=310) had higher BMI than food secure participants (mean BMI 33.0 vs. 31.1, p<.001) and were more often unmarried, unemployed, and had lower income (p<.001). A regression model including several material and psychosocial factors showed that not eating vegetables, fruits, and berries daily was associated lower age and education, food insecurity, loneliness, lower resilience and being male.

Conclusions: Lower socioeconomic position is associated with obesity and unhealthier behaviors in this sample of adults at high risk for type 2 diabetes in Finland, a Nordic welfare state. This study will add knowledge on the associations of different material and psychosocial disadvantages with lifestyle factors, adjusting for sociodemographics and allow cross-country comparisons to inform future research.
15959

S5, S.5.56

Demographic and Household Characteristics Associated with Food Insecure and Low-Income Food Secure Households in a Sample of Australian Mothers

Harris H, D Gallegos, C Parsell, K Thorpe

1University of Queensland, Queensland, Australia, 2Queensland University of Technology, Queensland, Australia

15724: Food Insecurity, Socio-Demographic Characteristics and Weight-Related Outcomes: A Multiple Country Collaboration from Members of the ISBNPA Society Mentorship Program (Convenor: Jayne Fulkerson), Club C, 8:30 AM - 9:45 AM

Socio-economic inequalities (SIG)

Purpose: Families with food insecurity have a higher risk of poor nutrition and overweight/obesity. Parents, particularly mothers, may 'protect' children from hunger by forgoing meals. Yet those with food insecurity are more likely to be overweight or obese, although the mechanisms underlying the food insecurity-obesity paradox are not clearly understood. The aim of this study is to examine the demographic associations of household food insecurity in a resource-constrained sample of Australian mothers and their children.

Methods: Australian mothers of preschool-aged children (N=260) residing in a low-income community participated in a cross-sectional child-feeding survey. The community was selected based on the high proportion of children with a "developmental vulnerability" (33%) using the Australian Early Development Census. Food insecurity was measured with a single-item indicator used in Australia's National Health Survey: "In the last 12 months, were there any times that you ran out of food and you couldn't afford to buy more?" Mothers self-reported demographic and household characteristics.

Results: Compared to food secure mothers, low-income mothers with food insecurity (11%) were significantly more likely to be younger in age (33 vs. 30 years, p=.008), single (15% vs. 46%, p=.001), and reported more psychological distress (19 vs. 29 out of 50 on Kessler-10, p<.001). Across food insecurity categories there were no differences between mothers' place of birth (p=.09) and whether mothers identified as an Aboriginal or Torres Strait Islander person (p=.47). Mothers with food insecurity had a higher self-reported BMI than mothers with food security (30 vs. 27kg/m2, p=.15). The BMIz scores of children from food insecure households were higher than those from food secure households (1.5 vs. 0.6, p=.07).

Conclusions: The present study findings indicate a high proportion of mothers living in this low-income community with food insecurity, compared to the national average (11% vs. 5%). Trends between food insecurity and overweight/obesity are seen in both mothers and children of a very young age. Community-based nutrition programs could be tailored to suit the needs of mothers and children with household food insecure through policy development. Holistic interventions could further support the mental health of mothers with food insecurity.
Knowledge exchange of promoting healthy pregnancy and healthy growth: studies from Australia, China, and Indonesia

**Taki S, Li Ming Wen**

1Health Promotion Unit, Sydney Local Health District, Sydney, NSW, Australia

*Children and families (SIG)*

**Purpose:** Cultural practices have a major influence on the dietary behaviours of families and are carried down to their children. This symposium will describe cultural influence of the carer's perception of overweight and obesity among children, cultural considerations of infant feeding advice provided by health professionals and cultural acceptance of delivering infant feeding advice through mobile health.

**Rationale:** Early intervention including education on infant feeding behaviours in the first few years of life is critical to prevent the development of overweight and obesity. Globally, the World Health Organisation infant feeding guidelines is practiced, which includes advice to exclusive breastfeeding for the first 6 months then to introduce solids while continuing to breastfeed up to 12 months and beyond. However, there are various cultural practices that may affect the uptake of these behaviours. As childhood overweight and obesity is a global epidemic it is crucial to understand and consider cultural factors and beliefs that influence the uptake of healthy behaviours and engaging modes to deliver advice to different cultural groups.

**Objectives:**

i) Explore health professionals' experiences with delivering infant feeding practices among cultural groups;

ii) Explore socioeconomic variations and cultural perceptions of overweight and obesity among carers;

iii) Explore the cultural acceptance of delivery pregnancy and infant feeding advice through mobile health;

iv) Explore challenges of targeting culturally and linguistically diverse communities for education on infant feeding practices

**Summary:**

Three international speakers will present the following:

**Presenter 1,** Cut Rachmi (Universitas Padjadjaran, Indonesia): a qualitative study that explored views of mothers and grandmothers on childhood overweight/obesity in 3 districts of Bandung Area, Indonesia

**Presenter 2,** Sarah Marshall (University of Sydney, Australia): a qualitative study that explored the perspectives of healthcare professionals on promoting healthy infant growth among culturally and linguistically diverse communities in Sydney, Australia

**Presenter 3,** Na Wang (Fudan University, China): a qualitative study which explored the use of mobile apps for health information among Chinese women during pregnancy.

**The Discussant, A/Prof. Li Ming Wen:** Discuss challenges with implementing programs to educate various cultural communities on healthy infant feeding practices

**Format:** The Chair, Dr Sarah Taki will introduce the speakers and provide a 5-minute overview of the symposium. The 3 presenters will present for 15-minutes. The Discussant will close with a 10-minute presentation, drawing upon the presentations and their experience in infant feeding practices among cultural communities in Australia. During the remaining 15-minutes, the Discussant will moderate questions from the audience.
Understanding of the use of smartphone apps for health information in Chinese pregnant women: a mixed studies from Shanghai, China

He G, N Wang, Z Deng, LM Wen, Y Ding

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Abstract

Background: Hospital-based health promotion resources to assist pregnant women in achieving healthy lifestyle and optimizing gestational weight gain (GWG) and promoting healthy infant feeding practices is important, but with limited effects. Increasingly, women are using mobile applications (apps) to access health information during the antenatal period.

Objectives: This study aimed to have a better understanding of the use of mobile apps for health information among Chinese women during pregnancy and to inform the development of health promotion program through an app for promoting healthy pregnancy and healthy infant feeding.

Methods: A mixed methods study design was applied. Study participants were recruited from two maternity hospitals in Shanghai, China between March and July 2018. A self-administered online survey was conducted with 535 Chinese pregnant women on their sources of health information and reasons for using apps during pregnancy. Four semi-structured focus groups were also conducted with pregnant women (n = 28).

Results: The use of pregnancy related apps and internet were common among the respondents. Almost half of women had used pregnancy related apps. The main reasons of using an app were for monitoring foetal development (81.5%) followed by learning nutrition and recording diet in pregnancy (26.2%). Women found the apps were useful and convenient for promoting lifestyle modifications during pregnancy. However, some apps also contained misinformation or incorrect information which could cause anxiety. Many women expressed the need of developing an app containing evidence-based, well-informed and tailored health information to support them during pregnancy.

Conclusions: Smartphone apps have the potential to deliver health information, but they can also cause negative impact on women with misinformation. Efforts should be made by health professionals, app developers and policy makers to ensure quality apps to be developed for providing timely health promotion information. The apps can be intergraded into maternal care to meet the needs of pregnant women.
Promoting healthy infant growth among culturally and linguistically diverse communities in Sydney, Australia: perspectives of healthcare professionals

Marshall S, S Taki, P Love, LM Wen, C Rissel

1School of Public Health, University of Sydney, Sydney, Australia, 2Health Promotion Unit, Sydney Local Health District, Sydney, Australia, 3The Centre for Research Excellence in the Early Prevention of Obesity in Childhood (EPOCH CRE), University of Sydney, Sydney, Australia, 4Institute for Physical Activity and Nutrition (IPAN), School of Exercise and Nutrition Sciences, Deakin University, Melbourne, Australia, 5NSW Office of Preventive Health, NSW Health, Sydney, Australia, 6School of Public Health, University of Sydney, Sydney, Australia | Health Promotion Unit, Sydney Local Health District, Sydney, Australia | The Centre for Research Excellence in the Early Prevention of Obesity in Childhood (EPOCH CRE), University of Sydney, Sydney, Australia

16042: Knowledge exchange of promoting healthy pregnancy and healthy growth: studies from Australia, China, and Indonesia (Convenor: Sarah Taki), Club D, 8:30 AM - 9:45 AM

**Early care and education (SIG)**

Background/Objectives: Childhood obesity rates among Culturally and Linguistically Diverse (CALD) migrant groups in Australia have been increasing disproportionately. Health professionals play a key role in communicating early childhood obesity prevention practices and promoting healthy infant growth. Culturally appropriate and culturally safe healthcare can contribute to positive health outcomes for CALD children and families. This study aimed to explore healthcare professionals' perceptions of the best ways to deliver messages regarding infant feeding and active play practices among Chinese- and Arabic-speaking mothers/families in Sydney Australia.

Methods: Participants were healthcare professionals working within Sydney metropolitan area with Arabic- and/or Mandarin-speaking pregnant women and/or women with young children. Recruitment and data collection was conducted from July until October 2018. All interviews were conducted in English following a semi-structured interview protocol. Interviews were audio-recorded with consent, transcribed verbatim, and analysed using inductive thematic analysis.

Results: 18 interviews were analysed. Healthcare professionals described their considerations and practices when giving culturally sensitive advice: flexibility, non-judgemental approach, addressing family's concerns first, need for language-specific resources and explanation of evidenced-base and meaningful rationale for advice. Health care professionals also identified perceived barriers to the access and provision of care and perceived enablers for mother and families to access appropriate health care.

Discussion: Healthcare professionals who participated in this study identified techniques and methods for delivering healthy infant growth messages to CALD families, yet a lack of cultural sensitivity was also evident at times. These findings highlight the need to strengthen healthcare professionals' understanding and implementation of culturally safe practice. With the increasing multiculturalism of Australia, culturally safe healthcare is a priority for the early prevention of childhood obesity among diverse cultural groups.
Novel techniques to assess activity patterns: Data reduction, data analysis, and data visualisation.

Verswijveren S, Nicola Ridgers

1Institute for Physical Activity and Nutrition, Burwood, VIC, Australia

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: To explore novel techniques for reducing, analysing and visualising data for understanding patterns across the activity spectrum (sedentary [SED], and light [LPA], moderate [MPA], and vigorous [VPA] physical activity [PA]), and the manner in which they are accumulated.

Rationale: Regular participation in PA is beneficial for the health. In contrast, emerging evidence shows that SED has a detrimental effect on health. Recently, evidence suggests that it is not only the total time of PA and SED accumulated, but the manner of accumulation, that is associated with health outcomes. There is a need to ensure data reduction and analyses are enhanced to explore and visualize beyond the traditional focus of MVPA as a measure of healthy activity levels and as a promotion strategy. Consideration should be given to the way in which activity is accumulated, including all activities of the activity spectrum. This symposium will summarise and present novel techniques concerning the data reduction, data analysis and data visualisation of activity accumulation and associations with health.

Objectives:
1. To summarise and discuss current evidence regarding the influence of PA and SED patterns on health.
2. To explore the use of novel techniques to reduce and analyse PA and SED patterns.
3. To investigate the use of novel data visualisation to contextualise PA and SED patterns.
4. To consider the use of these approaches in future research into patterns of PA and SED accumulation.

Summary: The session will begin with an overview of existing research regarding PA and SED accumulation patterns and associations with health, including how these have been under-researched. The first presentation will present the development and validation of a threshold for defining moderate-to-vigorous PA using activPAL accelerometers. The second will focus on accumulation patterns (i.e. bouts and breaks) of activity across the activity spectrum and associations with cardio-metabolic health outcomes using a latent profile approach. The third will present novel visualisations of PA data.

Format:
0-5: Introduction, Simone Verswijveren
5-20: Presentation 1: Grainne Hayes: The development, validation and application of two novel data reduction methods to determine moderate-to-vigorous intensity physical activity from the activPAL 3 micro physical activity monitor.
35-50: Presentation 3: Kelly Mackintosh: Translating large volumes of data to simple visualisations: an overview
50-75: Discussion, Nicola Ridgers
The development, validation and application of two novel data reduction methods to determine moderate-to-vigorous intensity physical activity from the activPAL 3 micro physical activity monitor.

Donnelly A, G Hayes, KP Dowd, C Mac Donncha,  
1Department of Physical Education and Sport Sciences, University of Limerick, Limerick, Ireland, 2Department of Sport and Health, Athlone Institute of Technology, Westmeath, Ireland, 3Health Research Institute, University of Limerick, Limerick, Ireland, 4Department of Physical Education and Sport Sciences, University of Limerick, Limerick, Ireland | Health Research Institute, University of Limerick, Limerick, Ireland

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)  
Purpose: Count-to-activity thresholds are commonly employed to determine the intensity of physical activity (PA) in accelerometer-based activity monitors. The activPAL device has been identified as gold standard for the measurement of sedentary behaviour. However, only limited information is available on the accuracy of the count function as a measure of PA. This study aimed to: 1) develop and validate a threshold for defining moderate-to-vigorous physical activity (MVPA) for an adolescent population and; 2) compare this newly developed threshold with a commonly used MVPA step threshold of 25 steps/15 second epoch.

Methods: Fifty-two adolescents (32 developmental; 20 cross-validation) aged between 15-18 years, performed activities while wearing the activPAL 3 micro (aP) and the CosMED K4b2. Receiver operating characteristic analysis was used to develop a threshold for MVPA and for cross-validation. Following this, a sample of twenty adolescents (10M/10F; Age=16.5±smn;0.9yrs) were instructed to wear the aP on the anterior aspect of the right mid-thigh 24 hours a day for 9 consecutive days. Freely-living sedentary time and standing time were taken directly from the aP output. MVPA was calculated using both, the newly developed and validated count-to-activity threshold, and a step threshold of 25 steps/15 second epoch. Light intensity physical activity (LIPA) was calculated as 24 hours minus [sedentarytime+standingtime+MVPA]. Paired sample t-tests (Bonferroni correction aha;=0.01) were used to examine differences between MVPA, LIPA and both the count-to-activity and step thresholds.

Results: Participants spent 18.6±smn;1.2hrs sedentary and 3.32±smn;0.8hrs standing. An optimal MVPA intensity threshold of 5934 counts.15second epoch was determined from the vertical axis of the aP using receiver operating statistics. The developed MVPA threshold showed a high level of sensitivity (89%) and specificity (92%). When cross-validated in an independent group these high levels (=89%) remained. Significant differences were observed for MVPA between the count-to-activity threshold (50.0±smn;16.5mins) and the step threshold (32.4±smn;11.0mins; p<0.01). Similar differences were observed for LIPA when the step threshold (1.6±smn;0.5hrs) and count-to-activity threshold (1.3±smn;0.4hrs; p<0.01) were compared.

Conclusions: The findings of this study highlight the potential for over/under estimation of MVPA using different thresholds. Researchers should employ thresholds that have been validated within specific populations especially in health related research.
Patterns of accumulation of activity across the activity spectrum and associations with cardio-metabolic health outcomes: a latent profile approach.

Verswijveren S, K Lamb, J Salmon, A Timperio, K Mackintosh, M McNarry, R Telford, D Telford, N Ridgers

1Deakin University, Geelong, Australia, Institute for Physical Activity and Nutrition (IPAN), School of Exercise and Nutrition Sciences, Burwood, VIC, Australia, 2Murdoch Children’s Research Institute, Royal Melbourne Hospital, Parkville, VIC, Australia, 3Department of Paediatrics, University of Melbourne, Parkville, VIC, Australia, 4Swansea University, Swansea, United Kingdom, 5Centre for Research and Action in Public Health, Health Research Institute, University of Canberra, Canberra, ACT, Australia

Purpose: Accumulation of physical activity (PA) and sedentary behaviour (SED) (e.g. bouts and breaks) may be important for youth health. Research to date typically investigated associations between a single-intensity pattern (e.g., MVPA bouts) and health, however, it is likely that these cluster within youth. This study aimed to: 1) Identify distinct groups of 7-15 year-old youth based on combinations of activity patterns; 2) Compare total volume of PA & SED between groups, and; 3) Investigate cross-sectional associations with cardio-metabolic health outcomes.

Methods: ActiGraph accelerometer data from 7-15 year olds from three studies were pooled (n=1288). Time accumulated in =5 min and =10 min SED bouts, and =1 min and =5 min light (LPA), and =1 min moderate (MPA) and vigorous (VPA) PA bouts were calculated. Frequency of breaks in SED were also obtained. Latent profile analysis was used to identify groups of participants based on these patterns. Total volume of PA and SED were compared between groups. Linear regression models were used to test associations of groups with adiposity, lipids, blood pressure and a combined summary score.

Results: Three distinct groups were identified: Group 1 ("Prolonged sitters") was characterised by most prolonged SED bouts and least time spent in VPA bouts (n=323). Group 2 ("Breakers") had the highest number of SED breaks and moderate engagement in PA bouts across intensities (n=435). Group 3 ("Prolonged movers") (n=134) was characterised by the lowest levels of SED bouts and high levels of PA bouts across intensities. Whilst, "Breakers" engaged in lowest sustained PA compared to both other groups, their total PA was higher than the "prolonged sitters" and they had the healthiest adiposity profiles. No significant results for other health outcomes were found.

Conclusions: The results of this study highlight that children accumulate their activity differently. This information can be used to inform PA promotion strategies and for targeted interventions. In addition, breaking up sitting time and engaging in sporadic behaviours may be a plausible alternative strategy for reducing health risk in this age group. However, more longitudinal research is warranted.
Translating large volumes of data to simple visualisations: an overview

Mackintosh K
1Swansea University, Swansea, Wales, United Kingdom, Applied Sport, Technology, Exercise and Medicine Research Centre, Swansea, United Kingdom

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Physical activity (PA) is associated with numerous physiological and psychosocial health benefits, with the accumulation of activity, as well as context, identified as important components. We are increasingly using monitors with multiple tri-axial sensors operating at high frequencies, producing large volumes of data, which are difficult to interpret. Technology, in the form of 3D printing, gravity-based spherical plots (G-Sphere's) and LED light strips, enables the creation of novel ways to visualise and contextualise physical activity levels (PAL). Therefore, the purpose of this research was to investigate the efficacy of visualising PA data to enhance our understanding of PAL and intensities, as well as act as potential motivational tools.

Methods: The extent to which novel visualisations can incorporate the complexity of multi-dimensional acceleration and magnetometry data will be explored. Specifically, the development of representing simple data as a 3-dimensional tangible objective to represent PAL over time will be compared and contrasted to using a LED lighting-strip to provide near real-time visual feedback. Moreover, the G-Sphere, using different acceleration-derived metrics on a 3-dimensional plot which then occupies points on the surface of the sphere, highlights patterns that are not obvious using current approaches. Greater radial distances from the sphere surface indicate greater dynamic body acceleration.

Results: The approaches taken concatenate large volumes of complex data into one visualisation. The G-Sphere provides the ability to highlight patterns within data to enable researchers to identify different postures and behaviours, depending on monitor placement. Whilst 3D Printing and LED light-strip visualisations provide less context, they are easily interpretable by children (7-11 years old) and may be more accessible for participants. Indeed, analyses revealed enthusiasm for the concept of visualising PA through both lights and a tangible object.

Conclusions: Results suggest that data visualisations, irrespective of form, may offer a unique strategy for enhancing both researchers and participants' knowledge of PAL. Indeed, such approaches may facilitate positive behaviour change. Future research should seek to build this approach to link behaviour and energy expenditure predictions to inform our identification and understanding of movement-related processes, highlighting subtle differences in movement and its associated energetics.
Evaluating the impact of the Chilean regulations on front-of-package warning labels and food marketing

Reyes M, Popkin B

Department of Nutrition, Epidemiology, and Health Promotion, University of Chile, Santiago, Chile

Purpose: Present one-year results evaluating Chile's 2016 front-of-package warning labels and marketing restrictions.

Rationale: Many countries are considering front-of-package warning labels and restrictions on food marketing to children as important regulations for obesity prevention. This session will present new evidence evaluating the impact of Chile's 2016 regulations, which included the first national mandatory front-of-package warning labels, comprehensive restrictions on marketing to children, and the banning of sales in schools for all foods and beverages exceeding thresholds for energy, added sugar, sodium, or saturated fat. This work is timely as a number of countries are implementing or considering similar policies.

Objectives:
- Examine product formulation changes pre-/post-regulation, including sugar, sodium, saturated fat, and calorie content
- Examine pre-/post-regulation changes in food marketing on television and packages and in children's exposure to food marketing
- Examine changes in sugar-sweetened beverage purchases pre-/post-regulation using longitudinal household beverage purchases data, overall and by socio-economic status
- Discuss the implications of Chile's policies for obesity prevention policy in Latin America and globally

Summary: First, Reyes will present an introduction including an overview of the Chilean regulations. Second, Reyes will present findings on changes in the nutrient profile of Chile's packaged food supply using nutrition facts panel data (collected annually, 2015, 2017). She will show changes in the distribution of critical nutrients by food category from pre-regulation (2015, 2016) to post-regulation (2017). Results reflect supply-side changes including new product entry, product removal, and reformulation. She will also present results for a product subset followed longitudinally to understand whether companies reduced products' calorie, sugar, saturated fat, or sodium to meet regulatory thresholds. Second, Carpentier will present impact on the marketing environment, including changes in prevalence of unhealthy television food commercials and in the types of marketing strategies used (e.g., child-directed) as well as changes in children's exposure to unhealthy food advertising. Changes in marketing strategies used on food/beverage packages will also be presented. Finally, Taillie will present results on the regulations' impact on household purchases of regulated foods and beverages, including changes in volume and key nutrients, overall and by socio-economic status. Popkin will then lead a discussion on the relevance of these findings for food policy efforts in Latin America and globally.
Format:

- Introduction by Reyes (5 minutes)
- Presentation by Reyes (15 minutes)
- Presentation by Carpentier (15 minutes)
- Presentation by Taillie (15 minutes)
- Discussion by Popkin (15 minutes)
Short-term changes in critical nutrients content of prepackaged foods after the implementation of the Chilean Law of Food Labelling and Marketing

Reyes M, R Kanter, LS Taillie, C Corvalan
1University of Chile, Santiago, Chile, 2University of North Carolina, Chapel Hill, Chapel Hill, NC, United States

15848: Evaluating the impact of the Chilean regulations on front-of-package warning labels and food marketing (Convenor: Lindsey Smith Taillie and Marcela Reyes), Club H, 8:30 AM - 9:45 AM

Objective: To describe changes in nutritional quality (i.e. content of energy, total sugars, saturated fats, and sodium) and in the proportion of prepackaged foods that were regulated before and after 6 months of implementation of the Chilean Law of Food Labeling and Marketing.

Methods: Nutrient fact panels information was obtained from photos taken to food items available at 5 major supermarkets in February 2015-2016 (baseline) and February 2017 (follow-up). Foods that had addition of critical nutrients (criteria for being included in the regulation) and with information at baseline and follow-up were included in the analyses (n=3,200). We estimated changes in the content of energy and critical nutrients, and in the frequencies of regulated foods for all foods and beverages, and by subgroups. Comparisons between pre- and post-implementation periods were done using paired t-test or Mc Nemar's tests.

Results: Overall, sodium content decreased in about 10%, and 1/3 of food items avoided becoming regulated for sodium by reducing the amount of critical nutrients. Decreases in sodium were greater among salty baked snacks, cheese and ready-to-eat meals. In the case of sugars, there was a decrease of about 5% in the overall content, with greater decrease among yogurts/milks, ready-to-eat breakfast cereals, and desserts/ice creams. Overall, more than 10% of food items avoided the regulated condition by reformulation. Changes regarding saturated fats and energy were smaller.

Conclusions: The content of sugars and sodium of packaged foods decreased significantly after 6-8 months of implementation of the Chilean set of regulations and about 10% of products in the sample avoided the regulation. These results suggest that the Chilean regulation has been an important stimulus for improving the nutritional quality of prepackaged foods sold in Chilean supermarkets.
S5, S.5.59

A comparison of unhealthy food advertising on television and children’s exposure to this advertising before and after Chile’s implementation of a food marketing restriction

Carpentier F, LS Taillie, C Corvalan, M Reyes, T Correa

1University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, United States, 2Institute of Nutrition and Food Technology, University of Chile, Santiago, Chile, 3Diego Portales University, Santiago, Chile

15848: Evaluating the impact of the Chilean regulations on front-of-package warning labels and food marketing (Convenor: Lindsey Smith Taillie and Marcela Reyes), Club H, 8:30 AM - 9:45 AM

Policies and environments (SIG)

Purpose: Numerous studies link children's food marketing exposure with intake of advertised foods, broader food categories, and calories overall. Fewer studies evaluate effects of food marketing policies; much of this research uses national television audience ratings to estimate advertising exposure. In this presentation, we describe food advertisements on television prior to and after Chile's marketing restriction was implemented. We link these findings to preschoolers' and adolescents' television use before and after implementation to assess changes in their exposure to unhealthy food advertisements.

Methods: Advertising aired between 6am-12am during two composite weeks randomly constructed across April-May 2016 (pre-implementation) and April-May 2017 (post-implementation) were collected from the four broadcast and four cable channels with the largest youth audiences. Food ads were first classified as "unhealthy" if any food or beverage in the ad exceeded any of the regulation's nutrient thresholds and then analyzed for the presence of various marketing strategies. During the same periods, hours of television and channels viewed at different times of day were assessed in surveys of adolescents and mothers of preschoolers. Children's television use was then linked to the advertising analysis to evaluate exposure to unhealthy ads with and without child-directed strategies.

Results: The percentage of food ads on television was similar in 2017 (15%) and 2016 (16%). Within food ads, the percentage classified as unhealthy fell from 39% in 2016 (n = 149 ads/day) to 20% in 2017 (n = 87 ads/day). Within unhealthy food ads, the percentage with child-directed strategies fell from 29% in 2016 (n = 110 ads/day) to 17% in 2017 (n = 69 ads/day).

Children ranged widely in their television use and advertising exposure in 2016 and 2017. Still, there was a significant decrease in unhealthy ad exposure post-regulation. The heaviest viewers' exposure fell to nearly half their previous amounts of 4-23 minutes/week for preschoolers and 11-32 minutes/week for adolescents. Child-directed unhealthy ad exposure likewise fell by half.

Conclusions: Pre-regulation, a significant proportion of children had high levels of exposure to unhealthy food advertising, much of it child-directed. Post-regulation, unhealthy food ads were reduced but not eliminated from children's television use.
S5, S.5.59

An Evaluation of Changes in Household Purchases of Regulated Foods and Beverages After Chile’s front-of-package warning label and food marketing policies: a pre-post study

Taillie L, M Reyes, A Colchero, B Popkin, C Corvalan

1University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, United States, 2Institute of Nutrition and Food Technology, University of Chile, Santiago, Chile, 3Instituto Nacional de Salud Pública, Cuernavaca, Morelos, Mexico

Purpose: The purpose was to examine changes in household food and beverage purchases after the implementation of Chile's front-of-package warning labels and marketing policies, overall and by household education.

Methods: We used data on household food purchases from Kantar WorldPanel from January 1, 2014 to December 31, 2017. Household food and beverage purchases were linked at the barcode level to nutrition facts panel data. A team of trained nutritionists classified each product by regulation status (i.e., whether it received the warning label or marketing restrictions), categorized them into food groups, and reconstituted powders or concentrates. We used fixed effects models controlling for household covariates and macro-economic factors to compare purchases in the post-regulation period to the counterfactual, or what would have been expected based on pre-regulation trends.

Results: Descriptive analyses found that the percent consumers of regulated beverages decreased by 30% in the post regulation period, with the largest declines occurring among regulated fruit drinks and dairy products. From fixed effects models, we found that there was a 62% decline in purchases of regulated beverages compared to the counterfactual (72 mL/capita/day). There were relatively greater declines in regulated beverage purchases compared to the counterfactual for high-educated (68%) compared to low-educated head of the household (49%), but the absolute amount of reductions was similar (a decline of 71 to 72 mL/capita/day). Results will also be presented for ready-to-eat breakfast cereals, yogurts, and sweet snacks and desserts, by volume, calories, and sugar.

Conclusions: Preliminary longitudinal results suggest that the Chilean front-of-package warning label and marketing policies significantly reduced purchases of regulated beverages, although it is not clear what percent of this shift is due to changes in product reformulation or consumer purchasing behavior. Additional research will be needed to explore this as well as the effect on nutrients.
FRIDAY JUNE 7 2019
INVITED TALKS
INVITED TALKS

Where next for physical activity promotion in young people?

Sluijs E
1University of Cambridge, United Kingdom

Invited Speaker (Chair: Philip Morgan), Congress Hall, 9:50 AM - 10:50 AM

Regular physical activity is important for young people’s current and future health, well-being, and academic performance. Evidence consistently shows that young people’s levels of physical activity are insufficient for optimal health. Globally, the vast majority of children do not meet the World Health Organisation (WHO) recommended 60 minutes of moderate-to-vigorous physical activity (MVPA) each day, and physical activity declines during childhood and adolescence and into adulthood. Identifying ways to promote and maintain active living in young people is therefore a critical public health issue, but intervention efforts to date generally show limited impact.

In this talk, I will review the most recent intervention evidence of school-based physical activity interventions, explore our understanding of the reasons for the limited impact (including implementation issues), and discuss future directions for young people’s physical activity promotion.
Are underserved, minority communities an afterthought in the design of nutrition interventions? Are population-based nutrition programs a last priority in the light of competing economic and political priorities of underserved communities? In this talk, I will draw on our body of work to describe the team’s experience with present-day challenges to addressing dietary disparities in this nutrition transition era. I will present empirical findings of our work to bring a Latino immigrant community partners into the forefront of change to support healthful eating behaviors.
FRIDAY JUNE 7 2019
POSTER SESSION 3
Correlations between the anthropometric, biochemical levels and blood pressure in Taipei elite young athletes

Hsieh A, HM Chin
Taipei City Hospital, Taipei City, Taiwan

Objective: To investigate the associations between anthropometric levels (body mass index, body fat percentage), biochemical levels (fasting blood glucose, serum cholesterol, serum triglyceride and serum uric acid) and blood pressure of elite young athletes in Taipei.

Methods: We reviewed the medical charts of elite young athletes selected from National High School Athletic Games in Taiwan and had participated in sports clinics at Taipei Sports Health Management Center in 2013. Anthropometric data, biochemical data and blood pressure were collected and analysed using the Pearson correlation of coefficients.

Results: 161 boy (16.7±smn;1.6 y) and 122 girl athletes (16.7±smn;1.5 y) were included in this study. Body mass index (BMI) were 21.9±smn;3.3 and 22.0±smn;3.1 kg/m², while body fat percentage were 12.6±smn;5.4 and 23.2±smn;6.1% respectively. For boy athletes, the level of BMI showed a moderate positive correlation with systolic blood pressure (r=0.427, p<0.001) and mild positive correlations with diastolic blood pressure (r=0.331, p<0.001), serum cholesterol (r=0.181, p<0.05), serum triglyceride (r=0.319, p<0.001) and serum uric acid (r=0.328, p<0.001). Body fat percentage had mild positive correlations with systolic blood pressure (r=0.308, p<0.001), diastolic blood pressure (r=0.345, p<0.001), serum cholesterol (r=0.234, p=0.003) and serum triglyceride (r=0.265, p=0.001). In addition, girl athletes showed mild correlations between BMI and serum triglyceride (r=0.205, p<0.05) or uric acid (r=0.184, p<0.05). There was also a mild positive correlation between body fat percentage and serum triglyceride (r=0.215, p<0.05) for girls. However, there was no relationship between anthropometric levels and fasting blood glucose in both genders.

Conclusions: This study indicated that anthropometric levels were positively correlation with blood pressure and blood lipids for boy athletes, but only correlated with serum triglyceride for girl athletes in Taipei.
The influence of environment temperature and humidity on water and sports drink supplies in soccer players

Bai L, AC Hsieh, YC Kao
Taipei City Hospital, Taipei, Taiwan

Objective: To investigate the correlation between environment factors (temperature and humidity) and the supplies of water and sports drink in soccer players.

Methods: We collected the supplies of water and sports drink from 4 soccer venues in the Taipei 2017 Summer Universiade. Daily temperature and humidity records of each venue were refer to the website of the Central Weather Bureau in Taiwan. The correlation between environment factors and the supplies of water and sports drink were analyzed by the Pearson correlation of coefficients.

Results: 4 soccer venues were located in 3 districts, 2 in Hsinchuang, 1 in Linkou and 1 in Zhubei. The average temperature during the Universiade were 31.1\(^\circ\)C, 29.9\(^\circ\)C and 28.5\(^\circ\)C, while the average humidity were 65.6\%, 71.3\% and 76.8\%, respectively. For the Taipei 2017 Summer Universiade soccer players, the average daily supplies of water and sports drink were 4260±392 mL and 2897±1286 mL per athlete. The supply of water showed a strong positive correlation with environment temperature \((r=0.996, p<0.01)\) and a strong negative correlation with humidity \((r=-0.992, p<0.01)\). However, there were no significant correlations between the supply of sports drink with environment temperature \((r=0.948, p=0.206)\) nor humidity\((r=-0.930, p=0.240)\). The total supply of fluids (water and sports drink) also had no correlation with the environment factors.

Conclusions: This study indicated that higher environment temperature or lower humidity increased the supply of water but not affect the supply of sports drink for soccer players. The supply of sports drink might be related to the preference of athletes.
Effects of Time of Day of Physical Activity on Daily Total Physical Activity, Sleep, and Metabolic Health

Hsu Y, YJ Chang, YL Lin

1Chia Nan University of Pharmacy & Science, Tainan, Taiwan; Republic of China (ROC) | Chi-Mei Medical Center, Tainan, Taiwan; Republic of China (ROC)

Purpose: There is a lack of studies on determining how time of exercise during the day could affect total energy expenditure and metabolic health. The study aims to examine associations between timing of physical activity, sleep time, and biomarkers.

Methods: A total of 307 adult Taiwanese (mean age=56.9±10.7 years, male=40.7%) were recruited. Subjects wore pedometers for 24 hours and for 7 days. Based on the average percentage of accumulated steps throughout the week, subjects were categorized into four types of exercise concentration: morning, afternoon, evening, and no preference. Sleep behavior was assessed by questionnaires. Fasting glucose, insulin, and lipids were collected from blood assays.

Results: Those in the morning exercise group were older than the afternoon, evening, and no preference groups (p<0.001). Those in the evening and morning group had a higher level of daily physical activity than those in the no preference group (p=0.001). Individuals who exercise in the afternoon reported longer night time sleep duration and shorter nap length than those who exercise in the morning (p=0.004). In addition, greater steps accumulated in the morning were correlated with a higher level of High-density lipoproteins (HDL) cholesterol (r=0.14, p=0.02) and a higher level of triglyceride (r=0.13, p=0.03). Steps accumulated in the afternoon were inversely related to HDL-cholesterol (r=-0.17, p=0.004) while positively related to waist circumference (r=0.13, p=0.02) and 2-hr fasting glucose (r=0.14, p=0.02). After controlling for age, gender, and BMI, afternoon exercisers had a higher level of fasting glucose (p=0.04), greater waist circumference (p=0.03), and a lower level of triglyceride (p=0.048) than morning exercisers.

Conclusions: Afternoon exercisers had a lower level of total physical activity and more unfavorable effects on metabolic biomarkers. Studies with larger sample sizes and longitudinal design are needed to confirm associations between time of day of physical activity and metabolic health.
Results from the Czech Republic’s 2018 Report Card on Physical Activity for Children and Youth

Gába A, L Rubín, P Badura, E Roubalová, E Sigmund, D Sigmundová, J Dygryn, M Kudláček, Z Hamrik

1Palacký University Olomouc, Olomouc, Czech Republic

Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Regular physical activity (PA) is associated with numerous health benefits. However, the decreasing level of PA and increasing screen-time among Czech schoolchildren has been well documented in the last two decades. To build effective intervention and prevention programs, it is necessary to review all available sources of evidence. Therefore, the aim was to perform synthesis of most recently available evidence and to develop the first Czech Report Card on Physical Activity for Children and Youth within Global Matrix 3.0 project.

Methods: The Report Card included the 10 indicators that are common to the Global Matrix 3.0 project. To assess the indicator grades, a multi-level search strategy was used to find all relevant sources that provide published/unpublished data collected from 2013 through 2018. We retrieved 724 records from database search and 81 records identified through other sources. A total of 40 records were identified as eligible for data extraction. The data were synthesised and a set of benchmarks was used to assign grades. Final grades were assigned upon consensus of all members of the national research work group.

Results: Overall PA in Czech children and youth was observed to be inadequate, with high rates of excessive screen-time and low numbers of children and youth spending time in unstructured/unorganized play. On the other hand, some grades indicated promising foundations to build on in future. They are represented, for instance, by a relatively high number of children and youth participating in organized sports and/or PA programs, or generally PA-friendly setting (e.g., family, school, and built environment).

Conclusions: There is ample evidence that Czech children and youth are insufficiently active, and the prevalence of physical inactivity and excessive screen-time has increased in both sexes during the last two decades. Thus, PA in childhood and adolescence should be promoted intensively and effective intervention and prevention programs are needed.
Are cooking perceptions, attitudes and behaviors related to weight loss?

Harvey J, J Wolfson, R Krukowski, D West
1University of Vermont, Burlington, VT, United States

Objective

Both the decline in cooking and the increased reliance on consumption of prepared foods have been associated with the rise in obesity. Little is known however, about cooking perceptions, attitudes and behaviors among treatment-seeking individuals with obesity. The objective of this study was to determine if baseline cooking perceptions, attitudes and behaviors predicted weight loss during a behavioral intervention. Additionally, change over time in attitudes and behaviors were examined.

Methods

Participants in a 6-month, online behavioral weight loss intervention (iReach3) completed a 53-item questionnaire assessing cooking perceptions, confidence, attitudes and behaviors. Weight (kg) was measured in-person at both timepoints. Treatment consisted of weekly on-line group chat sessions covering standard topics such as self-monitoring, goal setting, problem solving, and relapse prevention. There was no specific intervention focus on cooking attitudes or behaviors, with the exception of providing recipes periodically.

Results

Baseline and 6-month measures were available for 149 participants (93% female, 15% minority, BMI: M=35.2 kg/m2, 58% were older than 50 years). There were no significant changes in cooking attitudes or behaviors over the 6-month intervention. The perception that cooking could include not using heat was significantly related to weight loss with 1.5 lbs. lost for every 1-point increase in the scale. At baseline, 77% of participants reported cooking dinner 4-7 times/week and 78% agreed with the statement, "I enjoy cooking". Those who agreed with the statement "Cooking is important to me" (70.4% Agree/Strongly Agree) lost significantly more weight at 6 months (p<.01). Additionally, "cooking lunch" more often at baseline (4-7 times/week reported by 26%) was also significantly related to greater weight loss at 6 months (p<.03). No other cooking attitudes or behaviors were predictive of weight loss.

Conclusion

Treatment seeking individuals with obesity were generally positive about cooking and reported cooking frequently upon entry into a 6-month behavioral weight loss intervention. Treatment did not change attitudes or behaviors. The importance of cooking overall and cooking lunch at baseline were both predictive of 6-month weight loss. Future research needs to continue to evaluate the role cooking plays in the development and treatment of obesity.
Sedentary Behaviour Research Network (SBRN): Achievements and membership satisfaction, 2012-2018

Barnes J, TJ Saunders, MS Tremblay

Healthy Active Living and Obesity Research Group, CHEO Research Institute, Ottawa, ON, Canada

Purpose: The Sedentary Behaviour Research Network (SBRN) was established in 2012 with a mission to connect sedentary behaviour researchers and health professionals working in all fields of study, and to disseminate this research to the academic community and to the public at large. This research chronicles the growth, development and achievements of SBRN and report results of the 2018 membership survey.

Methods: SBRN was the first global network established to connect sedentary behaviour researchers and health professionals and has grown and engaged its membership in projects related to its purpose. Organizational archives were reviewed to identify key initiatives and related evaluations to assess their impact. In October 2018, an on-line membership satisfaction survey was administered to gather feedback on SBRN initiatives, communication, logo and website (www.sedentarybehaviour.org).

Results: SBRN has grown to 1650 members from >55 countries. The website now attracts >3000 visitors per month and is regularly approached by media. In 2018 SBRN posted 14 blogs and research papers/updates and has a total research database of 193 articles. In 2012 SBRN members collaborated on a letter to journal editors encouraging standardized definitions for "sedentary behaviour" and "physical inactivity" to avoid misuse and misinterpretation. This letter was coauthored by >50 SBRN members, published in three journals, translated into French, Portuguese and Spanish, and has been cited >880 times (Scopus). SBRN spearheaded the development of sedentary behaviour guidelines in Canada. In 2016 the SBRN Terminology Consensus Project engaged 134 SBRN members, launched the results at the 2017 ISBNPA conference, had consensus definitions translated into 11 languages, and the related manuscript is in the top 0.1% for citations and was recognized by the SpringerNature Change the World, One Article at a Time initiative. Most membership survey respondents had favourable levels of satisfaction with SBRN and the website; <3% expressed any dissatisfaction.

Conclusions: SBRN is the largest network of researchers interested in sedentary behaviour in the world. It has initiated and completed several impactful projects that have advanced related research. The membership is satisfied with the network and would like to see even greater efforts to engage the membership and advance sedentary behaviour research.
Temporal Associations of Emergency Nurses’ Physical Activity Levels Within and Between Shifts

**Objective**
Recently, interventions have been developed to increase nurses' leisure time physical activity. However, little research has documented nurses' occupational activity, and whether activity levels are associated with subsequent activity engagement. The aim of this study was to determine how nurses accumulate activity across a shift, and whether activity levels during a 1-hour period or one shift are associated with activity levels in following period or shift.

**Methods**
Emergency nurses' were recruited from three emergency departments in Melbourne, Australia as part of the PACED Study. Fifty emergency nurses (90% female) wore an ActiGraph activity monitor and completed work/sleep diaries for up to four weeks. Time spent in different activity intensities (sedentary (SED), light-intensity activity (LPA), and moderate-to-vigorous-intensity activity (MVPA)) were calculated using validated cut-points. Multi-level analyses were conducted using general linear and latent mixed models. Analyses were conducted on all data and separately for shift type (early, late and night).

**Results/Findings**
The average shift length was 8 hours and 39 minutes. Emergency nurses spent the majority of a shift or 1-hour period SED (67%), however 5% was spent in MVPA. This was consistent across shift type. Within shifts, every minute of MVPA and SED was associated with a decrease in MVPA in the following hour, and during late shifts MVPA was associated with an increase in LPA. Across consecutive early shifts, every minute of SED, LPA and MVPA was associated with a decrease in SED and an increase in LPA in the following shift. Every minute of MVPA in a late shift was associated with an increase in MVPA in the following late shift. Across the late-early rotation, there was an increase in SED based on prior-shift MVPA but a decrease in SED based on prior-shift SED.

**Conclusions**
Emergency nurses' are highly active at work and are able to maintain and/or increase their activity levels within and between consecutive shifts. However, decreases in activity levels were also observed, predominantly between the late-early rotations. This calls into question whether interventions are required to increase activity levels or provide opportunities to recover. Future research should consider this when designing interventions.
Sedentary Time Among Undergraduate Students: A Systematic Review

Moulin M, S Truelove, SM Burke, JD Irwin

Western University, London, Ontario, Canada

Objective: Undergraduate students worldwide spend much of their sedentary time (ST) engaged in study-related behaviours. Given the deleterious health effects of excessive sedentary behaviour, interventions are warranted. This systematic review provides a detailed synthesis of the literature concerning the ST of undergraduate students.

Methods: Four electronic databases were searched. Published, peer-reviewed articles were included if they: (a) were available in English; (b) had a study population that consisted entirely of undergraduate students; (c) reported a daily or weekly ST for undergraduate students; and (d) measured ST via accelerometers or a valid sedentary behaviour questionnaire consisting of at least three of the following six domains: 1) sleeping and napping, 2) meals, 3) transportation, 4) work, study, and volunteering, 5) child and elder care, and 6) light leisure and relaxing.

Results: A total of 23 studies, published between 2010 and 2018, were included in the review. Sixteen studies (70%) involved the use of questionnaires to assess sedentary time, while seven (30%) used accelerometers. A wide range of undergraduate ST (0.75 to 14.35 hours per day) was reported. Mean ST as measured by domain specific questionnaires and accelerometers was 11.10 hours per day and 10.69 hours per day, respectively.

Conclusion: Acknowledging the range of reported ST across studies, the findings suggest that some undergraduate students participate in high levels of ST. This review demonstrates the need for continued research on ST among undergraduate students, effective interventions, and using accelerometers/inclinometers and domain specific ST questionnaires when measuring ST.
Patient perceptions of podiatrist-delivered physical activity promotion

Crisford P, D Aitken, T Winzenberg, A Venn, V Cleland

Menzies Institute for Medical Research, Hobart, Tasmania, Australia

Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective

Many podiatrists are able, keen and involved in promoting physical activity (PA), however, nothing is known about patients' views of the podiatrist role in promoting PA. The aim of this study was to provide an understanding of the PA promotion interaction from patients' point of view in the podiatry setting.

Methods

Consecutive patients recruited from 10 conveniently selected Australian podiatry practices were invited to complete an exit survey. Patients' experiences of the PA promotion provided, consultation reason and frequency, PA intentions and attitudes, and perceptions of the PA promotion role and behaviour of podiatrists were the main areas of interest. Descriptive statistics were used to present data.

Results

One hundred and seventy patients completed the survey, 60% reported discussing PA in previous consultations and 15% reported being advised to become more physically active.

Of those who discussed PA, around a third reported receiving advice about the frequency, duration and intensity of PA, and options for PA. Few patients reported planning to discuss their PA on a future visit (< 9%) or being referred to programs or other health or exercise professionals (< 6%). Many agreed that the advice was useful, that they were satisfied with it, that it would help them become more physically active and intend to act on it. Most patients agreed that podiatrists' PA promotion role includes assessing PA levels (81%), providing general PA advice (76%), specific PA advice (68%), tailoring a PA program (59%), carrying out activity counselling (59%) and monitoring ongoing PA levels (61%). Most participants were keen to become physically active, reporting positive intentions and attitudes to PA.

Conclusions

Patients appear broadly supportive of the PA promotion role and actions of podiatrists. However, many patients report not receiving any advice about PA, and if they did, the level of delivery they received appears suboptimal. Identification of podiatry patients' experiences and perceptions of PA promotion may help evaluate the need for improvement, provide guidance to enhance communication and expectations between patients and providers, and inform strategies to increase PA promotion in this setting.
What are the factors associated with physical activity promotion in the podiatry setting?

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Objective

All health care professionals are encouraged to promote physical activity (PA), however, little is known about the extent and influences on PA promotion among podiatrists. The aim of this study was to describe the current status of and identify the factors associated with engagement in PA promotion in the podiatry setting.

Methods

In 2016-17 Australian podiatrists were invited to complete an online survey, informed by our qualitative research, work in other non-medical health settings, and the Theory of Planned Behaviour. Items assessed included; frequency of providing PA assessment and promotion, podiatrists' intentions, attitudes, social norms, confidence, barriers, role beliefs and perceived knowledge and skills regarding the promotion of PA. Data were analysed using descriptive statistics, exploratory factor analysis and Structural Equation Modelling (SEM).

Results

Among 316 respondents, 62% reported always or often giving general PA advice and 39% specific advice, 34% followed-up on advice and 18% referred to another health professional for PA advice/counselling. Attitudes to PA promotion were mostly positive and 83% agreed it was part of their role. Over 60% believed they have the knowledge and skills to promote PA. Podiatrists were generally confident to carry out basic PA promotion activities (83%), but less confident to assess PA levels (54%), provide specific advice (47%), monitor patient PA levels (49%) or carry out PA counselling (41%). Over a third reported a lack of guidelines, patient interest and resources as major barriers to PA promotion. SEM revealed intention was influenced by behavioural beliefs ($\beta_a = 0.35$, p < 0.001), outcome evaluations ($\beta_a = 0.27$, p < 0.001) and enablers ($\beta_a = 0.18$, p < 0.05). PA promotion was influenced by intention ($\beta_a = 0.45$, p < 0.001) and behavioural control ($\beta_a = 0.43$, p < 0.001).

Conclusions

PA promotion is feasible and regularly practiced in the podiatry setting, however the current levels appear suboptimal. This study is the first to describe the status of PA promotion in podiatry and the factors associated with its practice. Enhancement of attitudes and behavioural control may improve PA promotion behaviors of podiatrists. Identifying effective strategies for increasing PA promotion among podiatrists is the next critical step towards improving the health and wellbeing of podiatry patients through increased PA.
P3, P3.17

Relationships between area-level socioeconomic status and urbanization with active transportation, independent mobility, outdoor time, and physical activity among Canadian children

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Objective: Active transportation (AT), independent mobility (IM), and outdoor time are promising ways to increase children's physical activity. However, in order to create interventions to increase those forms of physical activity, it is important to understand the relationships between area-level socioeconomic status (SES) and type of urbanization with AT, IM, outdoor time, and physical activity, and this was the aim of the study.

Methods: 1699 children in grades 4 to 6 from three Canadian regions participated. AT, IM, and outdoor time were assessed using questionnaires and physical activity was measured using a pedometer. Area-level SES was assessed using the median household income of the census tract in which the school was located and type of urbanization was determined for each school using standardized procedures. Generalized linear and general linear mixed models were used to examine the relationships.

Results: Area-level SES and the type of urbanization were generally not related to AT, IM, or physical activity for either gender. However, we observed that both boys and girls living in lower SES areas had decreased odds of spending >2 hours outdoors on weekend days compared to their peers from higher SES areas. Girls living in suburban or rural areas were more likely to spend >2 hours outdoors on weekdays compared to their urban counterparts.

Conclusions: AT, IM, and physical activity are generally not associated with area-level SES or the type of urbanization in this sample of Canadian children. The finding regarding outdoor time showing that both boys and girls of lower SES areas had decreased odds of spending >2 hours outdoors on weekends compared to their peers from higher SES areas suggest that additional efforts should be implemented to offer outdoor play opportunities in lower SES areas.
Improving the choice architecture of school dining increased fruit and vegetable consumption at lunchtime in two primary schools in Wales, UK

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Purpose: The present research investigated whether improving the choice architecture of school dining environments can lead to increases in children's consumption of fruit and vegetables at lunchtime. It was the first to examine the consumption from packed lunches brought from home in addition to school-provided hot meals.

Methods: 145 children aged 5-11 years, from two primary schools in North Wales, UK, took part. Lunchtime intervention in dining room included increased provision, improved presentation, and attractive labelling of fruit and vegetables; it was implemented for 3-4 weeks. Individual children's consumption of target foods was measured in grams using a validated photography method that subtracted plate waste from servings. Each child contributed data at baseline and at the end of intervention. School menus were matched for the two measurement periods.

Results/findings: Baseline consumption was very low in both schools and meal types (fruit median = 0-5g; vegetable median = 0-29g). Non-parametric analyses showed that the intervention significantly increased children's consumption of target foods (fruit median = 0-48g; vegetable median = 0-61g). Effects sizes were small to medium and better for school-provided dinners, where baselines were especially low in both schools. Fruit consumption at mid-morning snack-time remained consistent, showing that lunchtime effect was an improvement rather than a shift in consumption.

Conclusions: These results replicate and extend our previous research, showing that a school-based 'nudge' intervention can increase children's consumption of both fruit and vegetables. To our knowledge, it is the first to investigate changes in consumption (rather than choice) of vegetables in a primary school setting, using individual children's data. We have demonstrated that providing inexpensive fruit and vegetables in an attractive way can influence those children who were previously not eating these foods to improve their diet. This should be of interest to schools, parents, and policy makers.
Objective The prevalence of food insecurity among college students is high, and some researchers have proposed this issue may be due to students' meal plans providing insufficient meals. Unexpectedly, other studies indicate college students do not use all of their available meals. To date the association between college students' food insecurity status and meal plan use has not been examined.

Methods First-year college students (N=619) self-reported their food security status at the end of Fall 2015 and Spring 2016 semesters. Objective measures of students' meal plan, and meal plan use, were obtained from the university. A logistic Generalized Estimating Equation (GEE) was used to examine how students' meal plan predicted food insecurity, adjusting for student demographics and clustering by dorm. Linear GEEs were used to examine how meal plan usage was associated with food security. Seven potential mediators (anxiety, depressed mood, working a job, perceived meal plan adequacy, and alternative food supplies from parents, friends, and roommates) were examined to see if they explained associations between students' food security status and number of meals used.

Results Students used less than ¾ of the meals available to them. Compared to students on the most expensive (unlimited) meal plan, students on the cheapest (8 meals/week) meal plan were the most likely to report food insecurity (OR=2.5, 95% CI=1.6, 4.1). However, in the Fall semester, 28% of students on unlimited meal plans still reported food insecurity. When weekends were excluded, food insecure students used 6 fewer meals than food secure students over the semester (βa=-6.0, 95% CI= -10.4, -1.5). None of the potential mediators explained the association between food security status and number of meals used.

Conclusion Students are reporting food insecurity while having meals left in their meal plan. It is currently unclear why these apparently contradictory findings are co-occurring. One possibility is that several questions referred to having enough money for food, and students may not think of their pre-paid meals as a 'money' source. This study raises the concerning possibility that the USDA food security tool is inappropriate for college student populations living in residence halls.
Objective
Many universities require first-year students to live on campus and to share a room with at least one other person. Prior studies indicate that students do not use all of their available meals. This study examined if roommates' meal plan behaviors were similar.

Methods
A total of 1198 first-year college students (599 roommate pairs) were included in the analysis. Logistic generalized estimating equations (GEEs) were used to determine if students' meal plan behaviors were similar to their roommates'. Linear GEEs were used to examine if students meal plan use was higher when their roommate had higher meal plan use. A logistic GEE examined the proportion of meals a student and their roommate used at the same time (within 1 minute) and location. Additionally, a simulation was conducted by assigning 557 students to another same-sex student residing in the same residence hall and floor at random to determine if residence, rather than roommate, explained the results.

Results
Students were likely to purchase either the cheapest or the most expensive meal plans if their roommate did so (p<0.001). A student used more meals in Spring if their roommate had higher meal plan use ($\beta_a=-0.09, 99\% CI=0.04, 0.14$), even after adjusting for the number of meals students used in Fall. In the Fall and Spring, 21% and 14% of students used a meal at the same time and location as their roommate, respectively. Students were more likely to use a meal at the same time and location as their roommate if they were the same race/ethnicity (OR=1.51, 99\% CI=1.23, 1.86), or on the same meal plan (OR=1.51, 99\% CI=1.26, 1.81). Roommates were less likely to use a meal at the same time and location if they were male (OR=0.60, 99\% CI=0.48, 0.74), and in the Spring semester (OR=0.61, 99\% CI=0.56, 0.66). The simulation analysis indicated these findings were due to the students' roommate, rather than residence.

Conclusion
Students' meal plan behaviors were associated with their roommates' meal plan behaviors, especially in the first semester of university (Fall) and for roommates of the same race/ethnicity.
A novel community-based approach to increasing fruit and vegetable intake in Australia

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Currently only 5% of adults in Australia meet the recommended daily intakes of fruits and vegetables. Food co-operatives (co-ops), are community-based groups of people who collectively purchase fresh food in bulk. This decreases barriers to fruit and vegetable intake by lowering cost, increasing access and availability. Existing food co-ops have cited advantages such as sharing cooking skills and recipes, meeting like-minded people, and being more connected to the community.

Objective
To examine the association between fruit and vegetables intake in people participating in food co-operatives, compared to people who do not participate.

Methods
Participants were recruited online for a population survey using targeted advertisements in parents groups on various social media channels. Participants were eligible if they resided in the greater Sydney area (determined by postcode), were aged >18 years and did not have any major health conditions. Participants were asked about demographic characteristics, including if they regularly participate in a food co-op. Validated short questions about daily fruit and vegetable consumption were used.

Results
This survey is ongoing and so far a total of 208 participants (97% female) have responded. Most were aged over 30 years and 22% spoke a language other than English at home. Of all surveyed 69% had completed a higher education (degree or diploma). So far, a total of 29 (14%) were members of a food co-op. Our interim analysis shows in the food co-op group 17.2% met the daily recommendations for intake of vegetables and 65.5% met the daily recommendations for intake of fruit. In the non-co-op group only 8.4% met the daily recommendations for intake of vegetables and 50.8% met the daily recommendations for fruit. Once the complete sample is recruited we will be able to compare the groups for statistical differences.

Conclusions
There was a 9% difference in meeting the recommendations for vegetables and 15% difference in meeting the recommendations fruit between the coop and non-co-op group. This study will provide valuable pilot data to demonstrate the potential of food co-ops for improving fruit and vegetable intake and will inform the development of a community-based intervention for improving dietary behaviours of families.
Promoting Light Volleyball among people with physical disabilities in Hong Kong

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Objective: Studies showed that people with physical disabilities (PWDs) have lower level of physical activity (PA) and fitness thus associated with poor health status. Comparing with people with intellectual disability, PWDs have less opportunities or types of physical activity (PA) to participate. Light volleyball (LVB) is a PA that modified from traditional volleyball. It uses a lighter weight and bigger sized ball which travels in the air in a lower velocity and for a longer time. That thus makes LVB more playable to those people with lower motor ability. Leung and colleagues (2017) showed that LVB is beneficial to older adult's functional fitness and health, however, its effect on improving fitness and health among PWDs has not been explored. By integrating the major components of Paralympic sitting volleyball and LVB, Sitting Light Volleyball (SLVB) was developed to help improve the fitness and health of PWDs. This study therefore aimed to examine the experiences of PWDs in playing SLVB in its developmental phase.

Methods: Twenty-three PWDs ([mean age = 52, SD = 10.24; females (21%)]) were invited to experience SLVB in June 2018. They all participated in two SLVB tryouts at its developmental phase. After the tryouts, we conducted four focus groups interview to ask participants' experiences and comments in playing SLVB.

Results: The most common reported themes playing SLVB were "increase perceived competence in physical activity", "increase physical activity enjoyment", and "increase social support and communication". Overall, participants have demonstrated positive perceptions towards playing SLVB. Comparing to other wheelchair sport, SLVB allows participants to have more autonomy and independence in movement, which may help increase exercise intensity and as a result, improve their fitness level. However, the playing capability of SLVB may be restricted by the type of disabilities of the PWDs. Participants suggested that PWDs without waist injury are more suitable in playing SLVB.

Conclusions: Interview results demonstrated positive effects of SLVB on improving psychological health among PWDs. Above and beyond, its possible physical health benefits and the health benefits drawn in this study should be further examined in the future study.
Purpose:
Physical activity and nutrition theory are foundational to the athletic therapy (AT) practice in Canada. The AT scope of practice includes work "in cooperation with performance enhancement personnel and members of the healthcare delivery team to maximize the performance and welfare of all Canadians. Athletic Therapists (ATs) nurture an attitude of positive health." Understanding a patient's post-injury motivation and guiding the patient towards increased activity and a healthy lifestyle is a critical competency for ATs. Canadian AT education is a responsibility of the Canadian Athletic Therapists Association (CATA) and by proxy, the eight accredited programs in Canada. The CATA has adopted a new competency framework that will guide the education of future ATs. The framework has seven roles: collaborator; communicator; scholar; leader; professional; health advocate and; AT expert. ATs have always functioned with competencies related to physical activity and nutrition. However, new competency framework development afforded the opportunity to re-evaluate competencies related to physical activity and nutrition, along with the behaviours that support their theory and practical application. The purpose of this research was to content validate new competencies related to fostering AT education for positive behavioural aspects of physical activity and nutrition, particularly in post-injury patients.

Methods:
A consensus method to content validate the competency framework and the competencies embedded under the seven roles was adopted. Former competencies were revised and slotted under a role in the new framework. All CATA members were invited to grade the importance of competencies within each role. An expert group of AT educators subsequently content validated the competencies using a modified Ebel procedure. Eighty percent consensus was the threshold used to determine inclusion of new competencies. If consensus was not achieved, face-to-face discussion was facilitated, which culminated in a final vote.

Results/Findings:
Forty-four former competencies were related to behavioural physical activity and nutrition. They were slotted under three of the seven roles. A significant change related to the behavioural theory necessary for patient modification in their physical activity and nutrition post-injury. Curricula to support teaching and assessing these revised competencies will be required in CATA accredited programs.
Adolescents’ perspectives of a school-based physical activity intervention (GoActive): a mixed method study

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Objective: Opinions of adolescents receiving interventions are rarely unpacked in detail. We aimed to understand adolescent experiences and perspectives of the GoActive physical activity promotion intervention (ISRCTN31583496; based on Self-determination Theory and Social Cognitive Theory) using a mixed-methods process evaluation. We assessed satisfaction of intervention components: class-based sessions, competition, choosing new activities, mentorship, to elucidate mechanisms of perceived change and provide insights for future intervention design.

Methods: Participants (N=1532; Mean(SD) 13.2(0.4)y) provided questionnaire data at baseline (gender, shyness, reported activity level (YPAQ)) and post-intervention (intervention acceptability and satisfaction of components; 5-point Likert scales). Between group differences (gender; shy and inactive (shy/inactive)) were tested with multi-level linear regression models clustered by school. Data from 16 individual interviews (shy/inactive students) and 11 focus groups with 48 participants (mean=4; range 2-7; grouped by website-derived intervention engagement) were thematically coded. Qualitative and quantitative data were merged in an integrative mixed-methods convergence matrix, which denoted convergence and dissonance across datasets.

Results: Boys preferred class-based sessions (Beta: 95%CI: 0.2: 0.1;0.4) and also found the intervention more fun (0.2: 0.1;0.3) compared to girls; qualitative data suggested that this was because boys preferred competition. Girls (-0.2: -0.4;-0.1) and shy/inactive students (-0.3: -0.5;-0.1) did not enjoy the competition. Shy/inactive students enjoyed trying new activities less (-0.2: -0.4;-0.1), but didn't find the intervention as boring compared to others (-0.2: -0.3;-0.1); qualitative data indicated a desire to try new activities but identified barriers to choosing unfamiliar activities with self-imposed choice restriction leading to boredom. Compared to girls, boys favoured the mentorship component (0.2: 0.1;0.3); qualitative data highlighted critique of mentorship and suggested adolescents liked the idea but that older mentors did not meet expectations due to lack of mentor consistency, clarity and attendance.

Conclusions: This mixed-methods approach garnered more insights than either qualitative or quantitative alone, and elucidated complex pathways and new insights into components relevant to future interventions. Mentorship was liked in principle but implementation issues undesirably impacted satisfaction, whereas competition was disliked by girls and shy/inactive students. Suggested improvements include better implementation of activity choice provision and novelty, considering gender difference in preference of competition, and improved mentorship training.
Maternal healthful dietary patterns during pregnancy and long-term overweight risk in their offspring

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Purpose: Adherence to healthful dietary patterns is associated with lower body mass index (BMI) in adults; however, whether maternal diet quality during pregnancy is related to overweight risk in their offspring remains to be elucidated. No study, to our knowledge, has examined maternal dietary patterns in relation to offspring weight beyond the age of 10 years. To address this research gap, we examined whether adherence to healthful dietary patterns during pregnancy is related to overweight risk in their offspring during childhood through early adulthood.

Methods: We included 2,729 mother-child pairs from the Nurses' Health Study II and offspring cohort Growing Up Today Study 2 (GUTS 2). Children, 12-14 years at baseline were 21-23 years at the last follow-up. Overweight or obesity was defined for youth less than 18 years of age using sex- and age-specific BMI cut-offs recommended by the International Obesity Task Force and for those 18 years or older as BMI =25 kg/m2. Maternal dietary patterns were calculated from food frequency questionnaires using three diet quality scores, the Alternate Healthy Eating Index (AHEI), Alternate Mediterranean Diet (aMED) and Dietary Approach to Stop Hypertension (DASH). Log-binomial models were used to estimate relative risks (RRs) and 95% confidence intervals (CIs).

Results/findings: In models adjusted for sex, gestational age at delivery and maternal total energy intake, greater maternal adherence to aMED and DASH, but not AHEI, was associated with lower overweight risk in the offspring (RRQ5 vs Q1 =0.82 [0.70-0.97] for aMED and 0.86 [0.72-1.04] for DASH, P for trend <0.05 for both). After additional adjustment for maternal pre-pregnancy lifestyle factors and socio-demographic characteristic, none of the diet quality scores were significantly associated with offspring overweight risk (RRQ5 vs Q1 =1.03 [0.86; 1.22] for AHEI, 0.93 [0.78; 1.10] for aMED and 0.86 [0.72; 1.04] for DASH, P for trend >0.05 for all). Maternal pre-pregnancy BMI did not modify any of these associations.

Conclusions: In this population of generally well-nourished women, maternal healthful dietary patterns during pregnancy were not independently associated with offspring overweight risk at ages 12 to 23 years. Further studies are required to examine these associations in other populations.
Patterns of mode of commuting to and from school in a sample of 46,243 Spanish preschoolers, children, and adolescents; the PACO Study.

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Purpose: This study aimed to describe the patterns of the mode of commuting to and from school in a sample of Spanish preschoolers, children, and adolescents regarding age and gender, and secondly, to examine these patterns across the age.

Methods: A total of 5,373 preschoolers (3-5 years old), 19,346 children (6-11 years old), and 21,524 adolescents (12-17 years old) from 34 original Spanish studies with cross-sectional data between 2006 and 2017 were included in the analyses. Databases included information about children's mode of commuting to and from school, age, gender, and time of commuting between home and school (categorized as "<15 min" if they commuted less than 15 minutes and as "³15 min" if they commuted 15 minutes or more). The Chi-square test was used to analyse the differences between mode of commuting to and from school with gender for each age group. A multilevel logistic regression model was used to associate the mode of commuting to and from school behaviour with age group; time of commuting and gender were covariates.

Results: Descriptive results displayed a percentage of active commuting to and from school (ACS) ranging between 49.69% in 3 years old up to 61.37% in 17 years old. Overall, a 53.58% of the preschoolers, a 59.74% of the children, and a 60.16% of the adolescents were active commuters. Moreover, male adolescents showed higher percentages of ACS than female adolescents (p<0.05), but no differences were found in preschoolers and in children for gender (all, p>0.05). Active commuting to and from school was associated with age (odds ratio=1.03, p<0.001). Children and adolescents were more likely to ACS than preschoolers (odds ratio=1.46 and 1.57 respectively, all p<0.001). Moreover, adolescents were more likely to ACS than children (odds ratio=1.07, p<0.05).

Conclusions: This study provides an unique and global vision regarding the commuting patterns in Spain. he percentage of ACS increased by age, being adolescents the most active and the preschoolers the less active. Policy makers should take a special attention in preschoolers and children to promote this healthy behaviour, designing and implementing more focused family-based interventions to increase the percentage of ACS.
Urban green and blue spaces impact on health and health equity: A stakeholder driven logic model

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: In a world increasingly urban, green and blue spaces such as canals, rivers and lakes will become increasingly important assets for sustainable health in cities. Currently the mechanisms by which green and blue may or may not impact health in urban settings is poorly understood. The aim of this research is to gather information from organisations that develop, manage and use urban green and blue spaces on possible pathways.

Methods: An initial logic model was developed through a scoping review of the scientific and grey literature. This model was presented at the 2016 World Canals Conference. During the conference a co-creation workshop was held with stakeholders to develop and refine the model. Further stakeholders were recruited through a snowball system. To be included stakeholders had to represent organizations that own, manage, develop and assess urban green and blue spaces. In addition, organizations such as housing associations, sports organization, health care providers, schools and charities which use green and blue spaces were also invited. Each stakeholder was provided with the initial model and asked to update it by annotating the model and drawing new pathways.

Findings: In total, 57 organisations completed models. Green and blue spaces are places to be active and deal with stress (restoration) but this is not the only proposed pathway for health. Green and blue spaces can be a social environment, counteracting the isolation in urban living. Green and blue spaces are also involved in regulation of the environment though pollution reduction, management of water resources, controlling temperature and mitigating flood risk. Green and blue spaces can bring economic growth through business development or place making (tourism). Finally, green and blue spaces such as canals and rivers contribute to green and active transportation which also impact atmospheric pollution.

Conclusions: The impact of green and blue space on urban health is complex and act on multiple and interacting pathways. A system thinking approach should be adopted to understand how environmental, economic, transportation and leisure pathways interact to generate health in urban settings.
A comparison of physical activity and sedentary behaviour in 12-16-year-old Czech and Spanish adolescent.


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Objective

The purpose of the study was to describe differences between accelerometry-based physical activity (PA) and sedentary behaviour (SB) among Czech and Spanish adolescents.

Methods

The participants were 12-16-year-old girls and boys (n=536; Czech=255, Spanish=281), whose PA and SB during waking hours were measured with hip-worn ActiGraph GT3x for seven days. All measures were adjusted for accelerometer wear-time. Differences between PA and SB were analyzed by Independent sample t-test using SPSS 23.0 (Inc, Chicago IL).

Results

Compared to Czech adolescents, Spanish adolescents accumulated significantly less light PA (mean 246.4 min/day for Spanish adolescents vs. 336.0 min/day for Czech adolescents; p<0.001), less moderate PA (27.5 vs. 39.0 min/day; p=0.001), less vigorous PA (10.3 vs. 18.3 min/day; p<0.001), but accumulated significantly more sedentary time (639.7 vs. 530.6 min/day; p=0.001). Fewer Spanish adolescents (12.1%) met physical activity recommendation compare to Czech adolescents (40.0%) There was no significant difference in time spent in sedentary bouts (10+ min) per day.

Conclusions

Czech adolescents were more active than Spanish adolescents. Sedentary time was higher in Spanish adolescents, but time spent in sedentary bouts did not differ. It is necessary to focus on psychosocial and environmental determinants causing these differences in PA and SB among Czech and Spanish adolescents.
Objective: Current reports have identified that the average adult spends more than half of their waking day sedentary. However, individuals' perceptions of sedentary behaviour (SB) relative to others and subsequent psychological health outcomes (PHOs) is not well understood. This research sought to examine the relationship between individuals' perceptions about their level of SB, in relation to others, with PHOs.

Methods: Data were collected through a cross-sectional survey using an internet-based program, SurveyMonkey. Respondents (n = 289, 66.3% female; Mage= 59.6% age 18 to 24) were asked to complete two purpose built items evaluating their perceived level of SB relative to other persons their age, specific to weekdays and weekends. In addition, sociodemographic characteristics (age, gender, marital status, education, mental health status) and comprehensive self-report measures of actual SB using a modified Sedentary Behaviour Questionnaire were included. The following inventories were used to assess PHOs: Perceived Stress Scale; State-Trait Anxiety Inventory; Centre for Epidemiologic Studies Depression Scale; and Warwick-Edinburgh Mental Well-being Scale.

In order to examine the association between perceived SB in relation to others and PHOs a hierarchical linear regression model was used, adjusting for sociodemographic characteristics and actual SB.

Results: All variables entered into linear regression model had to be significantly correlated with PHOs and in the expected direction. Actual SB failed to correlate with any of the PHOs, hence it was not included in the subsequent regression model. Demographic variables (i.e., block 1) explained 15.0-24.0% of variance in PHOs. Perceived SB in relation to others (i.e., block 2) accounted for a further 2.5-6.8% of variance in PHOs.

Conclusion: These preliminary data suggest that perceived SB in relation to others may be more important than actual SB when examining associations with PHOs. A social comparison framework may offer important insight into our understanding of non-movement behaviours and PHOs.
Global Sedentary Behaviour Monitoring Initiative (Phase 1+2): Adding sedentary behaviour indicators to the Global Observatory for Physical Activity (GoPA!) Country Cards

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Sedentary behaviour has risen in prominence as a potential risk factor for chronic disease morbidity and mortality, yet, prevalence and surveillance of sedentary behaviour globally is not well summarised. The International Society for Physical Activity and Health's Sedentary Behaviour Council (SBC), in partnership with the Global Observatory for Physical Activity (GoPA!), have undertaken a project to collate and report sedentary behaviour data from 190 countries globally.

Methods: A subset of sedentary behaviour indicators were identified as relevant by the SBC-GoPA! Team. Country-level searches were made for the following sedentary behaviour indicators: total sitting time, total TV viewing time, the number of periodical national surveys that included sedentary behaviour questions, and, the number of articles related to sedentary behaviour and public health identified via Medline searches. A six stage search strategy was iteratively developed to find relevant articles between 2008 and 2018. The search strategy consisted of phase 1 (stages 1-4) and phase 2 (stages 5-6). Phase 1 was conducted by a working group of SBC members, and included: (1) a review of the 139 countries' data sources in the current physical activity GoPA! Almanac in addition to five more countries with data collected after the Almanac launch; (2) screening 190 country-specific Medline searches; (3) screening of the 'Demographic and Health Survey' website; and (4) 190 country-specific Google.com/ncr searches. Phase 2 was conducted by the author team, including (5) a review of the 2017 Eurobarometer 88.4; and (6) a country-specific Google.com/ncr<
Objective: The purpose of this study was to examine the prevalence and characteristics of comprehensive school physical activity programs (CSPAPs) in the United States. Methods: An electronic survey was developed based on an extensive literature search and two rounds of pilot testing. Using a federal website listing all U.S. public schools, a total of 3000 schools (60 from each state; 20 elementary, 20 middle, and 20 high) were randomly selected. A link to the survey was sent to the email addresses of 2955 physical education teachers identified from the school websites. For the purposes of the study, a CSPAP was defined as any combination or variety of program components (physical education, PA during school, PA before and after school, staff involvement, family and community engagement) that provides opportunities for all students to (a) receive quality educational experiences related to PA and (b) meet the national PA guidelines for school-aged children and adolescents. Four weeks were provided to complete the survey and three follow-up reminders were sent in an attempt to maximize the response rate. Results: A total of 409 participants (14% response rate) responded to the question, "Is a CSPAP currently being implemented at your school?" Among these participants, 292 (71%) responded "yes". A total of 139 of these respondents (48%) provided further information about the characteristics of their school's CSPAP. Across school levels, the following PA promotion strategies were most commonly employed within each CSPAP component: standards-based instruction (78%) for physical education, classroom-based PA (68%) for PA during school, interscholastic sports (52%) for PA before and after school, staff wellness programming (61%) for staff involvement, and facility joint use agreements with outside organizations (45%) for family and community engagement. The least used strategies within each component were opportunities to learn (68%) for physical education, physical activity assemblies (28%) for PA during school, active transportation programs/options (23%) for PA before and after school, staff training for PA promotion (17%) for staff involvement, and active homework for students (24%) for family and community engagement. Conclusions: This study provides useful information for asset-mapping, needs assessment, progress monitoring and interventions related to CSPAPs.
Perceptions, enablers, and barriers to physical activity participation of Arab-Australian adults

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Objective: Those from culturally and linguistically diverse backgrounds have unique experiences with regards to physical activity participation. Understanding the culturally-specific context for physical activity is critical to design and implement effective programs. That said, little is known concerning the physical activity experiences of Arab-Australians, a growing culturally and linguistically diverse group in the Australian context. The objective of this study was to explore the perceptions, enablers, and barriers to physical activity participation from the perspective of Arab-Australian adults aged 35-64 years.

Methods: Participants were 28 Arab-Australian adults (20 women and 8 men aged 45 (SD=7.9) years) recruited from community centres in Western Sydney. Five focus groups were conducted, ranging from 35-90 minutes in duration with 4-7 participants per session. The focus group discussions were recorded and transcribed verbatim. The data were analysed inductively using thematic analysis techniques as described by Braun and Clarke (2006) in order to identify themes and sub-themes.

Results: Participants had a general understanding of physical activity, however the majority were not aware of physical activity guidelines for health. General barriers to physical activity included a lack of time and competing priorities, lack of motivation, lack of availability, costs of services, lack of social support, discomfort and shyness, and existing health conditions. Cultural and religious barriers to physical activity included a lack of gender-exclusive settings and traditional gender roles were also identified. General enablers to physical activity included social support, organised physical activity, and health as a motivator, and cultural and religious related enablers included appropriate and gender-exclusive settings and religion as a motivator. For future physical activity program development, participants emphasised the importance of gender-exclusive settings, peer-support, incentives, location and accessibility, need for childcare services, and language adjustments.

Conclusions: This study highlighted the various general, cultural, and religious factors influencing the physical activity levels of Arab-Australian adults aged 35-64 years. The findings of this study will be used to inform the development of a culturally-tailored intervention to increase the physical activity levels of Arab-Australian adults in Western Sydney.
The evaluation of the Enlace physical activity intervention on measures of wellbeing in low-income Mexican origin women living in the U.S.-Mexico border region

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Objective: The success of previous physical activity interventions has largely been determined in relation to the primary outcome, leaving out important information on other measures of wellbeing impacted by the program. This study examines the effect of the Enlace intervention on measures of wellbeing individually, and, in relation to physical activity. The analysis will provide important information on the potential impact of physical activity interventions on the wellbeing of participants.

Methods: Enlace was a physical activity intervention targeted at low income Mexican origin women living in the U.S., Mexico border. A total of 620 Mexican-origin women were recruited to participate in this 16 week long physical activity intervention. Pre and post physical activity, nutrition and psychosocial measures were taken on all participants. Physical activity was measured subjectively using the CHAMPS and objectively by accelerometer. Comparison was made between pre and post values of physical activity and nutrition and psychosocial measures. Linear and cubic spline analysis was conducted to assess for linear and non-linear relationships. Intent to treat principle was incorporated into the analysis to account for attrition between pre and post measurement points.

Results: Out of the original 620 enrolled participants, 439 completed the 16 week intervention and post assessment. On average, women in the intervention group attended 9 sessions and increased their objectively (accelerometer) measured physical activity by 1.3 minutes per day and subjective (CHAMPS) by 27 minutes per day. Both objective and subjective measures of physical activity were correlated with nutrition and psychosocial measures. Cubic spline analysis revealed non-linear relationships between both physical activity measures, and nutrition and depression, whereas linearity is only observed at higher levels of physical activity. Further analysis will be conducted to explore these relationships in greater detail.

Conclusion: The Enlace intervention successfully increased participants' objective and subjective physical activity engagement. There was also an observed positive effect on measures of wellbeing, however, the analysis suggests that this relationship is nonlinear and dependent upon the intensity of physical activity engagement.
Individual and environmental determinants of physical activity among Latinas: The moderating role of stress

**Objective:** Research has identified the neighborhood environment, social support, and self-efficacy as correlates of physical activity (PA) among low-SES populations. Research also indicates that lower-SES individuals are exposed to more chronic stressors. This study investigates the relationship between neighborhood environment, self-efficacy, and social support and PA among Latinas and whether stress moderates these relationships.

**Methods:** Participants were 370 Latina women (Mage=40.3 years) recruited from colonias in South Texas. Time in sedentary, moderate, and vigorous activity, as well as in MVPA (past week) was assessed via accelerometry and a modified version of the Community Health Activities Model Program for Seniors (CHAMPS). Participants self-reported perceptions of neighborhood PA environment (e.g., "There are sidewalks on most of the streets in your neighborhood"), self-efficacy, social support, and stress. Items were summed to calculate social support, self-efficacy, and stress scales, respectively. Items for neighborhood environment were summed and averaged. Higher scores indicated greater self-efficacy, social support, stress, and a supportive neighborhood environment. Hierarchical linear regression analyses were conducted, controlling for age, BMI, education, and health status.

**Results:** For analyses with accelerometry-assessed PA, there was no association between neighborhood environment, social support, and self-efficacy and time spent in sedentary, light, moderate, MVPA. Social support was positively associated with vigorous PA. Stress was not a significant moderator. For analyses with CHAMPS-assessed PA, stress moderated the relationship between social support and time in total MVPA and leisure-time MVPA. Those with high stress showed social support was positively associated with time in MVPA. No association between social support and MVPA was found among low stress individuals. No other significant associations were found.

**Discussion:** Consistent with previous research, social support was an important correlate of physical activity. Self-report PA indicated that greater social support was related to more time in total MVPA and leisure-time MVPA among individuals with high levels of stress. Certain PA (i.e. walking, bicycling) may be categorized into different intensities based on PA assessment. This may account for disparate findings. Future research should explore whether specific subtypes of stress have differential impact on relationships between environmental- and individual-level correlates and PA as this may inform intervention design.
A systematic literature review on the relation between dietary patterns and the risk or incidence of depression among adults: results of the Food4Thought review study

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: The purpose of the current review was to provide an overview of the scientific evidence on the relation between dietary patterns and depression or depression risk among adults. If there are beneficial relations, promotion of healthy dietary patterns can become an important target in the prevention and treatment of depression among adults.

Methods: The systematic literature review focused on a broad range of dietary patterns in relation to depression: general food/dietary intake, specific diets (e.g. Mediterranean) and diet quality. A broad search strategy including keywords regarding depression, dietary patterns and age defining terms was developed. Inclusion criteria were: (I) Focusing on the diagnosis of depressive disorders or self-reported depressive symptoms through validated questionnaires (II) dietary pattern was assessed (intervention or observational) (III) the focus of the study was adults aged 25 years or older, including elderly populations. Pubmed, CINAHL, Web of Science, the Cochrane Databases, OVID and Psychinfo were searched on July 9, 2018. Results were analyzed as a review of reviews when possible, or otherwise as a systematic review of single studies.

Results/findings: After removing duplicates the search strategy led to 8955 hits. Title and abstract screening revealed 1274 relevant hits. Studies were summarized by making a categorization between healthy diets (i.e. Mediterranean/traditional diet, diet high in fruit and vegetables) and unhealthy diets (i.e. Western diet, processed food, snacks). Overall, there were five meta-analyses, three reviews and nine single studies addressing the relationship between healthy diets and depression among healthy populations. The meta-analyses showed that healthy diets can have a significant positive effect on reducing depressive symptoms by 16-36% in the general population. Moreover, concerning unhealthy diets, three meta-analyses, two reviews and one single study were identified. Although one meta-analysis found an association between unhealthy diets and higher incidence of depression, the majority of papers found no significant association.

Conclusions: Evidence suggest a protective effect of healthy dietary patterns on depressive symptoms, though evidence for a beneficial role of healthy diets among a clinical population is currently lacking. Also, more research is needed to determine whether an unhealthy diet has an independent effect on adults' depression status.
A systematic literature review on the influence of prenatal nutrition and nutrition during childhood on the development and endurance of childhood mental health issues: results of the Food4Thought review.

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**Purpose:** The purpose of the current review was to provide an overview of the relation between nutrition factors both prenatally and during childhood and the development and the endurance of childhood mental health issues. This is the first review with such a broad focus with regard to nutrition factors and mental health issues in childhood.

**Methods:** The systematic literature review focused on three primary mental health issues in childhood: ADHD, autism spectrum disorder (ASD) and depression. The review was executed according to the PRISMA guidelines. A broad search strategy including keywords regarding mental health disorders, nutrition terms and age defining terms was developed. Inclusion criteria were: (I) Focusing on ADHD, ASD or depression or questionnaires assessing one of those disorders (II) nutrition was assessed (intervention or observational) (III) the focus of the study was children <12 years of age or nutrition was determined during pregnancy and mental health during childhood.

**Results/findings:** The search strategy led to 24563 hits, after deduplication 15090 hits remained. Title and abstract screening revealed 451 hits. Overall there was some evidence for a small but significant positive effect of PUFA supplementation on ADHD (SMD/ES varying from 0.05-0.48). For the effect of PUFA supplementation and ASD, GFCF and ketogenic diet and ASD the evidence was limited and inconclusive. For prenatal folic acid supplementation there was some proof that it can decrease the risk for ASD. Prenatal vitamin D status seemed to be related to the development of ASD and ADHD during childhood. Lastly, there was a scarcity of studies with a focus on dietary patterns and the disorders and a lack of studies with a focus on childhood depression.

**Conclusions:** There are indications that prenatal nutrition and nutrition during childhood can influence the development and endurance of ADHD and ASD during childhood. However, more high quality research is needed and research on dietary patterns in relation to mental health issues and research on the influence of nutrition on childhood depression needs especially attention.
Intercultural Education through Physical Activity, Coaching, and Training (EDU-PACT)

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Objective
EDU-PACT is an Erasmus+ funded project aiming at improving the quality of pre-service and in-service education strengthening the professional profile of both sport related teaching, professions preparing teachers and coaches for inclusive intercultural education in and through physical education and sport. The second work package of the project aimed at identifying best available knowledge and generate expert-practice input related to the field of intercultural learning through physical activity and sport. Knowledge obtained in the second work package will be used as a basis for the next work package where educational modules will be developed to guide PE teachers and sports coaches in tackling the intercultural challenges and opportunities.

Methods
Each participating project partner conducted a national need-analysis in order to obtain knowledge on intercultural learning through physical activity and sport, from an academic perspective, PE teacher perspective and sports coach perspective. All national needs-analyses are currently being collected and compared in order to identify recommendations for the next project steps. Further, a rapid evidence analysis was conducted in order to scope the scientific literature and thereby obtain knowledge on the area.

Results
At the moment, the project needs analysis is at its final stage. The recommendations based on the collected needs-analysis and the rapid evidence analysis will be presented at the conference. Preliminary results indicate, that both school and sports clubs serve as ideal settings for inclusive intercultural education through physical activity. However, sports clubs are extraordinary in the way that it gives refugees the opportunity to connect to society, give something back by volunteering and to be active. However, alternative sporting activities might be most suitable to get everyone involved.

Conclusion
The modules are going to be available as an online tool to be used in various settings, however, primarily targeting PE teachers and sports coaches. For PE teachers or sports coaches working with children and youth with diverse ethnical backgrounds, the modules will help improve the intercultural education through physical education and sports activities.
Exploring connections with the land in a physical activity context among Indigenous youth in urban centres

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Objective: The purpose of this research was to explore connections to the land within a physical activity context among Indigenous youth in urban centres. Two research questions guided this study: (a) What does a connection to the land look like in an urban physical activity context, and (b) How can communities support land-based programs in an urban physical activity context. Responding to recent calls in the Indigenous physical activity literature (McHugh et al., 2018), this research provides necessary insights for enhancing the physical activity experiences of Indigenous youth.

Methods: This research was guided by a participatory research approach. Nine youth that self-identified as Métis and First Nations participated in this research. Data were generated through sharing circles and follow-up one-on-one interviews. All interviews were audio-recorded, transcribed verbatim, and analyzed using the six phases of thematic analysis outlined by Braun and Clarke (2006).

Results: Participants described how the land in an urban context represents more than just a physical space; the land is connected to their identity, holistic health, family, healing and languages. Physical activity was described by participants as an important context for maintaining ties to the land in urban centres. Four themes that represent opportunities to support land-based programs in an urban physical activity context were identified: (a) reclaiming spaces; (b) stewardship of the natural world; (c) culture camps and land-based education; (d) accessibility to resources and fostering information.

Conclusions: Findings from this research suggest that physical activity can play a central role in connecting Indigenous youth to the land in urban centres. Furthermore, practical suggestions to facilitate connections to the land within physical activity contexts were identified, and should be considered by physical activity practitioners. Such findings may also be useful for Indigenous youth to explore ways to restore connections to their culture and with the land.
The feasibility and impact of embedding pedagogical strategies targeting physical activity within undergraduate teacher education: Transform-ED!

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**Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM**

**Other**

**Purpose:** Low levels of physical activity and high levels of sedentary behaviour are widespread public health issues. In spite of government recommendations, low levels of physical activity and sedentary behaviour are pervasive, especially in schools. Preservice teacher education is pivotal to school and educational reform, but is an under-studied setting for physical activity and sedentary behaviour intervention research. Therefore, the objective of this pilot study was to test the feasibility and potential impact of embedding evidence-based active pedagogy, based on an adapted version of Transform-Us!, Transform-ED!, within one core unit of an undergraduate teacher education degree.

**Methods:** Baseline and follow-up measures (i.e., surveys) were conducted with Bachelor of Education (Primary) preservice teachers who received the Transform-ED! intervention, and academic educators who delivered the intervention. Focus groups (FG) were conducted with a sample of senior academics in the School of Education, and telephone interviews were conducted with a sample of primary school principals to examine their perceptions of intervention feasibility and to explore potential real-world relevance and impact of preservice teachers trained in active pedagogy. Paired t-tests compared preservice teachers’ perceptions before and after the Transform-ED! intervention. Inductive thematic analysis was performed to analyse FG and interviews.

**Results:** After 12 weeks, preservice teachers (n=218) were significantly more willing (t=2.81, p=0.005), confident (t=5.45, p<0.001) and competent (t=8.79, p<0.001) to deliver Transform-ED! Had more positive feelings about the impact of physical activity on student outcomes, (t=8.66, p<0.001), and perceived fewer barriers to integrating Transform-ED! into current and future teaching (t=8.85, p<0.001). Four major themes emerged from the FG (n=9) and interview (n=5) data around participant perceptions of Transform-ED!: i) acceptability, ii) need (tertiary level), iii) need (primary level), and iv) challenges.

**Conclusion:** Transform-ED! demonstrated promising results across multiple participant levels. Therefore, embedding active pedagogy into undergraduate teacher education is an acceptable and potentially sustainable approach to integrating physical activity and reducing sedentary behaviour across the school day.
Associations of physical activity and support garment use with hernia incidence among patients with a stoma: A cross-sectional study.

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: A stoma is a surgically created connection between the bowel and the surface of the abdomen to divert the flow of faeces or urine. Patients with a stoma report decreased levels of physical activity (PA) post-surgery. Patients report concern about engaging in PA for fear of developing a hernia. However, there is limited understanding of PA in this patient group and its association to the development of a hernia. This study aimed to explore associations between PA, frequency of support garment use and hernia diagnosis.

Methods: A cross-sectional, online survey run between April and May 2018. A sample of 1528 people with a stoma responded to a survey advertised via social media and via email to Vanilla Blush customers. Participants completed validated questionnaires for PA and reported their frequency of support garment use (belts or underwear), if they had a diagnosed hernia (parastomal or incisional) and their demographic and clinical characteristics. Linear and logistic regressions were run on multiply imputed data.

Results: The majority of the sample were female (78.5%) with an Ileostomy being the most common stoma (61.7%). Participants were also more likely to engage in PA for 30 minutes on at least one day of a week (72%). Participants with higher levels of PA were 18% less likely to report a hernia diagnosis (OR 0.82, 95%CI: 0.70; 0.95). There was an interaction between support underwear use and PA for hernia diagnosis (OR 1.16, 95%CI: 1.01; 1.34). Among those that frequently wore support underwear the likelihood of hernia was similar regardless of level of PA, whereas among those that wore support underwear infrequently, those with lower PA were more likely to report a hernia diagnosis compared those with higher PA.

Conclusions: PA appears to be associated with lower reported hernia diagnosis in patients with a stoma and there appears to be an interaction between PA and infrequent use of support underwear on hernia diagnosis. However, the current study cannot determine the direction of the relationship and so prospective research is needed to investigate the causal pathways between PA and hernia and the potential role of support underwear.
The effect of PE lessons on classroom behaviour

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Purpose: To investigate the impact of PE lesson intensity and skill complexity on students' on-task behaviour in the classroom. It was hypothesised that (i) intensity would have an inverted-U relationship with on-task behaviour, (ii) that skill complexity would have a positive effect on-task behaviour, and (iii) interaction effect of intensity and complexity, whereby high complexity negates the inverted-U relationship at high intensity.

In contrast to laboratory-based studies, this study investigated the effect of physical activity (PA) on learning behaviour in a naturalistic setting, lending it high ecological validity.

Methods: A 3 (intensity) x 2 (complexity) intrapersonal design was used to assess the effect of PE lesson intensity and complexity on on-task behaviour over a 6-week study period. Participants were 101 children (Nboys= 41) in years 3-5 of primary school (Mage 9y 4m, SD 7.5m, range 7y 11m - 10y 5m), across 8 classrooms in 4 schools. They were observed for 25min in classroom lessons before and after PE lessons. Behaviour was rated on-task or off-task every 30sec. Observation data were analysed using generalised linear mixed models for binary data.

Results: A main effect of intensity on post-PE on-task behaviour was found (F(2,51634)=11.07, p<0.001), but only for high intensity PE lessons (thigh=2.85, p<0.01, tmedium=0.52, p=0.60). No main effect of complexity on on-task behaviour was observed (F(1,51636)=1.89, p=0.17). The interaction of intensity and complexity was significant (F(2,51628)=69.19, p<0.001). On-task behaviour did not differ after low intensity/low complexity (control condition) and medium intensity/high complexity PE lessons. After high intensity/low complexity (OR=1.12) and low intensity/high complexity (OR=1.39) it differed, but effect sizes were d=0.06 and d=0.18 respectively. Small effect sizes were found for medium intensity/low complexity (OR=1.78, d=0.32) and high intensity/high complexity (OR=1.82, d=0.33).

Conclusions: These findings demonstrate that participation in PE lessons can positively affect children's on-task behaviour in the classroom. PE lessons involving high complexity and high intensity or low complexity and medium intensity appear to have the greatest benefits for students' behaviour in the classroom.

This knowledge will enable teachers to plan PE lessons to maximise the benefits to pupils, and to help improve pupils' task-related behaviour.
What do teachers think about included children with special educational needs and disabilities in physical educational classes? Preliminary analysis based on a systematic review

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Objective: The aim of this study is to investigate the physical education (PE) teachers' attitudes toward inclusion of children with special educational needs and disabilities (SEND) and seek to better understand the extent to which PE teachers view themselves as proximate enablers of inclusion.

Methods: The study used a systematic review approach. A search of eight electronic databases was conducted and empirical studies from between 1975 to 2018 were identified as eligible for consideration. Articles were included if (a) they assessed the in-service PE teachers' attitudes towards inclusion of children with SEND in a school-based context; (b) were written in English; and (c) were peer reviewed. Two reviewers independently evaluated the title/abstract in the RAYAN software to determine whether the studies met these inclusion criteria.

Results: The search strategy yielded 1385 articles in total, of which 49 met the criteria for inclusion in the systematic review. Whilst 4733 in-service PE teachers were surveyed in total, only 43% percent of the studies reviewed used validated questionnaires. Moreover, where validated questionnaires were used, there was very high level of between-study variability in terms of the sample size (157 ±smn; 161; mean ±standard deviation). Notwithstanding these methodological issues, the cumulative findings of these studies can be summarised as follows: 11 studies reported a positive, or at least a moderately positive, attitudes among teachers toward inclusion of students with SEND; one study reported an unfavourable attitude toward inclusion among general PE teachers; and the remaining studies reported mixed results.

Conclusion: This review highlights the limited research evidence that exists upon which to base our understanding of teacher attitudes towards including SEND children in PE. It is widely acknowledged that inclusion in PE requires practical changes to be made by PE teachers. However, this review shows that there is still a limited number of studies available that can tell us about teachers' actual practical competence, or self-efficacy, and with which we can begin to address shortcoming. Critical questions also remain about the validity and reliability of how we assess teachers' attitudes and work in relation to children with SEND.
Objective
In this nationwide cross-sectional study we aimed to determine the prevalence of physical activity, domain- and intensity-specific physical activity levels, and the association of lifestyle and socio-demographic characteristics with total physical activity among Nepalese aged 15-69 years.

Methods
The data were collected using self-administered Global Physical Activity Questionnaire in a nationally representative sample (n = 4,143; 66.5% females). The sample comprised both rural and urban populations in Nepal.

Results
We found that 97% (95% confidence interval [CI]: 96%, 98%) of men and 98% (95% CI: 98%, 99%) of women met the recommended levels of physical activity (i.e. 150 minutes of moderate-intensity physical activity, 75 minutes of vigorous-intensity physical activity, or an equivalent combination of the two intensities). Most participants of both sexes engaged in very high occupational physical activity, whilst not engaging in any leisure-time physical activity. A multiple regression analysis showed that higher levels of total physical activity were associated with younger age, rural place of residence, lower level of education, being married, 'normal' weight, and not smoking (p < 0.05 for all).

Conclusion
Vast majority of Nepalese meet the recommended levels of physical activity, due to labour intensive nature of jobs. However, most of them do not engage in any leisure-time physical activity. Given these findings, currently it seems that promoting more overall physical activity in Nepal may not be as important task as in some other countries. Nevertheless, there is a need for further research on the reasons for very low levels of leisure-time physical activity in this population.
Enrollment in physical education predicts increased physical activity among Canadian secondary students in the COMPASS study

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose
Currently in Canada, few youth meet the moderate-to-vigorous physical activity (MVPA) recommendation of 60 minutes per day, and physical activity guideline adherence steadily declines throughout secondary school (Harvey, Faulkner, Giangregorio, & Leatherdale, 2017). Enrollment in secondary school physical education (PE) courses have the potential to promote increased physical activity engagement among youth (Tassitano et al., 2010). However, this enrollment drastically decreases once students' PE credit has been met, typically in grade 9 (Davis, Zhu, & Haegele, 2018; Mandigo, 2010). The purpose of the current study was to examine whether continuous PE enrollment supports physical activity among youth in secondary school. This study is the first to investigate if PE enrollment predicts MVPA in two Canadian provinces.

Methods
Using Year 3 (2014/2015) and 6 (2017/2018) student questionnaire data from the COMPASS study, the sample included 1514 students from Ontario and Alberta, Canada, with data successfully linked from grade 9 to 12. Regression models tested whether change in PE enrollment predicted changes in self-reported MVPA (minutes) and MVPA guideline adherence from grade 9 (baseline) to grade 12 (follow-up). Models adjusted for school clustering and covariates (student sex, ethnicity, weekly spending money, sports participation, province, and school-area median income).

Results/Findings
Among students who took PE in grade 9, students currently enrolled in PE in grade 12 reported 30 minutes and 21 minutes more MVPA on average per day compared to students who did not take PE in grade 12 and those who took PE in grade 12 but not in the current term, respectively. Among students meeting physical activity guidelines and enrolled in PE in grade 9, students not taking PE in the current term in grade 12 were less likely to continue to meet physical activity guidelines, than students currently enrolled in PE (AOR 0.53; 95% CI: 0.36,0.78; p=.0013).

Conclusions
Future considerations surround enhanced knowledge translation of the importance of PE in secondary school to increase the likeliness of meeting the physical activity guidelines. Implications also include potential curriculum/policy adjustments for continued PE requirements in all terms.
The association of fundamental movement skills and moderate-to-vigorous physical activity in young children with and without motor impairments

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Purpose: To examine the association of fundamental movement skills (FMS) and moderate-to-vigorous physical activity (MVPA) in children with and without motor impairments (MI). The objectives were: (1) to compare FMS and MVPA in children with MI and those with typical development (TD) and to examine their relationship; (2) to determine predictors of physical activity (PA) guideline adherence (=60min MVPA daily) in children.

Methods:
Participants included 188 primary children (6-10 years old) consisting of 88 children with MI (59 boys) and 100 children with TD (49 boys). Movement Assessment Battery for Children-second edition (MABC-2) was used to assess general motor functioning and a child was considered as having MI (=5th percentile) or TD (=16th percentile) based on the total score of MABC-2 test. Five FMS (running, jumping, catching, kicking, throwing) were assessed using the Test of Gross Motor Development-second edition (TGMD-2). MVPA was objectively assessed with ActiGraph GT3X+ accelerometers (=2,296 counts/min) for consecutive seven days. Generalized linear models (GLMs) were performed to compare group difference (MI vs. TD) and examine the association of FMS proficiency with MVPA in both groups by sex after controlling for confounders. Predictors of the PA guideline adherence (0=not meet, 1=meet) were analysed by the logistic regression with group, sex, and FMS variables as independent variables.

Results: As expected, the MI group scored significantly lower in jumping (p<.001) and catching (p<.05) than the TD group. Children with MI spent 25.2min and TD 24.6 min of MVPA per day. GLMs results showed that MVPA was positively correlated to jumping (TD girls) and catching (MI and TD boys) and was negatively related to running (TD boys and MI girls) (all p<.05). Catching (odds ratio=1.686, 95% CI=1.096, 2.593) was found to be a significant predictor of PA guideline adherence independent of group and sex.

Conclusions: There is a close association of FMS proficiency with MVPA in children with MI and TD. Interventions focusing on FMS, especially catching, have potential to facilitate children's activity accrual and PA guideline adherence.
Purpose: To examine accelerometer-assessed physical activity (PA) and sedentary time (ST) of adolescents with special educational needs (SEN) and to compare their PA and ST by sex.

Methods: Participants included 27 Hong Kong Chinese adolescents with SEN (14 males; aged 12-18 years). PA was assessed using ActiGraph GT3X+ accelerometers for consecutive seven days. The time spent in different PA intensity levels (sedentary, light PA [LPA], moderate-to-vigorous PA [MVPA]) were converted into percentage (%) of the monitored time. One-way (sex) factorial analysis of covariance (ANCOVA) was used to compare %sedentary, %LPA and %MVPA after controlling for age and body mass index.

Results: During the valid monitoring time (732.6 min±smn;81.1), adolescents with SEN in general spent 69.7% of their time in being sedentary and only 5.3% in MVPA. The ANCOVA results showed a significant sex difference, with males being less sedentary (64.4%±smn;8.7 vs. 75.4%±smn;5.4) and spending more time in LPA (29.1%±smn;7.4 vs. 20.7%±smn;4.9) and MVPA (6.5%±smn;2.2 vs. 3.9%±smn;1.0) than females (all p<0.001).

Conclusions: Adolescents with SEN have low PA and high ST. Effective interventions should be designed to promote their PA, particularly in girls.
Identifying patterns and determinants of physical activity in the Andhra Pradesh Children and Parent Study (APCaPS) Cohort in India: A Cross Sectional Study

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Other

Purpose
India has a high burden of non-communicable diseases including cardio-vascular disease and diabetes, for which physical activity (PA) is a recognised intervention to reduce risk. Rapid urbanisation of peri-urban areas could have important influences on PA levels, but data on PA in peri-urban Indian populations are lacking. We studied patterns and determinants of PA in 29 peri-urban villages participating in the longitudinal Andhra Pradesh Children and Parent Study (APCaPS).

Methods
We analysed self-reported PA data collected using a validated questionnaire from 6073 individuals aged >18 years in the third APCaPS follow up (2010-12). We performed exploratory factor analysis (EFA) to identify latent patterns of PA and compared characteristics of individuals in the highest and lowest tertiles of the predicted factor scores. To identify PA determinants, we used a multilevel, random intercept linear regression model to identify variables associated with Moderate and Vigorous PA (MVPA) levels. We used standardised log Metabolic Equivalent of Task (MET) values as the outcome and modelled standard deviation changes in the log MET.

Results
Overall, 85.50% of individuals met the 1200 MET/week PA recommendation. Occupational activities accounted for 70% of vigorous PA, and leisure for the remaining 30%. In contrast, 50% of moderate PA was occupational, 18% leisure driven and 19% household related. 6 distinct patterns were identified from EFA. Factor 1, 2, 4 and 5 were primarily characterised by household activities done by women, walking at work by men, sports performed by men and cycling done by men, respectively. In the multivariable analysis, individuals aged >=60 years (-0.41 95%CI -0.52 - -0.29), professional workers (-0.52 95%CI -0.67 - -0.37) and obese (-0.06 95%CI -0.16, 0.05) perform less MVPA than 18-<30 year olds, unskilled manual workers and normal body mass index (BMI), respectively. Per unit increase in waist to height ratio is associated with less MVPA (-0.90 95%CI -1.63 - -0.17), confounded by BMI. Females (0.50 95%CI 0.440.57) perform more MVPA than males. Education reduced the effect of age with MVPA.

Conclusions
The results suggest a need to increase leisure type MVPA. PA intervention programs should target professional workers.
An assessment of nutrition education – review of general medicine curriculum at medical faculty of Masaryk University

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Objective:
The purpose of this study was to assess the current status of nutrition education in the medical school curriculum at the Masaryk University (MU) in Brno, Czech Republic (CR). Many surveys have evaluated nutrition education in medical schools around the world, but no research has been done in the CR. The research question aims to identify (1) number of hours of nutrition education (2) the type of courses offered and (3) the year of the study in which nutrition education is provided.

Methods:
The first step was a preliminary analysis of 59 obligatory, 10 elective and 30 selective courses in the current curriculum of the 6-year general medicine program and was completed during September-October 2018. The official accreditation material for the general medicine program at MU is valid from October 2015. It was used together with the Internal System (IS) of courses for the analysis process. The IS stores updated and detailed course information in a standardized electronic form. For each course the syllabus was evaluated for any nutrition related topics. In the second step, data for the research question was gathered from the relevant courses during November 2018.

Results:
From the total of 69 obligatory and elective courses analysed, no separate course for primary nutrition was identified. There are four courses providing nutrition topics offering a total of 19.5 hours of nutrition education to medical students as follows: 10 hours of seminars, 8 hours as part of the lectures and 1.5 hours as part of the clinical practice. Two of four courses were preclinical (semester 6, year 3) - Public Health (10h) and Introduction to Clinical Courses/Propaedeutics (1h) and two courses were clinical (semester 9, year 5), Paediatrics (6h) and Clinical Oncology (2.5h). From 30 selective courses, six lectures offered nutrition education in paediatrics during semesters 7-12.

Conclusions:
The obligatory courses at Masaryk University fall short of the recommended minimum of 25 hours of nutrition education by the US National Academy of Sciences. Nutrition education is presented mostly in the form of lectures and seminars in the 3rd and 5th years of study.
Are psychological distress and resilience associated with eating behaviours among Australian university students?

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: University students internationally have unhealthy eating behaviours, and experience poorer mental health than the general population. However, most studies investigating the association between eating behaviours and mental health are in older adults and further studies specifically in university students are needed. This study aimed to explore associations between two measures of mental health, psychological distress and resilience, with eating behaviours in a sample of Australian university students.

Methods: A cross-sectional analysis was conducted using data from an online survey of students from the University of Newcastle (UON), Australia (UON Student Healthy Lifestyle Survey 2017). Psychological distress was assessed using the Kessler Psychological Distress Scale, resilience was assessed using the Brief Resilience Scale, and eating behaviours (fruit, vegetable, soft drink, takeaway food and breakfast intakes) were assessed using short diet questions. Socio-demographic (e.g. gender, living situation), student (e.g. undergraduate/postgraduate) and health characteristics (e.g. physical activity, alcohol use) were captured. Multivariate linear regression models were used to explore the associations between psychological distress and resilience with eating behaviours, with adjustment for socio-demographic, student and health characteristics as potential confounders.

Results: The analysis included 2710 students (mean age 26.9±9.5 years, 30.4% male, 82.0% Australian born). Close to a quarter of the participants (22.9%) were classified as high risk of psychological distress and 14.3% as very high risk, while 29.7% were classified as having low resilience. Higher psychological distress was associated with lower fruit ($\beta_a=-0.30$, p=0.002) and vegetable ($\beta_a=-0.38$, p=0.001) serves/day, lower frequency of breakfast consumption (p<0.001) and higher frequencies of soft drink and takeaway food consumption (p<0.001). Lower resilience was associated with lower fruit ($\beta_a=-0.05$, p<0.001) and vegetable ($\beta_a=-0.03$, p=0.03) serves/day, and higher frequencies of soft drink (p=0.002) and takeaway food consumption (p=0.004).

Conclusion: These study results demonstrate that healthier eating behaviours are associated with lower psychological distress and higher resilience in a sample of Australian university students. Further studies are needed to substantiate this association, for example, cohort studies tracking diet and mental health over time. The findings provide further support for the need for nutrition interventions for university students, because of the potential positive impact on mental health and well-being.
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What do we know about the relation between dietary patterns and depression risk among adolescents? Results of the Food4Thought systematic review study

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Objective: Healthy eating (e.g., appropriate intake of fruit and vegetables, Mediterranean style diets, low sugar and fat diets) is thought to be associated with a lower, whereas unhealthy eating (e.g., fast food, high energy, high fat intake) is thought to be associated with a higher risk for depression or depressive symptoms. If these propositions hold true, promotion of healthy diets can be an important target in the prevention of depression. The aim of this study is to identify whether dietary patterns are related with depression risk among adolescents. Adolescents are an important target group for depression prevention, as depression often has its first onset in adolescence.

Methods: A systematic literature review following the PRISMA guidelines was conducted, using the PubMed, PsychInfo, Web-of-Science, CINAHL, OVID and Cochrane databases as sources. The search terms included synonyms for depression and depression risk, for dietary patterns and for adolescence. In line with recent insights from transitional psychiatry, we considered adolescence to range from 12, 25 years of age.

Results: Of the initial 6193 hits, 229 remained after title screening and 41 studies were included in the review. Most studies had a cross-sectional design and were conducted among large population based samples. Depressive symptoms and dietary intake were predominantly measured by means of self-report questionnaires. The 27 studies investigating the role of healthy dietary patterns consistently found a lower risk for depressive symptoms. The 14 studies that investigated the influence of unhealthy dietary patterns consistently found a higher risk for depressive symptoms.

Conclusion: This study shows that there is insufficient evidence to determine the relation between dietary patterns and depression risk among adolescents. Even though there seem to be beneficial associations between healthy dietary patterns and depressive symptoms, the evidence is based on cross-sectional data and no causal inferences can be drawn. Studies with longitudinal or experimental designs are needed to gain more insight in the role of dietary intake in depression risk among adolescents.
Purpose:
Veganism as a lifestyle is gaining popularity even in regions where it does not have a strong tradition, including the post-communist European countries. While survey data show that general populations in these countries show specific characteristics (e.g. higher alcohol consumption than in other areas of the world), a description of health attitudes and behaviour among vegans is lacking. The purpose of this study was to describe the health attitudes and behaviours of self-identified adult vegans in comparison to non-vegan controls, and to discuss potential cultural and regional specifics.

Methods:
A cross-sectional analysis of out-patient data from a tertiary clinical nutrition centre was performed. Questionnaires were distributed among 52 healthy adult vegans (29 females, 23 males) and 59 non-vegans (26 female, 33 males) including items on alcohol consumption, cigarette smoking, consumption of fruit and vegetables, supplement use, and consumer choices (preference for organic food, self-production of food etc.). Basic anthropometric characteristics were assessed. Associations between diet (vegan vs. non-vegan) and health attitudes, health behaviours as well as BMI were evaluated by conditional logistic regression analyses adjusting for age and sex.

Results:
According to our preliminary analysis, there are differences between vegan and non-vegan individuals in many of the evaluated characteristics. Vegans reported higher consumption of fruit and vegetables, a higher rate of supplement use, and a stronger preference for organic products. Regarding alcohol consumption, vegans showed a higher prevalence of abstinence, but a similar proportion of heavy drinking as among non-vegan controls was observed. Both groups reported a high interest in food quality and a very low prevalence of cigarette smoking.

Conclusions:
The obtained results could be used for better-targeted health recommendations taking into account the cultural and other specifics of the vegan population in this region.
Objective: Some authors have suggested that eating pleasure is underutilized in the promotion of healthy eating. However, the links between eating pleasure and dietary behaviours have not been reviewed comprehensively so far, which makes it difficult to assess whether and how the pleasure of eating can be a lever for healthy eating. Therefore, this review sought to explore the links relating the pleasure of eating with dietary behaviours and health.

Methods: We performed a scoping review based on the six-stage framework proposed by Arksey and O'Malley. We screened 16 082 articles from eight scientific databases: Medline, PsycInfo, Embase, ERIC, Web of Science, CINAHL, ABI/Inform global and Sociology Abstract. Studies targeting individuals of at least 5 years old, conducted in developed countries, interested in the subjective aspects of eating pleasure and written in English or in French were included. Descriptive statistics are presented.

Results: Of these studies, 39 evaluated the link between eating pleasure and dietary and/or health outcomes (25 cross-sectional, 10 intervention, 1 retrospective, 1 prospective and 2 qualitative studies). Results showed that in most of these studies, eating pleasure was associated with a better diet quality (50% of studies), smaller portion sizes (83% of studies), healthier food choices (80% of studies) and higher body weight/BMI (50% of studies). However, the dimensions used to define eating pleasure were quite variable among studies. We observed that, when eating pleasure was conceptualized as epicurean (i.e. focusing on multisensory aspects of food, discovery of new foods/variety, cooking experiences, sharing meals), 84% of studies reported that eating pleasure was favourably associated with dietary outcomes. On the contrary, when eating pleasure was conceptualized as visceral (i.e. associated with short-term visceral impulses triggered by hunger, external cues or emotional urges), eating pleasure was then unfavourably associated with dietary outcomes (50% of studies) and body weight/BMI (100% of studies).

Conclusions: This scoping review suggests that there is potential for integrating eating pleasure, using an epicurean paradigm, in approaches aimed to improve dietary habits. However, since the majority of studies were cross-sectional, testing well-developed and evidence-based interventions integrating eating pleasure is needed before reaching a clear conclusion.
The psychological aspects of eating behavior, psychological well-being and weight status in medical and healthcare students

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Aim: To assess the psychological aspect of eating behaviour and psychological well being, including depression, anxiety and stress in the medical and healthcare students in Hong Kong

Methods: This is a cross-sectional study which invited medical students, nursing student and pharmacy students to complete an online questionnaire. A Weight-related Eating Questionnaire (WREQ) was used to measure external eating (hunger and responsiveness to food cues), emotional eating and dietary restraint. The psychological well being, including depression, anxiety and stress was assessed by using the Depression Anxiety Stress Scales (DASS21). The data collection is still underway. This abstract reports the preliminary analysis of 167 respondents (65.5% female, mean age 20.2 ±smn;1.4 years, mean BMI 20.8±smn;2.3)

Results: Among the 167 respondents, 16% were underweight, 70% with normal body weight and 13.8% were overweight or obese. 32% reported consuming more in response to external eating cues and 19.8 % reported emotional eating. 35.3% had moderate to severe depression, 28.1% had moderate to severe levels of stress and 54.5% had severe to moderate levels of anxiety. A higher proportion of overweight or obese students reported consuming more in response to external eating cues (P=0.047). Students with depression problem reported a higher tendency of emotional eating (P=0.001) and external eating (P=0.012). Similarly, students with anxiety problem report a higher tendency of emotional eating (P<0.001) and external eating (P<0.001).

Conclusion: Medical and healthcare students reported a poor psychological well-being and their psychological well-being are related with the psychological aspects of eating behavior, including emotional eating and external eating.
Relationship between Mediterranean diet, body composition and physical fitness in 13 to 16-years old Icelandic students.

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Abstract

Purpose: Obesity among adolescents is currently a major public health concern. Physical activity, physical fitness and adherence to the Mediterranean diet (MD) are powerful indicators for the prevention and treatment of obesity. The aim of this study was to examine the association between health-related physical fitness components, body composition, and adherence to MD in 13 to 16 years old adolescents.

Methods: The study design was cross-sectional, with 387 subjects of 13 to 16 years old students (54% boys) from two secondary schools in the capital city of Iceland. The ALPHA Health-Related Fitness Test Battery for Children and Adolescents (ALPHA) Fitness Test battery was used to measure physical fitness and body composition. The Mediterranean Diet Quality Index (KIDMED) questionnaire was used to assess adherence to MD.

One-way ANOVA and Bonferroni post-hoc tests were performed for the associations between MD, body composition, and fitness according to gender and age.

Results: Compared with girls, boys had significantly lower body fat percentage (-33.4%, p<0.001), and wider waist circumference (+5.8%, p<0.001), but no significant difference was found in BMI (p=0.241) between gender. Among total subjects, high/medium MD group had significantly better performance in endurance test than those with low MD (p<0.05). Among boys, high/medium MD group had significantly lower fat percentage (p=0.006) and better performance on the 4x10m sprint test (p=0.002) than low MD group, but no association was found among girls. No association was found between MD and performances in handgrip test and the jump test.

Conclusions: The study found that MD was strongly related to endurance performance in both gender. The current findings indicate that MD is a strong determinant of lifestyle related health among adolescents living in Iceland.
Understanding the influence of the social environment on food and activity choices of Singaporean young adults

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Objective: Young adults experience major life-transitions, and habits formed during this period are indicative of long-term behaviors. This period is increasingly recognized as being important for weight control and lifestyle interventions. While social factors may be a strong determinant of lifestyle choices in younger persons, the influence of these factors on dietary and activity choices of Asian young adults, particularly in the context of increasing social media exposure and engagement, is not clear.

Methods: We conducted seven focus group discussions (3 male and 4 female groups) with 46 full-time students recruited through purposive sampling from two tertiary institutes in Singapore. Participants were asked about the factors affecting their activity and dietary behaviors, including exposure to social media. Audio-recordings were transcribed and analysed using thematic analysis with both inductive and deductive approaches.

Results: Participants were largely Chinese (80.4%), with a mean (SD) age of 20.9 (1.8) years and a mean BMI of 22.1 (3.0) kg/m². We identified three main themes related to social influences on diet and activity behaviors: role of social media; perceived social norms; and family and peer influences. Young adults used social media as sources of information, inspiration, and to share recommendations and promotions. Content related to food, especially those shared by popular food bloggers, often resulted in organization of social activities around promoted foods which were not necessarily healthy. While content on physical activity may also be shared depending on the social network's interest, follow up action is rare. Perceived social norms around settings such as gyms, and activities such as weight lifting, were reported as barriers to activity for women. Family members were described by women as "mirrors"; commenting on body weight which could influence self-image and behavior. Support from close family and friends was a strong motivating factor in starting and maintaining healthy lifestyles.

Conclusions: The ubiquitous use of social media in young adults facilitates the rapid spread of content and can spur changes in food and activity choices. Social networks, both virtual and real, can be influential in determining young adult's lifestyle choices and present important opportunities for behavioral interventions.
Dietary habits of adolescent sports clubs participants and non-participants: the Finnish Health Promoting Sports Club (FHPSC) study


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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: For adolescent athletes, data on nutrition behaviors are limited. The aim of the study was to evaluate the dietary habits of adolescent sports clubs participants (SP) compared with non-participants (NP).

Methods: This cross-sectional study including 1957 adolescents aged 14, 16 was based on data from the Finnish Health Promoting Sports Club (FHPSC) study. The health behavior surveys were conducted among sports club participants (n=1087) and non-participants (n=870). Multilevel logistic regression analysis was used to test statistical significance of the differences in dietary habits between SPs and NPs and to identify significant predictors of vegetable and fast food consumptions.

Results: Daily breakfast consumption on school days was self-reported by 69.8 % of SPs and 60.2 % of NPs [odds ratio (OR) 1.06, 95 % confidence interval (CI) 1.05, 1.07]. SPs were more likely to report daily vegetable (46.0 vs. 32.2 %, OR 1.22, 95 % CI 1.16, 1.27), fruit (35.4 vs. 26.0 %, OR 1.02, 95 % CI 1.00, 1.04), brown bread (35.6 vs. 26.3 %, OR 1.17, 95 % CI 1.10, 1.25) and fat-free or semi-skimmed milk (71.8 vs 55.2 %, OR 1.24, 95 % CI 1.23, 1.25) consumptions than NPs (p<0.05). Consumptions of chips (6.3 vs. 7.9 %, OR 1.21, 95 % CI 0.87, 1.69, p=0.248) and fast food (5.5 vs. 8.5 %, OR 0.98, 95 % CI 0.84, 1.14, p=0.748) more often than once a week were similar between the groups, whereas eating sweets (47.7 vs. 46.3 %, OR 1.28, 95 % CI 1.13, 1.44) more often than once a week was more frequent in SPs. Female sex and better educational achievement predicted vegetable consumption. Fast food consumption was associated with higher body mass index and lower educational achievement and self-rated health.

Conclusions: Healthy eating habits are more common in sports club participants compared with their non-participating peers. Many dietary habits regarded as unhealthy, such as fast food consumption, are equally frequent in the groups. Adolescent athletes would benefit from nutrition education for health promotion and sport performance.
A community-based weight loss programme on physical activity levels for overweight Chinese adults with pre-diabetes: A pilot study

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Aim
The study aims to pilot test a culturally appropriate community-based diabetes prevention programme for overweight Chinese people with pre-diabetes. This paper reports the change in physical activity levels between baseline and 6th months.

Method
This is a 12-month pilot study which targeted weight loss of at least 5% over 6 months through restriction of caloric intake and increased physical activity (PA) (goal =150 minutes of moderate physical activity per week, i.e. =600 MET-min/week in moderate PA). Participants attended 7 group-based lifestyle intervention sessions, including two 1-hour workshops delivered by a physical trainer, during the first 6 months. Each participant also received a pedometer and be encouraged to keep active. Level of physical activity were assessed by using a Chinese version International Physical Activity Questionnaire. The MET-minutes scores were calculated and used to categorizes participants' level of activity into "inactive" (less than 600 MET-min/week), "minimally active" (at least 600 MET-min/week) and "Health-enhancing Physical activity level" (HEPA) active (at least 3000 MET-min/week).

Results
10 middle-aged adults (7 female, mean age 50.4±smn;SD 7.5years) who were overweight/obese (mean BMI 27.0±smn;SD 3.2kg/m2) and pre-diabetic were recruited. At baseline, most of the participants were "inactive" (ie. <600 MET-min/week). After 6 month lifestyle interventions, the group showed an increase in both total PA levels and time spent on moderate and vigorous PA. 30% of the participants achieved the goal =600 MET-min/week in moderate PA and 80% of participants reported increase in moderate-intensity-activity participation. Overall, there was a 15% increase in the MET-min score between baseline and 6 months. 67% of the participants lost at least 5% of their baseline weight (mean weight loss 2.7±smn;3.9kg).

Conclusion
The group-based lifestyle intervention pilot study conducted in community setting was able to motivate and prompt generally inactive pre-diabetes participants to increase their participation in both vigorous-intensity-exercises and moderate-intensity exercises.
Sedentary behavior patterns using accelerometry and their association with cardiorespiratory fitness

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective. Recent studies in adults showed that higher levels of sitting time, less number of breaks in sedentary time, and longer sedentary bout durations were associated with lower cardiorespiratory fitness. Low levels of cardiorespiratory fitness are known to be one of the leading risk factors of cardiovascular health. We aimed to identify patterns of sedentary behavior (SB) and examined whether cardiorespiratory fitness differs between classes with distinct patterns of SB.

Methods. Among a general population sample, 170 participants (57% women, mean age = 56.4 years) received accelerometry monitoring for seven days. Prior to accelerometry assessment, cardiorespiratory fitness was assessed by peak oxygen uptake (VO2peak). Patterns in accelerometer data were classified based on time spent in SB per day using growth mixture modeling. The latent class variable was regressed on sex, age, and season of data collection. Accelerometer wear time was included as time-varying covariate. Model-implied class-specific VO2peak means were compared using adjusted equality test of means.

Results. Growth mixture modeling revealed four patterns: "High, stable" (n = 120, M = 724.9 min/day), "Low, increase" (n = 14, M = 622.2 min/d), "Low, decrease" (n = 11, M = 540.2 min/day), and "High, decrease" (n = 25, M = 694.8 min/day). Persons in class "High, stable" had significantly lower VO2peak values (M = 25.0 mL/kg/min, SD = 0.6) compared to persons in class "Low, increase" (M = 30.5 mL/kg/min, SD = 3.6; P = 0.001), in class "Low, decrease" (M = 30.1 mL/kg/min, SD = 5.0; P = 0.009), and in class "High, decrease" (M = 29.6 mL/kg/min, SD = 5.9; P = 0.032), respectively. No differences among the other classes were found.

Conclusions. We identified four classes of individuals with distinct patterns of SB and showed that VO2peak partially differs between classes. Varying patterns of SB across the week that were characterized by a higher or lower amount of SB on weekdays compared to weekends, or less sitting throughout the week seems to be associated with higher levels of cardiorespiratory fitness. Especially, individuals with stable high SB levels throughout the week might be addressed in public health recommendations and interventions.
I sit at work, because it’s what I always do – Ambulatory Assessment to examine contexts and habit strength of prolonged sitting bouts

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Sedentary time and especially prolonged sitting (=20min) is a health risk factor distinct from physical inactivity. Sitting occurs in multiple settings during the day and within varying contexts. Context-specific sitting may have distinct environmental, social and psychological correlates. Furthermore, it can be assumed that sedentary behaviors are to a large extent regulated automatically in daily life as sedentary behaviors are often a subcomponent of actions such as working, talking, reading etc. Habit, which implies an automatically triggered (behavioral) impulse, might be an important psychological correlate of sitting. Until now, contexts and correlates have almost exclusively been studied retrospectively, focusing on between-person differences. This study applied an ambulatory assessment design to address within-person variability and to assess contexts and environmental and psychological correlates (habit strength) of prolonged sitting bouts in everyday life.

Methods: Sitting was assessed during four consecutive days using thigh-worn accelerometers, which were coupled with smartphones via bluetooth. Whenever persons sat for 20min a short questionnaire was triggered on the smartphone. The questionnaire included questions regarding the context (where?, what?, with whom?), whether there was an option to stand and the perception of automaticity (“I automatically sat down”) and frequency (“I sat down because I always do so in this situation”).

Results: Data of 62 persons (31 female, M=29.5years, SD=2.2) with accelerometer wear times =10h/day were used for preliminary analyses. In sum, 3,406 questionnaires were triggered and 1,926 were answered. There was a high intra-individual variability in perceived automaticity and frequency of sitting: 55% (ICCA=0.45) and 67% (ICCF=0.33) of the variance were caused by within-person variability. For 33.5% of the prolonged sitting bouts, persons stated that there was an option for standing instead of sitting. The perception of options for standing differed according to the contexts: at work (25.5%) less options for standing were perceived than during leisure time (43.2%; ?;2=39.77, p>.001).

Conclusions: The results indicate meaningful within-person variability of habit strength and context-specific differences between options for standing. Information about contexts of sitting and its environmental and psychological correlates is crucial to detect those contexts and sitting bouts that are susceptible to change via targeted interventions.
Replacing bouted sedentary time with physical activity: effects on adiposity in Czech school-aged children

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Substituting sedentary time with physical activity (PA) has several health benefits. However, the effects of reallocating time from different sedentary bouts (SBs) to PA on health outcomes are not well-known. This study investigates the effects of reallocating time spent in different SBs to light-intensity (LIPA) and moderate-to-vigorous PA (MVPA) on adiposity in children. Participants were 425 school-aged children. Total sedentary time (TST) and time spent in different SBs (i.e., 1, 9, 10, 29 and =30 min) and PA were monitored using an ActiGraph accelerometer. Adiposity was expressed as fat mass percentage.

To investigate the effects of reallocating TST and time in SBs to PA, the compositional isotemporal substitution model was applied. The composition of movement behaviors was significantly associated with adiposity (R²=0.07; p<0.001). Further, the relative contributions of time spent in 10, 29 min SB (βa;ilr = 0.21; p=0.036), LIPA (βa;ilr = 0.37; p=0.045) and MVPA (βa;ilr = 0.21; p=0.004) were associated with adiposity. A negligible decrease in adiposity while reallocating TST and time in SBs to LIPA was observed. In contrast, reallocating 1 h/week of TST to MVPA resulted in a decrease of about 0.3 percent points in body fat percentage. The maximum effect on adiposity was observed while time from 10,29 min sedentary bout was reallocated to MVPA. In this case, body fat percentage decreased of about 0.4 percent points with every hour reallocated from 10,29 min SB to MVPA. Replacing sedentary time with MVPA is associated with positive effects on adiposity in children.
Interventions to improve physical activity and decrease sedentary behavior at the workplace - a systematic review of economic evaluations

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Purpose: Insufficient physical activity (PA) and excessive sedentary behavior (SB) are major causes of at least 35 chronic diseases which result in an important worldwide economic burden. The workplace is an ideal setting to implement public health strategies aimed at improving PA and SB. As economic justification for encouraging workplace interventions are needed, we performed a critical appraisal and synthesis of health economic evaluations (HEE) of interventions aiming to improve PA and SB at the workplace.

Methods: A comprehensive search filter was developed using guidelines, the PRESS checklist and published search algorithms. Six databases were searched and references of relevant articles were scanned for eligible studies. Full HEE of workplace-interventions targeting PA and/or SB were included. Methodological quality was assessed using the CHEC-list. All procedures were performed by two researchers independently, followed by a consensus meeting. Results were synthesized qualitatively.

Results/findings: The search yielded 3155 references, of which 197 full-texts were assessed and 17 included in the final synthesis. The methodological quality of included HEE varied considerably: the median of fulfilled CHEC-list criteria was 63.2% (range = 36.8%-100%). Nine multicomponent health-programs, seven specific PA-interventions and one specific SB-intervention were identified. Studies were heterogeneous regarding sample size, design, intervention technique and outcome measures. From the 17 studies, significant improvements were reported in six studies for PA and in the study on SB. Typically, cost-effectiveness analyses were performed from the societal perspective and cost-benefit analyses from the employer's perspective. However, the considered cost categories (e.g. different direct and indirect costs) varied. From nine cost-effectiveness analyses, two were considered to be cost-effective, and three others not. In four evaluations, the cost-effectiveness was uncertain. From 12 cost-benefit analyses, seven were considered to be cost-beneficial. Non-randomized trials were much more likely to report positive results than randomized trials.

Conclusion: Despite some promising results of worksite interventions targeting PA and SB, their economic value remains uncertain. Further randomized trials applying sound methodologies to identify effective strategies as well as their economic consequences are needed. To enhance generalizability across countries with different health care systems, future HEE should consider the societal perspective, including all costs.
Objective
Social jetlag is described as "the discrepancy between biological clock and social obligation". It has been found to be related to unhealthy behaviors and unfavorable health outcomes such as obesity. This study investigated the sociodemographic and behavioral (sedentary behavior and physical activity) correlates of social jetlag among adolescents in Hong Kong.

Methods
The analytic sample consisted of 615 adolescents (51% boys) aged 11-18 years. The adolescents wore an activPALTM for 7 consecutive days to measure moderate-to-vigorous PA (MVPA), sedentary time, bedtime, rise time, and sleep duration. Social jetlag was computed as the difference between the mean midpoint of sleep on free nights and on school nights. Time spent in screen-based activities and puberty stage was self-reported using validated questionnaires. Sociodemographic information including the participants' age and sex, number of siblings, and maternal educational attainment were reported by the parents. Generalized estimating equation (GEE) were performed to assess the association of sociodemographic, sedentary time, physical activity, and screen time with social jetlag.

Results
On average, the participants slept for 7.5 hours (SD: 1.0) on school days and 9.4 hours (SD: 1.5) on free days. The average social jetlag was 1.40 hours (95% CI: 1.31, 1.47) and over 60% had = 1 hour of social jetlag. Adolescents who were in pre-puberty stage had shorter social jetlag compared with those in late/post-pubertal stage (B=0.414, 95% confidence interval: 0.209, 0.821). The longer the average daily sleep hours over a week, the more likely the adolescents had the social jetlag (B=1.176, 95% confidence interval: 1.053, 1.312). Screen time was positively associated with social jetlag among adolescents in pre-puberty stage only (B=1.224, 95% confidence interval: 1.013, 1.480). No associations were found between MVPA and social jetlag.

Conclusions
Social jetlag was prevalent among adolescents in Hong Kong and it was associated with screen time in pre-puberty adolescents.
Objective

The present study investigated whether timing of motor development is associated with subjectively and objectively measured physical activity (PA) levels at different intensity levels and time spent sedentary in midlife.

Method

This population based study comprised of all 4,098 people born in the northern part of Finland in the year 1966 with measures of nine infant motor developmental milestones and data on self-reported and objectively measured PA. The milestones include making sounds, holding up the head, grabbing objects, turning from back to tummy, sitting without support, touching the thumb to the index finger, standing up with support, walking with support, standing without support and walking without support. Principal component analysis (PCA) was used to form combination variables (locomotion and non-locomotion motor development) of nine infant motor developmental milestones. PA was objectively measured using wrist-worn uniaxial accelerometer (Polar Electro Oy, Kempele, Finland). The participants were instructed to wear the activity monitor 24 h/day for 14 days on their non-dominant hand. Measured PA was classified at six levels (motionless: <1MET, very light: 1<2 MET, light: 2<3.5 MET, moderate: 3.5<5 MET, vigorous: 5<8 MET, and very vigorous =8 MET). Linear regression analysis was used to predict the PA level and time spent sedentary.

Results

Infant motor development was not associated with the amount of objectively or subjectively measured PA levels in middle age. Birth weight, gender, BMI and education level were the most significant predictors for both objectively measured and self-reported PA levels in midlife. Earlier locomotor development was associated with more objectively measured sedentary time (ßα; -0.054, p=0.003) and self-reported sitting time (ßα; -0.061, p=0.001).

Conclusions

Middle aged PA is a multifactorial behavior with various factors from childhood to adult age playing a role in determining individual physical activity levels. Locomotor development was not associated with PA, but inverse association was observed with sedentary time at middle age.
Association between subjective health complaints and adolescents’ lifestyle

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

**Purpose:** To investigate the relationship between adolescents' subjective health complaints, health behaviours and a composite measure of healthy lifestyle.

**Methods:** Cross-sectional study. Participants were 171,306 adolescents, aged 10-16 years, from 37 countries and regions. A composite score of healthy lifestyle was created using the combination of daily physical activity, daily consumption of fruit and vegetables, spent <2 hours daily in screen-based behaviours, never drinks, and never smokes. The subjective health complaints assessed were headache, stomach ache, backache, dizziness, feeling low, irritability, nervousness, and sleep difficulties. Binary logistic regression was conducted to analyse the effect of healthy lifestyle score on multiple health complaints.

**Results:** Adolescents who engage in physical activity every day, spend less than 2 hours a day in screen-based behaviours, do not drink alcohol, and do not smoke tobacco presented a higher likelihood of not having subjective health complaints more than once a week. Likewise, having a healthier lifestyle is related with less subjective health complaints. Among healthy behaviours, fruit and vegetables consumption was the only behaviour that was not related with stomach ache ($\chi^2(1)=1.955, p=0.162$), backache ($\chi^2(1)=0.529, p=0.467$), dizziness ($\chi^2(1)=2.245, p=0.134$), and difficulties in sleeping ($\chi^2(1)=0.113, p=0.737$) more than once a week. Adolescents that engage in physical activity every day, spend less than 2 hours in screen-based behaviours, eat fruit and vegetables every day, do not drink alcohol and do not smoke tobacco, had less somatic, psychological and psychosomatic symptoms than those who do not have these healthy behaviours. Having a healthy lifestyle was related with having less of all the subjective health complaints. Having a healthy lifestyle decreased the odds of having multiple health complaints during adolescence, except for the ages of 10 and 14. Adolescents that have a healthy lifestyle are 50% (OR= 0.5, 95% CI: 0.5-0.6, p<0.001) less likely of having multiple health complaints, compared to those who did not have a healthy lifestyle.
P3, P3.248

Comparative Approach of the Use of Continuing Education on Physician Knowledge of Diabetes-Focused Nutrition Care

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Other, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: This research focus is to determine if a continuing education (CE) course is an effective tool to improve physicians' nutrition knowledge and how the method of delivery plays a role. It is hypothesized that online delivery provides an optimal path to deliver nutrition-focused CE.

Methods: A one-hour CE course was implemented with physicians (n=230) to educate on evidence-based recommendations for nutrition care for patients with diabetes. This quasi-experimental study focuses on providing a course in three different delivery formats (on-demand webinar (n=148), PDF self-study (n=42) and live in-person (n=40)). Texas Medical Association hosted the course, available on-demand online and delivered once in-person at the annual association meeting. Associated 10-question pre- and post-tests were taken to determine overall changes in nutrition-focused knowledge related to the course. Data collected were analyzed using paired t-tests, one-way ANOVA, multiple comparisons and descriptive statistics.

Results: Physicians who completed the CE resulted in a significant improvement in knowledge-based test scores (mean=+2.64, p=0.000). A 7/10 is considered "passing" for continuing education; including all delivery methods, only 29% had "passing" pre-test scores and 92% had "passing" post-test scores. The delivery method seemed to have played an important role in improvements in test scores (p=0.000). On-demand webinars, as compared to self-study and live CE, resulted in the largest changes in mean (+3.17, +2.29, +1.05) respectively. Qualitative data described physicians intended changes from to this CE demonstrated an ongoing theme of screening patients and delivering basic nutrition education and counseling around carbohydrate consumption.

Conclusions: Continuing education is a vital component to healthcare providers, staying updated on current recommendations and care for their patients. In general, nutrition-focused CE's are a viable approach to educating physicians about nutrition care for their patients. The most effective delivery method of CE found regarding nutrition care for diabetes for physicians was on-demand webinars. As physicians lead the way in delivering nutrition education to stimulate patient's improved lifestyle changes, it is vital that we instruct providers with the most current recommendations and guidelines for care. A clear, effective approach to improving knowledge of nutrition-focused topics is one-hour CE courses.
Objective: Sedentary behavior is increasingly recognized as a risk factor for chronic disease and mortality. However, there are few data on sedentary patterns among undergraduates, and even less is known about complementary behaviors, such as snacking, which may accompany sedentary behavior in this population. The current study examined sedentary behaviors among undergraduates at a public US university and characterized snacking during sedentary activities.

Methods: Self-reported time spent sedentary was measured using the validated Sedentary Behavior Questionnaire (SBQ), which assesses sedentary time in 9 domains; we adapted the SBQ for college students to assess 3 additional domains: lecture/course, leisure computer surfing, and socializing. Additionally, we developed a questionnaire which inquired about the frequency of snacking in each domain. To characterize exposure to snacking during sedentary behaviors, we created the Snacking Intensity and Time (SIT) index: snacking (yes/no)*Intensity(once in a while [1]/about half the time [2]/almost all the time[3])*Time(weighted daily minutes sedentary) and summed across domains. Demographic data were also obtained. All questionnaires were online.

Results: Undergraduates (N=272; 79% female) reported a median 11.8 hours/day sedentary time on the adapted SBQ, with classroom/coursework sitting (2.25 hours/day), TV viewing (2 hours/day) and socializing (1.58 hours/day) emerging as top contributors to total sedentary time. However, only socializing and TV viewing were commonly accompanied by snacking; 75% indicated complementary snacking while socializing and 69% during TV viewing, but just 24% reported snacking while attending lecture/doing schoolwork. Females were more likely to snack while engaged in sedentary behaviors than were males (M SIT index = 154 vs 111, respectively, p=0.003), although they did not engage in greater sedentary time (708 vs 705 min/day, respectively). Mean SIT Index for undergraduates with obesity/overweight (22%) did not differ significantly from normal/underweight students (174 vs 134, respectively, p=0.46)

Conclusions: Undergraduates report classwork-related activities, TV viewing and socializing as the primary contributors to sedentary time, and they commonly engage in snacking during some of these activities. Complementary snacking likely contributes excess caloric intake and may magnify the negative health impact of sedentary behavior. Interventions targeted at reducing time spent sedentary and decreasing complementary snacking should be explored among undergraduates, particularly among women.
Physical activity in secure settings: A scoping review of methods, theory and practise

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: To explore and synthesise existing literature on methods, theory and practice used to investigate physical activity in secure mental health settings; to identify gaps in existing literature; and to highlight future recommendations. The review aims to: (1) Identify methodology in studies aiming to increase or evaluate physical activity; (2) explore use of behavioural and psychological theory; (3) explore and identify determinants of physical activity.

Methods: Review used scoping review guidance (Arksey & O'Malley, 2005; Peters et al., 2015), and the PRISMA checklist for scoping reviews. The framework consisted of five stages; identifying research question, identifying relevant studies, selecting studies, charting data, collating.
Transition to secondary school: A qualitative approach to discern factors that influence physical activity behaviours

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Transition from elementary to secondary school is an emotionally and socially complex time when adverse behaviours appear, such as decreased levels of physical activity (PA). Behavioural and environmental factors that influence PA during this time are poorly understood. Therefore, we aimed to identify factors that influence PA as youth transition to secondary school.

Methods: We conducted 28 semi-structured interviews among a sample of ethnically diverse youth/parent dyads within the public school system in Surrey, British Columbia, Canada (50% boys, 68% mothers, 25% White). The interview probed for environmental and behavioural factors in school, family, and social contexts that potentially initiated change in PA as a result of the youths transition from the youth and parents perspective. We conducted thematic data analyses of both youth and parents' transcripts using NVivo12.

Results: Thematic analyses identified a hierarchy of factors at the individual, social, familial, and school levels that may trigger youth to change their participation in PA as they transition from elementary to secondary school. At the school level, factors were changes in school schedule (daily structure and autonomy to choose what to do during free time), availability and accessibility of PA resources, emergence of skill sets that dictate opportunities to qualify for team sports, disappearance of play, pressure to do well in school, and structure and content of physical education courses. At the family level, factors were most often related to changes in parenting practices such as change in expectations (increased focus on academic skills and decreased expectation to participate in PA). The social setting was also highlighted as friends' co-participation in PA changed, peer pressure intensified, and social norms surrounding PA changed as peer pressure emerged. At the individual level, identity formation, self-efficacy, and motivation to participate in PA emerged as factors that may initiate change in youth PA youth during as they transition to secondary school.

Conclusions: During this complex transition into secondary school, it is important to address factors that support youth engagement in PA. Interventions that target and effectively address these identified factors during is this transition would be a welcome addition to the literature.
The Perception and Determination of Intercollegiate water sports athletes towards sports career engagement: Case Study of Swimming and Synchronize Swimming in Hong Kong

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Purpose
The Department of Health, HKSAR (2014) reflected that 62.5% of Hong Kong citizens and 50.6% of teenagers do not reach the standard physical activity level suggested by WHO (2010). Public sports participation is seen to be affected by various aspects, including environment, education, government and the overall societal community; whilst, the effect brought by athletes engagement might relate to governance and the community. It can be acknowledged that "Promoting Sport in the Community, Supporting Elite Sport and Maintaining Hong Kong as a Center for Major International Sports Events" are the three main objectives advocated by the HKSAR Government; while the public has neglected their interactivity. Overviewing the sports engagement in Hong Kong, the limited societal commitment has discouraged Hong Kong intercollegiate high-performance athletes' attainment towards the sports career. Hence, it suppressed the role-model and motivational effect brought by athletes engagement and public participation in international sports events for enhancing community's sports participation. The purpose of this qualitative research is to discuss and investigate the factors that affect Hong Kong high-performance water sports athletes' determination on sports career engagement.

Methods
Swimming and synchronized swimming were being selected as the focus of this research. The two contrasting sports nature and development were able to show a diverse viewpoint and lead to distinct perception and determination. The research was based on the Self-determination theory (Deci & Ryan, 1985, 2000; Vallerand, 1997), and has focused on the cognitive and behavioural led extrinsic factors.

Results
The results indicated that the social image of academic achievement and parental support have generated the most significant effects on both water sports.

Conclusion
With the conclusive relation model, synchronize swimming, being a lower popularity sport, it showed enormous constraint in sports career engagement compared to swimming. At last, practical suggestions were offered for eliminating the constraints and burden of elite sports engagement.

Keywords: intercollegiate athletes, social image, social support, sports engagement
20448

P3, P3.52

How can just-in-time behavior change of physical activity be realized in older adults while considering the interaction with their environment?

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Purpose: The first aim of the project is to identify the dynamic determinants of physical activity (PA) in older adults using Ecological Momentary Assessment (EMA). EMA is a novel methodology that enables capturing the dynamic nature (i.e. time-varying and context-varying fluctuations) of determinants of PA in real time. This methodology is very innovative for this research domain, since using (event-based) EMA for PA and determinants in older adults has not been done before. A second aim of this project is to examine how just-in-time behavior change of PA can be realized in older adults while considering their interaction with the environment.

Method: To fulfill the first project aim, an observational study will be conducted. A random sample of 1000 older adults (65+) will be drawn from the municipal register from three cities in Flanders (e.g. Ghent, Belgium). They will receive an invitation letter and two to six days later, they will be visited at home to ask for their participation. During the first visit, information about the study and a training session in smartphone use and filling out the EMA questionnaires will be given to the participants. The participants will be monitored for seven consecutive days with an activity sensor (Move 4, Movisens) worn at the right hip. The Move 4 gives the opportunity to do event-based and time-based EMA using the smartphone application from Movisens (MovisensXS). This makes it possible to identify the dynamic determinants of PA.

The second project aim will be fulfilled through small micro-randomized trials (MRTs). MRTs can examine the isolated effects of the just-in-time adaptive determinants, identified in the observational part. The MRTs will contain small just-in-time adaptive interventions with diminutive differences (e.g. number or timing of triggers) that will be delivered through a basic application developed for this study.

Analyses: For the observational part, complex multi-level analyses with a time-dependent correlation structure will be carried out. For the experimental part, a centered and weighted least squares method will be performed to examine whether the dynamic determinants are effective in behavior change of PA.
20513

P3, P3.53

Exploring the impact of weight stigma on physical activity among women living with obesity

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Weight stigma is prevalent in the physical activity context and presents a barrier for women to engage in physical activity. The purpose of this study was an in-depth exploration of the impact of weight stigma on perceptions and experiences of physical activity in women with obesity.

Methods: Using Interpretive Description and guided by the principles, values, and strategies of health promotion, we conducted semi-structured telephone interviews with 16 Canadian women living with obesity (Mage=40 years, range 20-59 years). Interviews were audio-recorded, transcribed, and inductively coded to produce a thematic description. Data analysis is ongoing.

Preliminary findings: We found that all participants had experienced weight stigma in various physical activity contexts including fitness and recreation facilities, on sports teams, within individual activities, and from physical activity advertisements and media. The women we spoke to were not afforded the same privileges as 'smaller individuals' and faced issues others would not, such as receiving patronizing comments when engaging in healthy behaviours, feeling pressure to cover up their bodies, and needing to ask about weight restrictions on fitness equipment. Some participants felt that their weight was holding them back, whereas others felt like their bodies could do just as much as smaller bodies. These experiences influenced the participants' decisions around physical activity in several ways. They opted to stick within their comfort zone, where activities, spaces, and people were familiar and less likely to result in judgment or shame. For some, this meant avoiding physical activity altogether. To mitigate weight stigma, our participants suggested that agencies promoting physical activity or providing physical activity services avoid focusing on weight loss or quick fixes, acknowledge the complexity of body weight, promote various types of activities, show diverse body sizes in advertisements, increase availability and affordability of workout clothing, and uphold a sense of belonging and safety in physical activity spaces.

Conclusion: The findings illustrate how weight stigma influences women's relationship with physical activity, how they view their bodies, and how they make decisions about being active. Addressing weight stigma within physical activity contexts could improve access, participation, and ultimately health for women living with obesity.
Effects of exercise intervention to midnight shift workers

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INTRODUCTION: In Japan, the number of midnight shift workers is increasing in each year. Shift workers tend to suffer from disorders of various biological rhythms such as biological clock, autonomic nerves system and hormone secretion. As a result, they are reported to have more health problems, which increase the risk of ischemic heart disease, high blood pressure, metabolic syndrome. In a forecast of increasing number of midnight shift workers, environmental improvement is a crucial problem not only to employee but also to company and society for workers to maintain their health and work safely. On the other hand, people who have exercise habits and more physical activities are generally known to have less lifestyle disease rate and have longer life. In this study, the effects of exercise habits to midnight shift workers’ health were examined.

METHODS: Subjects were 47 men midnight shift workers who work at factory. They were working at two factories; 25 at A factory and 22 at B factory which have the same working system. At A factory, a licensed exercise instructor gave lessons from a year ago, and prepared training room in the factory. On the other hand, at B factory, subjects did not get the steps and worked at the same environment as before. Both A and B factories, subjects got measurements in physical activity, blood pressure and biochemical examination of blood at the same period.

RESULTS: Between A and B factory, no significant difference in age, height, weight, BMI, blood pressure, cholesterol levels, number of steps and total energy consumption. Then, correlation analyses of these data were conducted in each factory. Then, in B factory group, which had no lessons and training environment, significant positive correlation were found in BMI and systolic pressure, diastolic blood pressure and LDL (low-density lipoprotein) cholesterol level. In A factory, no significant differences were found.

DISCUSSION: These results showed the possibility of exercise habits to improve blood pressure and serum lipid state, which suggest that midnight shift workers, should learn effective exercise method and get training facility in a factory.
Systematic review of psychological and behavioural correlates of recreational running

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective:
Recreational running is becoming increasingly popular, but the study of its correlates is scarce. Therefore, the aim of this review is to systematically synthesise the published literature describing the psychological and behavioural correlates of recreational running in adults.

Methods:
Quantitative studies published in peer-reviewed journals until December 2018 in English were included. Studies were identified through MEDLINE, PsychINFO, SPORTDiscus, and Web of Science, and were selected for this review if they 1) studied recreational running, 2) included healthy adult samples (18 years or older, without a diagnosed medical condition or metabolic disorder), and 3) examined psychological or behavioural correlates of recreational running. Two independent researchers identified eligible studies, and are currently extracting data and assessing the methodological quality of each study, using the NHLBI, NIH Quality Assessment Tool.

Results:
Forty-nine articles reporting 52 studies met the eligibility criteria and were included. Ten were controlled trials, 14 had a longitudinal design and 28 a cross-sectional design (overall, n=31330; 42% women; 36.0±smn;10.9 years). Studies reported: 1) psychological and behavioural determinants of recreational running (motives, k=12; intention, k=4; self-efficacy, k=5; attitudes and norms, k=3; goals, pride and shame, social support, action and coping planning, k=1), and 2) psychological outcomes (mood, k=12; wellbeing, affect, enjoyment, k=6; cognitive function, depression, k=5; anxiety, k=4; flow, stress, k=3; vitality, engagement, skills, mental health, emotional regulation, k=1). Data regarding recreational running correlates is being extracted and conclusions will be drawn based on a narrative synthesis. If appropriate, meta-analytical techniques will be conducted.

Conclusions:
To our knowledge, this is the first systematic review presenting a methodical analysis of recreational running from the perspective of those actively engaging in it. Systematically identifying and summarizing relevant information on behavioural and psychological correlates of recreational running across populations can contribute to inform and guide a public policy agenda focused on helping people sustain regular PA, through an activity they have chosen and appear to enjoy.
The effectiveness of peer mentoring in improving physical activity levels in adolescents: A systematic review

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Currently there is a global decline in physical activity (PA) levels in adolescence. The emergence of peer relationships is one of the key developmental phases at this age. There is evidence that peers can influence others' health behaviours. Interventions employing peer-led strategies have been widely used for promoting positive health behaviours in adolescents such as smoking cessation, sexual health etc. The objective of this systematic review is to assess the impact and design of PA interventions that are peer-led.

Methods: This study was registered with PROSPERO (CRD42018090400) and followed the PRISMA guidelines and AMSTAR critical appraisal tool for systematic reviews. Two reviewers screened articles from Scopus, PsychINFO and Medline. For inclusion, studies had to focus on adolescents (age 12-18), include a peer-led intervention or an intervention with a peer-led component, and report on a PA outcome. Data extracted from the selected studies included, PA outcomes, training provided, method of choosing peer mentors, age dynamic between mentors and mentees and the theoretical framework underpinning the study. Study quality was critically appraised using a standardised tool.

Results: Out of 1509 potentially relevant articles, 13 studies were identified as meeting the inclusion criteria. Seven studies reported on an intervention that was solely peer-led whereas six reported on a multi-component intervention that included peer mentorship. Five studies reported an increase in PA levels, while eight reported no significant changes in PA levels. Nine studies reported on training provided to peer mentors and three reported on how the peer mentors were chosen. Nine studies reported using theory to underpin their study.

Conclusions: Peer mentorship a resourceful way of leading adolescents in physical activities. To determine the effectiveness of peer mentorship, more studies focusing specifically on the effect of the peer component would allow us to examine its impact further. Training of peer mentors and the method of choosing those best suited to the role should be more widely explored to maximise impact in future interventions.
Exploring Regional Accessibility and Neighborhood Walkability to Explain Domain- and Context-Specific Physical Activity

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objectives:
Regional accessibility (RA) represents physical connectivity/centrality between residence and impactful social/economic hubs of activity (e.g., employment, shopping, travel, and learning) within a larger metropolitan region. RA may influence active transport (AT) beyond local neighborhood walkability (NW) through shorter distances for work and non-work travel. However, few physical activity (PA) studies have examined the link between RA, NW, and domain- and context-specific PA. This analysis explored relationships between RA and four PA outcomes in the Phoenix, Arizona metropolitan region (23,828km2). We hypothesized greater RA would relate to greater AT and PA behaviors, adjusting for NW. Further exploration examined whether RA moderated NW for PA outcomes.

Methods:
RA was assessed using a protocol developed by the International Physical Activity and Environment Network (IPEN study) using participant baseline data (n=718) from the Walking Interventions through Texting (WalkIT Arizona) trial. Network distances to eight social/economic activity hubs were z-scored and summed to produce RA index scores. The Neighborhood PA Questionnaire (NPAQ) assessed self-reported AT inside neighborhood, AT outside neighborhood, and Total PA. The ActiGraph GT9X (n=651) measured moderate-vigorous PA (MVPA). Negative binomial regression models evaluated relationships between RA and each of the four PA outcomes individually: Model 1 statistically adjusted for sex, race, cohabitation status, household car:driver ratio, and neighborhood socioeconomic status. Model 2 included all Model 1 covariates plus NW. Model 3 included a NW*RA interaction term.

Results:
Participants were mostly female (62%), middle-aged (44.8yrs+/9.4), obese (32.9kg/m2+/6.9), and insufficiently active (72.9%). Greater RA was associated with more minutes of AT inside neighborhood (p=.018), statistically controlling for covariates except NW. After adjusting for NW, RA was no longer associated with AT (p=.355). No significant associations were observed with other PA outcomes or for interactions between NW and RA for any PA outcome (p>.05).

Conclusion:
After adjusting for local neighborhood walkability, regional accessibility was not predictive of objective, domain-, or context-specific PA. Further investigation is needed to clarify the role of RA in supporting AT behaviors as region-wide supports for PA are a potential target for improving public health.
Perceived barriers and enablers to physical activity participation in individuals with Alopecia Areata: A qualitative study

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Purpose: Alopecia Areata (AA) is an autoimmune condition that is characterised by hair loss. There is currently no effective treatment and AA individuals often describe feelings of trauma, social rejection and disrupted mental health due to cosmetic repercussion. Physical activity (PA) participation has been associated with better mental health outcomes in diverse populations. A preliminary study on AA individuals indicated that severe hair loss is associated with symptomatic depression, anxiety, stress which negatively impact PA participation. While strategies to increase PA participation in the general population have been established, little is known about the experiences of AA individuals. This study aimed to understand PA barriers and enablers of AA individuals to inform the development of evidence-based interventions and to quantify the benefits of PA for this specific population.

Methods: A qualitative study using focus group (8 participants [33.38±smn;10.81years]) and individual telephone interviews (8 participants [33.89±smn;11.87years]) was conducted in Melbourne, Australia. Interview data were recorded digitally, transcribed verbatim and analysed thematically. Data were coded and compared, and themes were developed, discussed and defined. Recruitment continued until data saturation.

Results: An inductive approach to data analysis was used to determine emergent themes generated through examination of participant's responses. The emergent theme that restricted PA participation were physical (e.g AA related physical symptoms, outward appearance and being started at, and inconvenience of wearing a wig), psychosocial (e.g low social support and being self-conscious) and environmental (e.g wearing a wig in challenging environmental conditions such as too windy, humid, hot) whereas the enablers to PA was related to psychosocial domains such as acceptance of the condition, and being resilient towards the condition and support groups.

Conclusions: These findings highlight the challenges to PA participation among AA individuals. Future interventions could consider addressing these barriers specifically; such an intervention could target these themes to maximise effectiveness to improve mental health status.
The effects of physical activity levels and symptoms of depression, anxiety and stress in individuals with Alopecia Areata

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Alopecia Areata (AA) is an autoimmune condition that is characterised by non-scarring hair loss. Its aesthetic repercussions can lead to profound changes in psychological well-being. Although physical activity (PA) has been associated with better mental health outcomes in diverse populations, the association in individuals with AA has not been established. The aim of this study was to examine the associations between PA and mental health outcomes in individuals with AA to inform intervention strategies for this specific population.

Methods: A cross-sectional study was conducted among individuals who were diagnosed with AA. A total of 83 respondents aged (40.95±smn;13.24years) completed a self-report questionnaire consisting of International Physical Activity Questionnaire-Short Form (IPAQ-SF) and the Depression and Anxiety Stress Scale (DASS-21). Three-way contingency Chi-square analyses were used to determine the associations between PA and mental health outcomes in individuals with AA to inform intervention strategies for this specific population.

Results: 81.9% of the participants did not meet PA guidelines. Participants with hair loss of more than 50% on the scalp and did not meet PA guidelines were significantly more likely to experience symptoms of severe depression (p = .003), moderate anxiety (p = .04) and mild stress (p = .003) than those who met guidelines. Participants who met guidelines with hair loss less than 50% did not exhibit any significant symptoms of depression, anxiety and stress.

Conclusions: Findings suggest that increased PA participation in AA individuals with severe hair loss can improve mental health status. Intervention efforts for this specific population should consider barriers and enablers to PA participation as they face challenges that differ from the general population.
Profiles of motivation for exercise in UK parents: a latent profile and transition analysis

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: The purpose of the present study was to take a person-centred approach to a) identify motivational profiles for exercise, using Self-Determination Theory (SDT) as a theoretical framework, among a sample of parents of primary school children in the UK, b) explore the stability of, and movement between, motivational profiles over a five year period and c) examine differences across these profiles in terms of accelerometer-estimated physical activity.

Methods: Data were from the B-Proact1v cohort. 2555 parents of British primary school children participated, and data were collected on three occasions when their child was in year 1 (ages 5-6), year 4 (aged 8-9), and year 6 (ages 10-11). Parents completed a measure of exercise-related motivation (BREQ-2) and wore an ActiGraph GT3X-BT accelerometer for five days on each occasion. Latent profile and latent transition analyses were conducted using a three-step approach in MPlus.

Results: Six motivational profiles were identified, comprising different combinations of behavioural regulations and in alignment with the motivation continuum proposed within SDT. Between each timepoint, motivational profiles were largely stable, with the likelihood of remaining in the same profile higher than the likelihood of moving. Generally, more autonomously motivated profiles were most stable and parents with an autonomous motivation profile at a previous timepoint were very unlikely to move to controlled or amotivated profiles. At all three timepoints, more autonomous motivation profiles were associated with higher levels of MVPA.

Conclusions: The results support the theoretical proposition of motivation as a multi-dimensional construct and provide further evidence for the experience of multiple simultaneous reasons for engaging in physical activity. The latent transition analysis presents the first evidence for the stability of and movement between motivational profiles, and the findings indicate that promoting more autonomous motivational profiles may be central to facilitating long-term physical activity engagement.
Background
In the study examined the physical activity of those patient who suffering heart failure and live with CRT. In the research Actigraph GT3X+ movement sensor was used simultaneously with the implanted CRT device to validate the CRT's internal sensor's data.

Methods
Biotronik CRT-P or CRT-D was implanted in all patients included in the study. The 6MWT and the physical activity data from CRT-P or CRT-D and Actigraph were collected for a week. SPSS 23 statistical package and Excel program were used for data processing. We used descriptive statistics, correlation analysis, Bland, Altman test and logistic regression in the study.

Results/ findings
Compared the physical activity time that spend in a day's % from the Actigraph (Acti %) versus the results of 6MWT, where was found also a moderate significant correlation among the variables \( r=0.338; 0.031 \). As we analyzed the 6MWT and the PA% data it was found a correlation by a linear regression \( F= 4.141; p= 0.049 \),

Conclusion
The heart failure patients's physical activity is low, lower than it would necessary to maintain their quality of life. The CRT activity sensors data showing higher values, than the Actigraph but both sensor data's values are moving similarly.

Keywords: Heart failure, physical activity, ActiGraph, remote controll, resynchronization device

Acknowledgement
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P3, P3.63

Safe fall-safe schools educational research and prevention program in Hungary

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose
The aim of this study is to show that the implementation of the "Safe Fall-Safe Schools" programme involved in physical education classes can help to reduce the negative effects of unintentional backward falls in the adolescent population. In a 6-week motor development program (Safe Fall) children learn how to protect themselves in case of falling. We would like to exam the efficiency of a preventional-research program, which already is working in Spain and Italy.

Methods
Our sample in this hungarian pilot study is n=21 (control group n=18) attending the 4th grade in an elementary school in Pécs (Hungary). Data was collected on an observation scale which records five basic elements during a backward fall: position of the neck, the hands, the trunk, the hips, and the knees, applying descriptive, correlational, and contrast statistics. For the statistical analysis was used the McNemar's test.

Results
In case of examination group after the teaching program we found significant difference on the determinated position of the bodyparts (neck p<0.021, trunk p<0.000, knees p<0.000, hips p<0.004, hands p<0.000). The data indicates that learning safe and protected ways of falling backward is possible through the implementation of the Safe Fall programme

Conclusions
The results show that the "Safe Fall-Safe Schools" 6 week program involved in PE lessons is able to develop the motor responses of children, which can reduce the risk of falling injuries.

Acknowledgements
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Variability of daily step volume with habitual activity level

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Average steps per day can be used to describe habitual activity level and a target goal a 10,000 (10k) steps/day is frequently used by behavioral interventionists and public health campaigns. However, little is known about how steps should be accumulated on a day-to-day basis in order to optimize success in reaching stepping goals. For example, do individuals who are sufficiently active maintain a relatively high number of steps on most or all days of the week or, do their daily steps fluctuate between high and low stepping days? Purpose: We investigated the day-to-day variability of stepping behavior in low to high activity individuals and hypothesized that the variation in habitual daily step count across these groups was independent of daily step volume. Methods: This study made use of accelerometry data collected in NCI’s iData Study. Healthy middle- to older-aged men and women wore the activPAL activity monitor for 7 days. Average steps/day were used to designate participants' activity level as very low (VL) (<5000), low (L) (5000-7500), moderate (M) (7500-10000), high (H) (10000-12500) or very high (VH) (>12500). Variability in daily step count was characterized using the within-subject standard deviation (SD). Results: Across all participants (516, age=64±smn;6, 47% female), 99 were classified as VL, 155 as L, 133 as M, 74 as H and 55 as VH. Average daily steps were VL=4113 L=6273, M=8642, H=11147 and VH=14949. Within-subject SD were VL=1646, L=2330, M=2903, H=3131 and VH=4907. Conclusion: These data demonstrate that within an individual, daily step count fluctuates between high and low stepping days, and this fluctuation increases with activity level. These data do not support our hypothesis that the variation in daily step volume is independent of activity level and suggest that individuals who are successful at achieving a high average activity level do so by incorporating a mix of high and low daily stepping -across their week's activity. Results from this study could be used to inform intervention strategies and public health messaging to increase activity in this population. Future research should investigate how stepping characteristics such as cadence and stepping bout duration contribute to the observed variability.
Pregnancy and Weight Monitoring: A Feasibility Study

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose
Excess maternal weight gain during pregnancy is associated with pregnancy and birth complications, resulting in increased NHS costs, and may lead to long-term maternal obesity. Although international weight gain guidelines exist, women in the UK have reported information as vague and inadequate. To assess the feasibility and acceptability of incorporating a weight management intervention, using a combination of a weight chart and midwife support, using motivational interviewing techniques, into antenatal care.

Method(s)
Pregnant women were recruited by study midwives at routine maternity appointments and provided with personalised weight charts (based on their BMI) to record pregnancy weight gain against a plotted recommended range. Participants were engaged in sensitive discussions by their community midwives, who were trained in motivational interviewing techniques. Participants were followed up post-birth and weight charts collected from maternity notes. Participant qualitative interviews and midwife focus groups were conducted and thematically analysed.

Results
Fifty two women were recruited across all BMI categories. Weight charts were obtained from 33 (63.5%) of participants' maternity notes; 29 participants (55.8%) had monitored weight =10 times throughout pregnancy and 4 participants (7.7%) had monitored their weight 1=<9 times. Gestational weight gain was obtained for 41 participants (78.8%) and compared to IOM recommended parameters. Of these, 11 participants (27%) were in range, 19 (36.5%) were above and 11 (21.2%) below recommended parameters. Qualitative interviews / focus groups with participants and midwives revealed that the weight charts were generally acceptable to participants, but that midwives did not engage participants in discussions about their weight as part of antenatal care.

Conclusions
Monitoring of gestational weight gain in pregnancy is generally acceptable to women and could be incorporated into an antenatal weight management intervention. However, careful consideration should be made to the feasibility of incorporating an intervention including a weight chart into routine antenatal care and to the burden on NHS midwives.
An Intervention promoting children’s water consumption using their social networks

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Purpose: A key contributor of childhood overweight and obesity is the consumption of sugar-sweetened beverages (SSBs). Research have shown that the replacement of SSBs consumption with water is an effective way to decrease overweight and obesity. Unfortunately, several campaigns have shown limited effects on changing children's consumption behaviors. Perhaps one reason for their limited success is that these campaigns fail to incorporate the strong influence of peers on consumption behaviors. The social network approach has effectively incorporated the power of peer influence by identifying the most influential peers in social networks as advocates to spread the targeted behavior among their peers. However, the question remains whether social network-based interventions are more effective than the widely used mass media campaigns (i.e., targeting large populations, in a rapid manner, to health messages through existing media) for promoting water consumption among children. Therefore, the current study examined the effectiveness of a social network-based intervention targeting water consumption by comparing it to a mass media campaign.

Methods: A total of 451 children were randomly assigned to either the social network-based intervention, mass media campaign, or control condition (no intervention). In the social network-based intervention condition, the most influential children in each classroom were identified and trained to promote water consumption among their peers for four weeks. The mass media campaign consisted of researchers giving a presentation to all children together in the classroom about the benefits of drinking water. Consumption-related behaviors (e.g., water and SSBs intake, social norms and motivation) were assessed by self-report measures before, immediately after the intervention and four weeks later.

Results: Preliminary findings suggest that the social network-based intervention was more effective in increasing children's water consumption and decreasing their SSBs consumption compared to the mass media campaign and control condition.

Conclusion: This is the first study that compares the effect of a social network-based intervention to a mass media campaign for water consumption, having several implications. Theoretically, it extends the literature on social network-based interventions by examining the effectiveness compared to the mass campaign. Practically, it could provide implications for campaign makers focusing on increasing water consumption.
Encouraging Food Engagement in Next Generation Consumers: IVvalueFood: A 3 Year Plan

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

IVvalueFood is an innovative, pan-European EU funded project spanning 3 years, involving partners from research and industry. Studies have identified younger generations' engagement and knowledge in food to be very low. For example, in a survey of UK primary school pupils 25% believed fish fingers originated from chickens or pigs, and in another survey 17% of UK children and adults believed that eggs were a core ingredient in bread (AHDB Cereals & Oilseeds, 2010; British Nutrition Foundation, 2013). The project aims to engage next generation consumers with food, from primary level school children to university students using novel approaches.

IVvalueFood's objectives are to improve next generation consumers' engagement with food, through increased knowledge, interest, understanding of where their food comes from and its value, in order to enhance consumer health and support the European Agri-Food economy. Encouraging the young people has the potential to cultivate a future generation that understands and places value on food and potentially influence their peers. This project hopes to create influencers, referred to as 'Food Champions', composed of consumers and industry who will champion food through the use of digital platforms including social media.

Using predominantly qualitative methods in year 1 the project will; evaluate existing tools and strategies used for engagement (WP1), understand the needs, wants and barriers of various stakeholders to food engagement (WP2), create a database to house the tools and strategies with a search and find capability (WP3) and explore how to successfully co-create future tools and strategies with industry (WP4). Work Packages 1 and 4 will utilize literature reviews, while qualitative interviews, focus groups and workshops will collect data across Europe for work packages 2 and 4. Work Package 3 will use decision modelling to develop a prototype to allow appropriate selection of tools and strategies based on pre-defined criteria.

Years 2 and 3 will scale up the studies, to create a solid presence of food champions across Europe.
Carry-over effect of physical activity in fruit-vegetable consumption among Chinese college students: Evidence from a randomized placebo-controlled trial

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Interest in health behaviour change interventions has been spurred by a burgeoning body of research. The remained question is to untangle the interrelationships among diverse health behaviours. Evidence supported the carry-over effect of physical activity (PA) in fruit-vegetable consumption (FVC), whereas limited studies targeting the Chinese population. Given this, the present study aimed to a) evaluating the effectiveness of a web-based intervention on PA and FVC as well as relevant social-cognitive variables of PA and FVC change, and (b) examining whether the first addressed health behaviour exerts carry-over effects on the followed health behaviour.

Methods: A randomized placebo-controlled trial was conducted, using the Health Action Process Approach as the theoretical backdrop. 565 Chinese college students (210 males, 355 females) were randomly assigned to one of three groups, including PA-first arm: first 4-week intervention on PA and followed 4-week on FVC; FVC-first arm: first 4-week intervention on FVC and followed 4-week on PA; and placebo-control group (PCG): participants only received general health information which is not relevant to PA and FVC. Data collection was conducted at baseline, the 5th after intervention completion of the first behaviour, the 9th after completion of the whole intervention, and 1-month follow-up.

Results: Results of repeated measures ANOVAs indicated that participants in the two intervention groups significantly improved their FVC (F=7.55, P<.001, Eta2 = .08) compared with the control group, whereas the PA improvement was not significant in all groups (F=1.4, P=.23, Eta2 = .02). Regarding the social-cognitive variables, intention and planning for both behaviours exhibited significant improvement (all P<.05, Eta2 range = .03- .07), while the improvement in self-efficacy (F=2.747, P=.01, Eta2 = .03) was only significant for the FVC. Moreover, the improvements of FVC and FVC intention, FVC self-efficacy, as well as the FVC planning were higher in the PA-first arm than that in FVC-first arm (all P< .05).

Conclusion: The findings indicated that first addressed PA facilitates the improvement of followed FVC behaviour, supporting the carry-over effect of PA in FVC to some extent. This is the first study to examine the carry-over effect of PA and FVC in the Chinese population.
P3, P3.75

The development of a health behaviour change intervention for teenage and young adult cancer survivors

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Motivation and behavior change (SIG)

Objective: At present there are no interventions available in the U.K to support Teenage and Young Adult Cancer Survivors (TYACS) to lead a healthy lifestyle. A lifestyle intervention targeted specifically at TYACS is likely to be more effective if it is tailored to patient need and feasible for delivery within the existing health care system. To inform the development of a lifestyle intervention for TYACS we carried out a series of studies to understand the needs and perspectives of both patients and professionals regarding health behaviour change.

Method: We gathered quantitative and qualitative data on TYACS (n=267) current health behaviour status; interest in, and experience of receiving, lifestyle advice; and preference regarding the type, format and delivery of a lifestyle intervention. Health professionals (n=95) were surveyed simultaneously to gather their views on how best to promote health behaviour change to TYACS. Following these studies a collection of health behaviour change intervention resources containing comprehensive lifestyle information and behaviour change support tools were developed. These underwent evaluation by TYACS and TYA health professionals' (n=37) for relevance, appeal and usability.

Results: TYACS demonstrated a desire for age-appropriate lifestyle information on a range of topics (physical activity, diet, smoking, alcohol consumption, sun safety, late effects management) delivered in multiple formats (paper, face-to-face, websites, and apps) at various time-points throughout the cancer pathway. The majority of health professionals were interested in a resource containing relevant lifestyle information that could be given to patients within their care but noted multiple barriers to addressing health behaviour as part of routine practice. The intervention resources were well received by TYACS and health professionals with the majority rating the information as high quality, helpful and relevant. Over 80% of TYACS reported they would find the behaviour change support tools 'very appealing' or 'quite appealing'.

Conclusion: It is hoped that by involving TYACS and TYA representatives at every stage of intervention development the problem of low uptake and adherence commonly encountered during formal intervention piloting and evaluation will be prevented.
Beliefs of childbearing age women on sleep hygiene behaviors: A Reasoned Action Approach elicitation study

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: There is little information on the psychosocial determinants of sleep hygiene behaviors (SHBs) among women of childbearing age. This study's objective was to identify women of childbearing age's beliefs on SHBs based on the Reasoned Action Approach. Methods: Thirty women of childbearing age (18-44 years) with no reported mood or sleep disorder and not taking sleep medication were randomly assigned to complete a 10-15 minute semi-structured phone interview. Participants were asked one question on sleep duration and another on overall sleep quality using items from the Pittsburgh Sleep Quality Index. Other questions were on behavioral beliefs (cognitive and affective), normative beliefs (injunctive and descriptive) and control beliefs (barriers and facilitating factors) regarding one of three SHBs: avoiding media use in bed; avoiding caffeine, alcohol and cigarettes before bedtime; and having a regular bedtime and wake up time even on weekends. Phone interviews were first transcribed using the exact wording from participants. A content analysis was performed independently by two experts to identify the most important beliefs using a 75% cumulative frequency of mention. Disagreements were discussed and resolved by consensus. Results: Participants' mean age was 26 years (range: 18-41 years). Most slept less than the minimum recommended 7 hours/night (53.3%). The mean sleep duration was 6.7 hours/night (range 4.5-10.0 hours/night). The vast majority (76.7%) rated their sleep quality as fairly good. Participants reported that adopting the SHBs would improve sleep, avoid side effects (e.g., headache, fatigue), help them relax before bedtime and make them feel like they were missing out on things. Adopting the SHBs was associated with feeling relaxed and satisfied, but also qualified as unpleasant and abnormal. Participants mentioned their parents, partner, siblings and children would approve or disapprove if they adopted the SHBs and were the most or least likely to adopt them. Barriers were having activities in the evening and social situations. Facilitating factors were putting their turned-off devices away from bed, having alternatives (e.g., reading a book, herbal tea) and a regular schedule. Conclusions: These results can guide the development of behavioral interventions to promote SHBs and sleep among women of childbearing age.
Do Older English Adults Exhibit Day-to-day Compensation in Sedentary Time or Prolonged Sedentary Bouts

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Motivation and behavior change (SIG)

Introduction: Activity compensation is the idea that if we our change activity levels at one time we compensate for it at a later time to maintain a set point. Compensatory behaviours may be one of the reasons for the limited success of sedentary time interventions in older adults, but this possibility remains unexplored. We aimed to assess whether time spent sedentary by older adults (=60 years) on one day was associated with sedentary time on the following day and whether these associations varied by sociodemographic factors.

Methods: Sedentary time was assessed for seven days using accelerometers (n=3701) between 2004-2011. We assessed day-to-day associations in total and prolonged bouts of sedentary time (=30 mins) using multi-level regression in January 2019. We included interaction terms to determine whether associations varied by age, sex, smoking, BMI, social class, retirement and education.

Results: Participants (70.3±6.8 years) accumulated 538 sedentary mins/day (SD=106). On any given day, every additional 60 minutes spent in sedentary time was associated with 9.6 extra sedentary minutes on the following day. This association was greater in non-retired versus retired (non-retired extra 2.2 minutes) and in current versus former smokers (current 5.1 extra minutes). On any given day, every additional 60 minutes spent in prolonged bouts was associated with 7.7 extra minutes in these bouts the following day. This association was greater in older individuals (0.22 extra minutes/year of age), and for retired versus non-retired (retired 2.92 extra minutes).

Conclusion: Older adults did not display day-to-day compensation. Instead, they exhibited positive day-to-day associations in total and prolonged bouts of sedentary time. Strategies to augment these habitual patterns may be possible, given patterns may differ by age, smoking and working status.
Physical Activity and Sedentary Behaviour among Recent versus Established Immigrants compared to Non-Immigrants, by Age Group

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: While research exists on the general Canadian population, little is known about Physical Activity (PA) and Sedentary Behaviour (SB) in the immigrant population. We aimed to investigate differences in PA, SB and combined PA-SB by age group, comparing new immigrants versus established immigrants to their non-immigrant Canadian counterparts. Methods: Cross-sectional data from the 2011-12 Canadian Community Health Survey included 107,373 respondents ages 12-65+, weighted to represent over 25.5M Canadians, with self-reported PA and SB (screen time). Bivariate analyses and logistic regression assessed the association of immigrant status (0-9 years; 10+ years; non-immigrant) to PA, SB and combined PA-SB controlling for gender, race, BMI, education, income, province of residence, self-perceived health, life satisfaction, sense of belonging, chronic conditions, and presence of young children. Analyses were stratified by age (12-17; 18-64; 65+). Results: Of the Canadian population, about 77% were non-immigrants, 6% were recent immigrants and 16% were established immigrants. Among youth, just fewer than 50% of recent and non-immigrants were classified as inactive versus almost 65% of established immigrants (p<0.001); no significant differences existed in SB by immigrant status (about 70% high-SB); 42% of established immigrants were classified as low-PA/high-SB versus 34% of both recent and non-immigrants (p<0.001). Among adults, almost 70% of non-immigrants, 77% of established and 81% of recent immigrants were inactive (p<0.001); just over 60% of recent and non-immigrants were classified as high-SB versus 57% of established immigrants (0.001); about 44% of both established and non-immigrants were low-PA/high-SB versus 50% of recent immigrants (p<0.001). Among older adults, almost 80% of established and non-immigrants were inactive versus about 95% of recent immigrants (p<0.001); about 60% of all immigrants were high-SB versus 71% of non-immigrants (p<0.001); about 57% of non-immigrants were low-PA/high-SB versus 51% of established immigrants (p<0.001) while recent immigrants fell in between. Results of logistic regression controlling for covariates were consistent with bivariate results. Conclusion: Immigrant patterns of PA and SB differ from non-immigrant patterns and vary by length of time since immigration and age group. Results can be applied to intervention strategies and social programming focusing on promoting PA and reducing SB among immigrants in Canada.
Moving out of home, physical activity and sedentary behaviour among school leavers: an exploration of baseline moderators

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Purpose: Transitioning out of school may disrupt physical activity (PA) and sedentary behaviour (SB), and this may be exacerbated by moving out of home. This study examined associations between moving out of home and PA and SB over two years (transition out of school). Applying an ecological model, baseline individual, social and environmental moderators of these associations were assessed. Methods: Students in Year 11 (second last year of secondary school) were recruited via schools and social media (n=1022, 16.9±0.4-years-old, 75% girls). Online or telephone surveys based on IPAQ and IPAQ-A measuring total PA (leisure and transport), total SB (all domains) and 27 individual, social and environmental attributes were completed at baseline and two years later (n=852 at two-year follow-up; n=823 included in analyses). Generalised estimating equation models were performed, with interaction terms for residential status (remained at vs left home) with each potential moderator (all dichotomous). Results: PA decreased by -9.3 (95%CI=-14.2, -4.5) mins/day and SB decreased by -0.7 (95%CI=-1.0, -0.5) hrs/day compared to baseline. There were no significant associations between residential status and PA (B=0.29, 95%CI=-10.76, 11.34; p=0.96) or SB (B=0.41, 95%CI=-0.24, 1.05; p=0.22) after leaving school. There were four baseline moderators of PA and one of SB (p<0.05). Among those who moved out of home, there was a pattern for a) higher PA after leaving school if they received frequent SB discouragement from family, b) lower PA if they had high co-participation in electronic games and in television and DVD viewing with friends, and c) lower SB if they had high co-participation in PA with family. Those who remained at home had higher PA after leaving school if they had high levels of PA equipment at home. Conclusions: Family and peer environments during secondary school moderated associations between residential status and PA and SB after leaving school. Fostering a family environment during secondary school that encourages PA (through co-participation and availability of equipment) and discourages excessive SB and co-participation in screen-based entertainment with friends, may protect against low levels of PA and high levels of SB associated with moving out of home over the transition from school.
Urbanization affects physical activity and sedentary pattern: a cross-sectional study over Fulanis from Senegal in three different stages of the epidemiological transition.

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

**Objective:** Human daily activities are deeply altered by urbanization, mechanization and passive transportation. Physical activity (PA) and sedentary behaviors are two determinants of non-communicable diseases and early mortality. Understanding the impact of modernization on activity patterns appears crucial but remains challenging because only a few contemporary societies are still undertaking this transition. We aimed to objectively characterize PA and sedentary patterns in three groups of an African population, the Senegalese Fulanis, who are at different stages of this transition.

**Methods:** Three groups of Fulanis male adults, originated from the Ferlo region, were equipped with an ActiGraphTM accelerometer for 10 days. The first one was still living in Ferlo (semi-nomad), with a pastoral semi-nomad way-of-life; the second one (semi-rural) settled near a borehole in a Ferlo village (Widou); the third one had moved to Dakar at least 10 years ago (urban). Valid data (>=3 days with 10h waking wearing time) were obtained in 19 semi-nomad (39.8±smn;2.4 y; 20.4±smn;0.8 kg/m2), 30 semi-rural (35.8±smn;1.9 y; 20.8±smn;0.6 kg/m2) and 27 urban (37.2±smn;2.0 y; BMI 19.9±smn;0.7 kg/m2). Several metrics were calculated from counts-per-minute, steps, raw accelerometry and automatic-activity-recognition. Active and sedentary bouts and breaks of different lengths were identified. Groups were compared using ANOVA.

**Results:** Total standing time (static, trampling, walking) was similar in the three groups, but with a progressive reallocation of time spent in static standing to trampling and walking according to urbanization (p<0.01). A negative gradient was noted for number and time spent in moderate-to-vigorous activity bouts of 10 minutes minimum from the semi-nomad to the urban group. The semi-nomad group spent more time in high walking cadences (p<0.01). By contrast, there was no difference in total sedentary time and breaks between the three groups.

**Conclusion:** Whereas time spent in total standing and sedentary postures did not differ across the transition stages, our study underlines a less active behavior and walking patterns according to urbanization. Thorough characterization of longitudinal changes in PA and sedentary behaviors in populations still undertaking their epidemiological transition will further help understanding the impact of urbanization on the different dimensions of PA and health.
Discriminating behavioural self-regulation and motivation variables across physical activity levels of successful short-term weight losers

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Motivation and behavior change (SIG)

Background: Physical activity (PA) autonomous motivation and self-regulatory skills are associated with long-term weight-loss, specifically through regular PA. Identification of psychological profiles of physically active weight losers may inform guidelines for treatment. This study examined whether motivational and self-regulatory variables vary across groups of individuals based on their PA level.

Methods: Data was collected as part of the baseline assessments of a large European multicentre randomized controlled trial (NoHoW project). Among the individuals who lost >5% in last 12-months (N=1627), a total of 1217 (8.8% women, 44.2 ±smm; 11.7 years) completed online questionnaires on: i) exercise motivation (behavioural regulations for exercise, index of autonomous function, basic psychological needs), and ii) self-regulation skills for PA (relapse prevention, action plans, coping plans, action control); and wore an activity tracker for two weeks to objectively assess PA (steps/day). Discriminant analyses with Wilk's lambda were conducted to identify which motivational and self-regulation variables discriminate between 5 PA level groups based on Tudor-Locke's criteria for steps/day: <4999; 5000 to 7499; 7500 to 9999; 10000 to 12499; >12500.

Results: Discriminant analysis extracted four discriminant functions. The discriminant function defined by motivation quality (RAI, p < .001) and action planning (p = .006) accounted for 91% of between groups variability (canonical r = .340; Wilk's lambda = .873; X2(28) = 162.669; p = .001). Other functions were not significant. Analysis of group centroids suggested that on this function, active and very active participants scored positively (.112, .403) while the remaining less active participants scored negatively (-1.016, -.547, -.098). Stratification by gender suggested that for women the only discriminant function (which explains 86.5% of variability) was defined by motivation quality (canonical r = .343; Wilk's lambda = .864; X2(28) = 119.068; p = .001).

Discussion: Higher levels of PA seem to be associated with better quality of motivation and better self-regulatory capacities. Targeting these mechanisms of action during a weight management intervention may increase PA maintenance. Motivation quality may play an essential role for women aiming to increase their PA levels to manage their weight.
20392

P3, P3.249

Secondary Data Analysis of Behavior Changes from Dietitian-Led Motivational Interviewing in Worksite Wellness Programs

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: High rates of sedentary behaviors and poor nutrition choices are widely prevalent, and it is well within a person's realm to change, particularly with support. The purpose of this analysis is to assess the significance and practicality of the impact of Registered Dietitian Nutritionist (RDN) facilitated worksite wellness programs, using motivational interviewing, on employee health, including dietary and behavior changes.

Methods: To assess the impacts of voluntary worksite wellness programs, we conducted secondary data analysis using de-identified company data from Family Food LLC from 2018. RDNs had 1-on-1 nutrition consults with employees from 65 various companies across the USA. These sessions were guided using motivational interviewing techniques to stimulate behavior change. All dietary and behavior data were self-reported to RDNs during the session. A total of 2,710 employees, totaling 6,149 number of visits, were included in these analyses. Data collected were analyzed using paired t-tests, one-way ANOVA and descriptive statistics.

Results: Prior to nutrition interventions, baseline measures indicated that 74% of all employees who participated were overweight or obese (BMI =25). Of the 2,710 employees, 53% had more than 1 visit with the RDN, of which 32% had 3+ visits throughout the year. These visits resulted in a small, yet highly significant (p<0.01) increase in consumption of daily portions of whole grains, vegetables, fruit, fish, and water. Additionally, employees significantly increased weekly physical activity intensity and time per day being active.

Conclusions: Worksite wellness programs are an avenue to identify, address and positively impact nutrition and lifestyle behaviors. The impactful changes that occurred from these convenience-based worksite wellness programs allowed for meaningful progress in both the personal and professional life of a person. Motivational interviewing by RDNs determines ambivalence while empowering clients to create behavioral change in dietary and physical activity habits that can then translate to significant health benefits. Registered Dietitian Nutritionists, experts in the field, should be the leaders applying this approach in worksite wellness, to help facilitate the adoption of healthier nutrition and activity behaviors.
Determinants of water consumption among adolescents: A review

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: To our knowledge, no study has reviewed the scientific literature on determinants of water consumption among adolescents. The objective of this review was to fill this gap in the literature by summarizing the latest scientific evidence on determinants of water consumption among adolescents.

Methods: Adolescents were defined as individuals between the ages of 12 and 17 years. There was no restriction on the year of publication of the studies. Quantitative and qualitative studies were included. MEDLINE/PubMed and PsycINFO were searched for articles on determinants of water consumption among adolescents, as well as by looking at the reference lists of the articles included in this review. Determinants of water consumption were classified according to ecological models of health behaviors (e.g., individual, social, environmental and policy).

Results: We identified 15 studies on determinants of water consumption among adolescents, of which one was qualitative. The majority of studies focused on individual determinants (k = 13), and few on social (k = 1) and environmental (k = 2) determinants, as well as on the impact of school policies (k = 1) on this behavior. This number exceeds the number of studies included in the review as some studied multiple types of determinants. Individual determinants included physiological (e.g., being thirsty, weight status), demographic (e.g., sex, ethnicity, age), psychological (e.g., water and safety cleanliness concerns, intention, beliefs about water being energizing and having health benefits) and behavioral (e.g., sleep duration, physical activity, diet, milk, juice and sugar-sweetened beverages consumption) ones, and taste preferences. Peer influence was the only social determinant which was reported to significantly impact adolescents' water consumption. Availability of water at school and at home was the only environmental determinant which was reported to significantly impact water consumption among this population. School districts with comprehensive school wellness policies had higher water consumption among adolescents.

Conclusions: Additional studies are needed on social and environmental determinants of water consumption among adolescents and the impact of school policies on this behavior as these can be useful to inform the development of interventions to promote adolescents' water consumption. Longitudinal and theory-based studies on determinants are also needed.
Interventions to promote water consumption among adolescents: A review

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Motivation and behavior change, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: To our knowledge, no study has reviewed the scientific literature on interventions to promote water consumption exclusively among adolescents. The objective of this review was to fill this gap in the literature by summarizing the latest scientific evidence on interventions to promote water consumption among adolescents.

Methods: Adolescents were defined as individuals between the ages of 12 and 17 years. There was no restriction on the year of publication of the studies. MEDLINE/PubMed and PsycINFO were searched for articles on interventions to promote water consumption among adolescents, as well as by looking at the reference lists of the articles included in this review. Interventions to promote water consumption were classified as educational/behavioral and/or legislative/environmental depending on whether they targeted individuals (e.g., nutritional education on water) or their environment (e.g., adding water coolers in schools) or both. Behavior change techniques used in interventions were classified according to a validated taxonomy.

Results: We identified 11 different interventions to promote water consumption among adolescents. The majority of studies reported interventions that had both educational/behavioral and legislative/environmental components (k = 8) and few were educational/behavioral (k = 2) or legislative/environmental only (k = 1). Five interventions were based on an ecological model (k = 2) and/or psychosocial theories, such as the Social Cognitive Theory (k = 3), Reasoned Action Approach (k = 1), Self-Determination Theory (k = 1), Theory of Planned Behavior (k = 1), and Transtheoretical Model (k = 1). The most common (i.e., reported in ≥50% of studies) behavior change techniques in all interventions were: restructuring the physical environment (e.g., adding water coolers in schools; 72.7%) and providing information on health consequences (e.g., health benefits of water; 72.7%). Overall, 63.6% of all interventions reported a significant increase in adolescents' water consumption. Of those, six (85.7%) had both educational/behavioral and legislative/environmental components and one was a legislative/environmental only intervention. No educational/behavioral only intervention reported a significant behavior change.

Conclusions: Interventions with both educational/behavioral and legislative/environmental components seem promising to promote water consumption among adolescents. Additional studies on educational/behavioral and legislative/environmental only interventions are needed to determine their impact on adolescents' water consumption.
Physical Activity and Sunburn: Sun Safety in the FLASHE survey cohort

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Cancer prevention and management (SIG)

Background: Physical activity is negatively associated with many cancers but is positively associated with melanoma, ostensibly via increased sun exposure. It remains unclear, however, whether PA in adults is associated with increased sunburn and behavioral differences in sun safe or sun exposure practices.

Design: The National Cancer Institute's Family, Life, Activity, Sun, Health, and Eating (FLASHE) national survey.

Population: U.S. adults (N = 1,793).

Main Outcomes and Measures: Descriptive statistics overall and stratified by gender, and logistic regression models of the relationship of activity and sunburn, overall and among active participants, controlling for sunbathing, race and age.

Results: Meeting U.S. physical activity guidelines was positively associated with sunburn after controlling for race and sunbathing status overall (OR: 1.53, P = .004) and among women (OR: 1.57, P = .005), but not among men. In those who met physical activity guidelines (n = 1,273) no sun protection behaviors were associated with sunburn after controlling for sunbathing. Men more frequently met U.S. physical activity guidelines (80.3% vs. 67.4%; χ² = 28.02, P < .001 and reported higher rates of sunburn than women (42.1% vs. 35.1%; χ² (1) = 5.54, P = .019). Sunbathing was more frequent among physically active people and increased odds of sunburn (Men: OR = 3.91, P = < .001; Women: OR = 2.67, P = < .001). Regularly wearing a sleeved shirt was the most commonly reported protective behavior (70.6%) and regular use of sunscreen (37.9%), hats (27.5%) and shade (32.3%) for protection was low.

Discussion: Physical activity is associated with sunburn among adults after controlling for sunbathing, and protective behaviors were not associated with lessened sunburn risk. These data suggest that the association of sunburn with physical activity may be due to both purposeful sun exposure as well as unintended overexposure due to inadequate sun protection. Active people report lower than desirable rates of sun protective behaviors given their higher risk of exposure. Research is needed to identify the best way to motivate behavior change at the intersection of physical activity and sun safety.
Perceptions and behaviors of oncologists on the promotion of physical activity

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: A minority of cancer survivors is counseled by the oncologist about physical activity (PA) as a part of the treatment. Hence, this study aims to describe correlates of oncologists' PA promotion and describe their needs in this context. Our principal hypothesis was: the perception of capacity, opportunity and motivation (COM-B Framework) of oncologists, regarding the PA promotion, is positively associated with the time dedicated to the PA promotion during the medical consultation. No similar studies were found in Portuguese oncologists.

Methods: A questionnaire with 43 questions (1-strongly disagree to 5-strongly agree) was applied to 76 oncologists to assess demographics, perception of capacity, opportunity, motivation, and behavior to promote PA. Questions were also made about needs related with PA promotion in the oncology service. For the statistical analysis we calculated frequencies, means and standard deviation, Pearson correlations and multiple linear regression.

Results/findings: Among oncologists, 94.7% promote PA, but only 28.9% promote structured exercise; and 98.7% stated that if there were exercise physiologists in the healthcare setting, they refer their patients to them. Also, they agree with the need of improvements in the available services for exercise practice by oncology patients (4.46 ±smn; 0.76, scale 1-5). We found low levels of capacity (2.27 ±smn; 0.74) and opportunity (2.38 ±smn; 1.18) to promote PA, and high level of motivation (4.22 ±smn; 0.66) to do so. We found a positive association between capacity (r = .416; p < .001), opportunity (r = .275; p = .016) and motivation (r = .280; p = .014) with the percentage of time dedicated to PA promotion. However, the most relevant variable was capacity which was confirmed by a multiple linear regression (F [3,72] = 6.499, p = .001).

Conclusions: Oncologists value exercise but they do not feel capable to discuss and prescribe it to their patients, despite having a lot of motivation to do so. Therefore, the presence of exercise physiologists can be a facilitator of exercise and PA promotion. However, results should be analyzed carefully due to the small sample size.
Systematic review and meta-analysis of maintenance of physical activity behaviour change in cancer survivors

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Engaging in physical activity (PA) following a cancer diagnosis can result in numerous physical and psychosocial benefits but for these benefits to be sustained cancer survivors must be physically active for the long-term. This is the first systematic review to evaluate the effectiveness of interventions in supporting maintenance of PA behaviour change among adults diagnosed with cancer and explores which behaviour change techniques (BCTs) and contextual features are associated with effectiveness.

Methods: Ovid Medline, Ovid Embase and PsychINFO were searched for randomised controlled trials (RCTs) including adults diagnosed with cancer, assessing interventions targeting PA and reporting PA at baseline and > 3 months post-intervention. The BCT taxonomy was used to identify intervention components and the Template for Intervention Description and Replication captured contextual features. Random effects meta-analysis explored between and within group differences in PA behaviour.

Results: Twenty seven RCTs were included, 19 were included in a meta-analysis. Interventions were effective at changing behaviour > 3 months post-intervention; standardised mean difference in moderate to vigorous PA (MVPA) between groups: 0.25; 95% CI = 0.16-0.35. Within-group pre-post intervention analysis yielded a mean increase of 65.30 (95% CI = 45.59-85.01) mins/wk of MVPA in intervention groups and 29.41 (95% CI 13.37-45.45) mins/wk of MVPA in control groups.

BCTs commonly reported across trials included 'goal setting', 'self-monitoring', 'instruction on how to perform a behaviour' and 'problem solving'. BCTs exclusive to trials achieving significant increases in PA at follow-up were 'action planning', 'graded tasks' and 'social support (unspecified)'. Interventions that did not achieve significant increases in PA tended to include older populations with existing physical limitations, had fewer contacts with participants and were less likely to include a supervised element. Included studies were biased towards inclusion of younger, female, well-educated and white populations who were already engaging in some PA.

Conclusions: Interventions achieved modest increases in PA at least 3 months post-intervention completion. Small improvements were also evident in control groups who typically received printed materials promoting PA. New interventions should consider a stepped-care approach, providing more intensive support for older people with physical limitations where behaviour change is more difficult to achieve.
Employment Status and Physical Activity among Puerto Rican Breast Cancer Survivors

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Cancer prevention and management (SIG)

Objective: Breast cancer treatment is associated with adverse physiologic effects. Even though there is scientific evidence that proves physical activity (PA) has a positive effect on health and quality of life, breast cancer survivors, like adults in the general population, are still not meeting the suggested national guidelines for exercise. Sociodemographic characteristics, such as employment status, are among the factors which could impact the amount of PA performed; however, the relationship between these variables had not been studied thoroughly among them. The aim of this exploratory study was to determine the amount of PA performed by breast cancer survivors, in relationship to their employment status (Employed vs Not Employed).

Methods: To examine this relationship, we conducted a secondary data analysis that explored intergroup (n=41) differences in the amount of PA (measured in daily steps) and categories of employment status among the sample. Data is derived from an ongoing clinical trial being conducted in Puerto Rico. Secondary aims included analysing other sociodemographic variables which might impact engagement in PA. A Mann-Whitney test was conducted to test the primary aim.

Results: Of the 41 participants, 46% were employed and 54% were unemployed. The median of daily steps within the unemployed participants was 4531.8, while the median for employed participants was 4083. Even though no significant difference was detected between the primary variables, the statistical test showed that the mean rank of those who were unemployed was higher (M=22.59) than those who were employed (M=19.16). Additional comparisons of other demographics yielded a significant difference between age and daily steps. The analysis showed women older than 61 had a higher number of steps in comparison to those who were younger (50-60 years old).

Conclusions: Being employed may represent a limitation for survivors if they perceive a lesser capacity in time and resources for exercising. Taking employment status into account might be useful for providers to develop treatment plans and health promotion strategies that improve physical activity engagement and adherence. Further research is needed to explore new interventions that healthcare professionals can use to increase physical activity among breast cancer survivors with different social backgrounds.
A Home-Based Physical Activity Program integrated in the Electronic Health Records for patients with bladder cancer before and after radical cystectomy: an intervention mapping approach.

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective
To develop an evidence-based intervention to stimulate physical activity (PA) before and after radical cystectomy in patients with muscle-invasive bladder cancer.

Methods
The Intervention Mapping approach was used to guide systematic development of the intervention. A literature review was performed to identify existing PA interventions for patients with bladder cancer. Qualitative interviews were performed with bladder cancer survivors to explore determinants of PA before and after radical cystectomy. Based on the most important and changeable determinants, matrices of change objectives were built. Next, theoretical behaviour change techniques (BCTs) were matched to every change objective and practical applications were developed to translate the BCTs into practice. Regular meetings with patients and healthcare providers throughout the development process ensured the involvement of different important parties.

Results
In total, 27 BCTs were used to construct the intervention. The intervention offers a structure in which PA will be stimulated in the patient's home-environment. The preoperative timeframe for the intervention is 4 or 12 weeks, depending on administration of neo-adjuvant chemotherapy (yes/no). Postoperatively, the intervention will last for 12 weeks. The intervention consists of a digital oncological platform (DOP), several consultations with healthcare professionals (with focus on motivational interviewing), personal booklet, and follow-up phone calls. DOP is integrated in the electronic health records of the patients, giving healthcare providers of the patients' easy access to the DOP. DOP includes information, diaries, visual representation of progress, mailbox, videos of peers and treating physician explaining the benefits of PA, photo material of exercises (which will be first practiced with the physiotherapist), and a walking program with an activity tracker (10 000 steps approach). Individual goals will be set and will be self-monitored by the patient through DOP. Patients will receive alerts and regular feedback. To provide psychosocial support, consultations with the psychologist and participation in peer support groups will be offered.

Conclusion
Intervention Mapping ensures transparency of all intervention components and offers a useful approach for development of behaviour change interventions for cancer patients and for translation of theories into practice. The intervention will now be tested in a pilot study for feasibility, acceptability, meaningfulness, and effectiveness.
Ecological momentary assessments to assess symptoms and behavior among patients with cancer: a systematic review.

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Cancer prevention and management (SIG)

Objective
Ecological momentary assessment (EMA) is an emerging method to assess an individual's current thoughts, emotions, behavior, physical states, and contextual factors as they occur in real-time and in their natural environment. Whereas EMA techniques are frequently used in mental health, little is known about the added value of EMA in oncology research. The aim of current review was to synthesize methodological information and the results of studies that applied EMA techniques among patients with cancer to inform future researchers about the opportunities and challenges.

Methods
Studies were identified in PubMed, Embase and PsychINFO up to December 2018. We included full-text articles that: 1) were conducted among adult patients with cancer; 2) examined cancer and treatment-related experiences by EMA techniques collecting self-report data; 3) included more than one assessment per day and lasted longer than 24 hours; and 4) were published in English. Information from the selected studies was synthesized and included: study designs, EMA data collection methods, response-related results and main findings.

Results
Nine studies were included. The design of the studies is observational, the EMA data collection methods varied considerably and the reporting of response-related results are poor. Nevertheless, the findings of this review show that EMA techniques are feasible as no systematic patterns of problems or complaints were reported across studies and the reported response-related results were acceptable (i.e., participation rate ranging from 28-87%, attrition rate from 1-25%, and missing data from 1-39%). Furthermore, the findings of this review show that EMA techniques are useful as they facilitate the examination of real-time emotions and behavior on disease and treatment-related problems.

Conclusions
EMA techniques to assess symptoms and behavior were found to be useful and feasible in oncology research. Future studies would benefit from guidelines for designing and reporting EMA studies to improve reproducibility, comparability and interpretation of results.
Evaluating The Translation Of Dutch Exercise Oncology Trials Into Clinical Practice Using The RE-AIM Framework

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Cancer prevention and management (SIG)

Objective:
Implementation of exercise programs for cancer patients is challenging. This study evaluated the potential for implementation of exercise programs from Dutch exercise oncology trials.

Methods:
Three randomized controlled trials (PACES, REACT, PACT), examining effects of exercise during or following chemotherapy treatment with curative intent, were evaluated using the 5 dimensions of the RE-AIM framework: Reach, Effectiveness, Adoption, Implementation, and Maintenance.

Results:
Reach: Participation rates were 37-45%. Compared to non-participants, participants were higher educated, less fatigued or distressed, and had higher scores on behavioral variables. Effectiveness: No serious exercise-related adverse events occurred. Significant benefits of exercise were found for physical fitness, fatigue, and quality of life. A significant benefit on chemotherapy completion was found in one study but not in another. Adoption: To enable twice weekly exercise session attendance close to patients' homes, local physiotherapists (PTs) were educated about exercise supervision for cancer patients. Generally, the PTs felt sufficiently capable to deliver exercise programs, but less capable to support behavioral change. Implementation: 61-89% of participants had high attendance at the supervised sessions. Education, additional radiotherapy, BMI, fatigue and self-efficacy predicted adherence in some studies. Basic insurance does not cover the program, but some additional coverage policies do. Some evidence for cost-effectiveness of the programs was found. Maintenance: Exercise-induced gains in physical fitness and quality of life post cancer treatment, and benefits from exercise during chemotherapy on physical activity and function maintained, whereas maintenance of fatigue benefits were inconsistent across studies. Sustainability of program delivery is ensured by incorporation of the exercise protocols in post-graduate oncology education for PTs. A quality control system has been implemented via Onconet.

Conclusions:
The exercise programs have high potential for successful implementation in clinical oncology practice, but reach and adherence should be monitored, and lack of reimbursement is currently a barrier. Future studies should focus on improving maintenance of benefits.
P3, P3.94

The role of dietary advice from health professionals on dietary changes and attitudes in cancer survivors

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Cancer prevention and management (SIG)

Objective:
Lifestyle factors, including diet, influence cancer outcomes, however, cancer survivors' diet quality remains suboptimal. Advice from health professionals after cancer diagnosis enhances health behaviours, but information is lacking on its potential role on diet-related changes and perceptions of cancer survivors. The purpose of this analysis was to explore whether receiving dietary advice from a health professional post cancer diagnosis, was associated with a healthier reported diet and with perceiving need for dietary improvement.

Methods:
Patients >18 years of age diagnosed with breast, colorectal and prostate cancer in 2012/2013, were mailed a survey exploring their health and lifestyle. Recruitment was via NHS Trusts across London and Essex. Patients reported whether they received any dietary guidance from a health professional since diagnosis (scores dichotomised; received any dietary advice vs. not), whether they consider their diet to be healthier, about the same or less healthy than before diagnosis (scores dichotomised; diet healthier than before diagnosis vs. not) and whether they think they should have a healthier diet (scores dichotomised; think diet should be healthier vs. not). Two logistic regressions examined whether reporting a healthier diet than before diagnosis and whether thinking diet should be healthier, were each associated with having received dietary advice from a health professional. Age, gender, education and BMI were included as covariates.

Results:
This analysis used data from Wave 1 (n=2035). Two thirds of the sample (68%) reported not receiving any dietary recommendation after diagnosis, 22.3% reported having a healthier diet than before diagnosis and 28.6% reported thinking their diet should be healthier. Those receiving dietary advice from a health professional were more than twice as likely to report adopting a healthier diet after diagnosis (OR= 2.79, 95% CI 2.20, 3.55, p<0.0001) and more likely to think their diet should be healthier (OR= 1.43, 95% CI 1.13, 1.79, p=0.002), compared to no advice.

Conclusions:
Dietary advice from health professionals appears important for improving diet-related behaviours and perceptions following cancer diagnosis. These findings, coupled with evidence that cancer survivors seek and welcome dietary guidance, support the integration of dietary education into the routine practice for patients after cancer diagnosis.
The adoption, reach and implementation of Healthy Living after Cancer + Txt in practice

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Cancer prevention and management (SIG)

Objective: This study aimed to inform intervention translation and sustainability by evaluating the adoption, reach and implementation of a 6-month text message-delivered, extended contact intervention for participants completing Healthy Living after Cancer (HLaC). HLaC is a 6-month, telephone-delivered intervention targeting healthy diet and physical activity behavior for adult cancer survivors, offered by Cancer Councils (CCs) in Australia.

Methods: HLaC completers (n=182) were offered extended contact via 1,11 text messages/fortnight for 6-months (HLaC+Txt). Text message content and frequency was tailored to participant preferences ascertained through interviews with CC delivery-staff (at baseline HLaC+Txt and 12-weeks). Adoption was quantified as uptake of HLaC+Txt among eligible CCs. Reach was quantified as uptake by eligible HLaC completers. Implementation outcomes were examined quantitatively (tailoring interview completion rates and duration; text dose/fortnight; participant withdrawal rates and average intervention length) and qualitatively (interviews with participants/CC delivery-staff). Qualitative interviews were transcribed and analysed thematically.

Results: The text messaging intervention was adopted by all four eligible and invited CCs who had delivered HLaC. In total, 115 participants commenced the HLaC+Txt intervention, with reach among eligible participants ranging from 46, 80% between CCs (mean = 63%). Participants (69% breast cancer, 91% female) had a mean age of 56.7 years (SD=10.4), BMI of 28.8 kg/m2 (SD=5.7) and mean time since diagnosis of 1.8 years (SD=2.4). Tailoring interview completion rates were 94% with an average length of 23 minutes (SD=10); and the average requested text message dose across CCs ranged from 3 to 8 (mean=6, SD=3). Between CCs: withdrawal rates from the 6-month intervention ranged from 15, 48% (mean 23%); and average intervention length ranged from 18.5, 22.5 weeks (mean 21.2, SD=1.8). Participants and delivery-staff perceived HLaC+Txt to: prompt participants to enact behavior maintenance techniques; and provide a transition between the telephone coaching and the end of intervention. CC delivery-staff identified benefits to participants of having continuity in staff between HLaC and HLaC+Txt.

Conclusions: Despite variable reach across CC sites, HLaC+Txt is feasible to implement and valued by participants. Text-message interventions provide a means for supporting the maintenance of weight, diet and physical activity behaviour changes made during lifestyle-based interventions.
A theory- and evidence-based redevelopment of behaviour change tools for cancer awareness activity in community settings.

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Cancer, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Around 4 in 10 cancers could be prevented by lifestyle changes, and if cancer is diagnosed at an early stage, treatment is more likely to be successful. Cancer incidence rates are typically higher in more deprived groups. Cancer Research UK deliver nurse-led cancer awareness activity in community settings to support prevention, early diagnosis and screening, particularly among deprived groups. Previous work developed a behaviour change tool based on habit theory for nurses to use with members of the public (the 'habit card'). This study utilised a theory- and evidence-based approach to re-develop the habit card.

Methods: A focus group was conducted with nurses responsible for delivering cancer awareness activity (n=5) which aimed to explored how habit theory and the habit card specifically was used. Transcripts were thematically analysed. A researcher also observed the activity to learn from conversations where the current tool did and did not work well. Behaviour change techniques in the existing habit card were mapped onto the Behaviour Change Wheel and changes were made that addressed learnings from the focus group and observation work. Nurses provided feedback on the revised tools via telephone and further refinements were made.

Results/findings: A key theme from the focus group was appropriateness of the habit card for discussing different types of behaviour change. Specifically, the habit card worked well for creating new habits, but did not work well for behaviours people wanted to stop, substitute or moderate. Based on the observation work, the habit card was only useful to those already motivated to change their behaviour. Behaviour change techniques were broadened to support a wider range of behaviour changes. A new tool was also developed utilising motivational interviewing techniques to increase a person's readiness to change their behaviour. Feedback from nurses on the revised tools was generally positive, but some further refinements were made.

Conclusions: The current work utilised a theory- and evidence-based approach to redevelop an existing behaviour change tool used in cancer awareness outreach activity. Supporting lifestyle behaviour changes in at risk groups will help reduce risk of developing cancer and drive early diagnosis to support successful treatment.
The Impact of an Outdoor Loose Parts Intervention on the Physical Competence of Nova Scotian Preschoolers

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Introduction: Early childhood development is optimized when children have opportunities to develop physical literacy (PL). PL consists of a child's physical competence, confidence, and motivation to participate in physical activity (PA), and understanding of the relationship between PA and health. Physical competence, specifically, refers to an individual's ability to develop fundamental movement skills (FMS). The preschool years are a critical stage in life for developing FMS, as children are experiencing rapid brain growth and neuromuscular maturation. Providing opportunities for children to develop FMS in early years settings is important for encouraging lifelong PA participation and overall health and wellness. Integrating loose parts (LP) into early years outdoor spaces could provide preschoolers with an opportunity to develop physical competence. LP are open-ended materials (e.g. stumps, planks, buckets) that provide greater affordances for outdoor play, and opportunities for diverse movements and risk-taking, which could contribute to children's physical competence. However, little evidence exists on whether integrating LP into childcare outdoor spaces improves preschoolers' physical competence.

Purpose: To explore the impact of a childcare outdoor LP intervention on preschoolers' physical competence.

Methods: The Physical Literacy in the Early Years (PLEY) project used a mixed-methods, randomized control trial design to facilitate unstructured, active, risky play among Nova Scotia preschoolers aged 3-5 years by integrating LP into outdoor spaces at licensed childcare centres (intervention: n=10; control: n=9). Child demographic (age, sex), anthropometric (height, weight) and physical competence (FMS, balance) data were measured pre- and post-intervention. Analyses will determine if children exposed to the LP intervention had improvements in physical competence, and results compared to controls. Focus group discussions regarding educator's perceptions of the impact of LP play on children's physical competence will be used to supplement and explain quantitative findings.

Anticipated Results: Outdoor play with LP will afford preschoolers with opportunities to develop physical competence, one component of PL, and lead to an enhancement in FMS.

Conclusion: Findings will improve understanding of how LP outdoor play contributes to physical competence development in early life, and could support the integration of LP in other early years settings (home, school, community).
Through the eyes of the educator: the cognitive and social benefits of loose parts play in Nova Scotian preschoolers.

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective:
Loose parts (LP) are natural or synthetic materials (e.g. tires, planks, tubes, and rope) that can be moved, manipulated, carried or combined in various ways to enrich children's outdoor play experiences. The open-endedness of LP play allows children to develop cognitive skills such as creativity and problem solving. Moreover, participating in active play, particularly LP play, has been shown to promote psychological wellbeing and an increased sense of belonging. That said, little is known about the perceptions of early childhood educators (ECE) on this type of play in relation to young children's cognitive and social development. The purpose of this project is to describe ECE perceptions of the cognitive and social benefits of LP play in preschool-aged children (age 3-5 years), through photo elicitation (PE) and focus group (FG) discussions.

Methods:
Eleven licensed early childcare centers across Nova Scotia received LP materials as part of a mixed-methods randomized control trial exploring physical literacy in the early years (PLEY project). ECEs from participating sites engaged in FG and PE sessions 3- and 6-months post intervention. ECEs were asked to photograph and document examples of children participating in active outdoor play with LP. In-depth discussions were conducted regarding ECEs' experiences with the intervention, and perceptions of LP play. Discussions were audio recorded and transcribed verbatim. A qualitative description approach was used to identify key themes in photos and transcripts.

Results:
Emerging findings from PE suggest LP outdoor play promotes joyful play, child led play, and social inclusion. Through FG discussions, ECEs have described how outdoor LP play has contributed to children's problem solving, creativity, communication, and planning; and resulted in an increase in teamwork and prosocial behaviours. Findings will be supported by quotations and photos.

Conclusion:
Outdoor LP play is perceived by educators to have multiple cognitive and social benefits for preschool-aged children that are critical for optimal growth and development. These favourable perceptions should support the sustainability of outdoor LP play within participating childcare centers. Mobilizing this
knowledge to other early years advocates will help support the integration of LP materials into various spaces in which children live, learn and play.
Effectiveness of the PLAYgrounds for Toddlers program on type and amount of physical activity in playgrounds of Dutch preschools: a cluster randomized controlled trial

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective:
Preschools are identified as important environments for interventions to improve physical activity in toddlers. The aim of this study is to examine the effect of the PLAYgrounds for Toddlers program on the type and amount of physical activity in playgrounds of Dutch preschools.

Methods:
The PLAYgrounds for Toddlers program was part of a cluster randomized controlled trial in which 41 preschools of child care organization Impuls in Amsterdam Nieuw-West, the Netherlands, were randomly allocated to an intervention or control group. The PLAYgrounds for Toddlers program was designed to teach Early Childhood Education and Care (ECEC) teachers how to stimulate physical activity in the playgrounds of preschools. It focuses on knowledge and skills of ECEC teachers to create a challenging environment within the zone of proximal development of the different toddlers. Two training sessions were organized for in total 4 groups of teachers. Furthermore, a trainer visited each preschool to give specific instructions for improvement. For the purpose of the program, the SOPLAY observation protocol was adapted to the context of preschools. Observers were asked to note the type and amount of activities, to count the number of children per activity, to estimate the physical activity intensity (0=sedentary, 1=light, 2=moderate, 3=vigorous) and to note the different movement skills children used during participation in the activity. The observations were performed at baseline and after 4-5 months.

Results:
In the intervention group, the type of activities quintupled in boys (from 1.12 ±smn; 0.33 to 5.71 ±smn; 0.85) and in girls (from 1.24 ±smn; 0.44 to 6.24 ±smn; 0.44). Furthermore, the amount of activities increased significantly from 1.94 ±smn; 0.77 to 3.12 ±smn; 0.74. In the intervention group, physical activity intensity increased from 0.89 ±smn; 0.31 to 1.64 ±smn; 0.47 in boys and from 0.93 ±smn; 0.52 to 1.69 ±smn; 0.62 in girls. Type and amount of activities and physical activity intensity did not change in the control group.

Conclusions:
The PLAYgrounds for Toddlers program significantly increased the type and amount of activities in playgrounds of Dutch preschools. Physical activity intensity also increased significantly, but is still light-to-moderate.
18748

P3, P3.101

Vitamin D Composition in Meals Served in All-Day Childcare Centers

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Early care and education (SIG)

Purpose: Vitamin D is important for the development of bones in young children. Although the sun is a good source of vitamin D, children, especially those in daycare facilities spend very little time outdoors. This study was conducted to determine if the meals provided in childcare centers were adequate to satisfy the Dietary Reference Intake (DRI) of vitamin D for 3-5-year-olds.

Methods: We identified licensed childcare centers and selected them through online searches of the Department of Child Protective Services website. Seven facilities operating five days per week and registered children for fulltime care participated in the study. We collected 15 days menus from each facility and conducted unannounced observation visits during mealtimes to note the accuracy of portion sizes and if food components were consistent with posted menus. The nutrient composition of all foods served daily was determined using the Nutritionist Pro software. Using the Statistical Package for Social Sciences (SPSS), we calculated the overall means, and standard deviations of nutrients based on the foods served over the 15 days. One-sample t-tests compared the mean daily vitamin D content to two-thirds of the DRIs for the age group. Analysis of variance (ANOVA) determined any differences in the daily amounts of vitamin D provided by each facility.

Results/Findings: The menus from each facility indicated the foods served throughout each day. No mealtime substitutions were noted. The portion sizes served during mealtimes were age appropriate. The average daily vitamin D content of meals varied significantly between the centers. Vitamin D levels ranged from 1.79 ugs/day to 5.49 ug/day at the various facilities. The average amounts of vitamin D content in the meals from all childcare facilities had significantly less (p<.0001) vitamin D than indicated on the DRI.

Conclusion: The foods served in the childcare centers were not adequate in providing the levels of vitamin D to satisfy the DRI for the population served. Childcare centers should make more effort to serve meals that will allow children to obtain the required levels of vitamin D indicated for good health.
Exploring healthy eating practices in a universal school-based early childhood program in Nova Scotia, Canada

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Early care and education (SIG)

Objective: Establishing early healthy eating behaviours is important for childhood development and well-being. The landscape for early childhood is changing across Canada, and particularly in the province of Nova Scotia, which is in the process of implementing a universal Pre-primary Program (PPP). This no-fee child-centred, play-based school program is offered for children the year before they would typically begin school. Given the importance of early childhood nutrition, there is a need to understand the current healthy eating practices in the PPP to inform the development of policy resources. This presentation uses a case study approach to describe current practices related to healthy eating in Nova Scotia.

Methods: Cases (n=4) were selected in partnership with project stakeholders to include diverse communities in terms of rurality, programming and language. Site visits at each PPP included photographs, focus groups (n=13), and interviews (n=15) with key stakeholders including Early Childhood Educators (ECEs), families, community partners, teachers, principals and regional consultants. The Early Childhood Environment Rating Scale, Third Edition (ECERS-3). ECERS-3 was also administered in the four case studies by trained staff during a visit to each case site.

Results: Families are responsible for providing their child(ren) with lunches, however two snacks are to be provided by the PPP. The provision and preparation of these snacks follows the Nova Scotia Manual for Food and Nutrition in Regulated Child Care Settings. In most case sites, the lead ECE in a program would procure the food and with the help of the support ECEs, prepare snacks. The 'open snack' model was used in all case sites allowing children to choose when and how much to eat. A 'family style' dining approach to lunchtime took place in all case sites in which ECEs sat with the children during lunch.

Conclusions: The results from this research are helping to inform ongoing research in Nova Scotia to identify policy strategies to support ECEs in the PPP to create healthy eating environments for young children. Our findings have transferable implications to other early childhood environments through the description of how healthy eating practices take place within these environments.
The nutritional composition of children’s packed lunches in Australian centre based childcare.

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Purpose: Many centre-based childcare services in Australia and countries such as the US, UK and Norway, require parents to pack food for their child in a "lunchbox". As children consume between a third to half of their daily dietary intake in this setting, maximising the nutritional quality of food provided is an important public health strategy. Few published studies however have described the nutritional composition of foods packed in children's lunchboxes. The aim of this study is therefore to describe the nutritional composition of food and beverages packed in lunchboxes of children attending centre based childcare services.

Methods: A cross-sectional study of centre based childcare services from the Hunter New England region of NSW, Australia was undertaken with children aged 3-6 years from 17 services. Lunchboxes were photographed and descriptions and weights of individual foods were recorded on a standardised form by trained research assistants. Descriptions of lunchbox contents were verified using photos and entered into a nutrient analysis software program (FoodworksTM) by a trained Dietitian. Analysis of the data was undertaken using SAS (V.9.4).

Results: Data were collected for 358 children (89%) from the 17 participating centres. Preliminary findings suggest that the mean energy provided in packed lunchboxes was 2878 KJ compromising of 13% of energy from protein (22g), 29% from total fat (23g), of which 12% (9g) was saturated fat, and 53% (93g) from carbohydrate. Of kilojoules from carbohydrates, 24% (41g) were from total sugars. Mean sodium content was 1000 mg and mean fibre content was 9.5g. In regard to discretionary (unhealthy) food, 53% (n=188) of lunchboxes contained at least 1 serve (using 600KJ equivalents) and 45% (n=86/188) of these lunchboxes provided greater than 2 serves of discretionary foods. Overall, mean discretionary foods packed was 1.6 serves, and contributed to an average of 25% of total kilojoules packed.

Conclusion: The lunchboxes of children attending participating centre-based childcare services contained excessive amounts of saturated fat and sodium, exceeding recommendations for Australian children, and most likely due an over-representation of discretionary foods. This study contributes important data to inform future interventions targeting the improvement of child diet in this setting.
A pilot randomized controlled trial of the web-based Create Healthy Futures program to improve dietary habits among Early Care and Education professionals

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Early care and education (SIG)

Objective: Early care education (ECE) center-based programs to prevent childhood obesity rely on classroom teachers for implementation success. However, interventions designed to improve nutrition knowledge and wellness among ECE professionals are lacking. Create Healthy Futures is a web-based intervention to improve nutrition knowledge, and promote healthy eating behaviors among ECE professionals. The purpose of this study was to evaluate the feasibility and preliminary impact of this intervention.

Methods: We used a group-randomized controlled trial (RCT) design with measurements at baseline, post-test, and three months post-intervention follow-up. Nine center-based ECE facilities in Cleveland, Ohio were recruited and randomly assigned into intervention (n=4 centers; 56 teaching staff) and comparison (n=5 centers; 55 teaching staff) groups. Create Healthy Futures was implemented over the 2017-2018 school year. Diet-related psychosocial factors, environmental, and behavioral factors were assessed using online surveys. Mixed-effects linear regression analyses were conducted to determine intervention impact on dietary behaviors and related psychosocial factors. Process data was collected to evaluate program feasibility and acceptability.

Results: Majority of the 111 participants were female (97.3%), with a college degree (59.5%), and overweight or obese (75.2%). Overall, we saw significant between-group improvements in nutrition knowledge of ECE professionals with small to medium effect size (Cohen's d=0.63, p=0.003 for baseline-to-post-test; p=0.006 for baseline-to-follow-up), improved perceived support for staff wellness (Cohen's d=0.54, p=0.038 for baseline-to-post-test), decreased perceived barriers to eating fruits and vegetables (FV; Cohen's d=0.05, p=0.004 for baseline-to-follow-up), and decreased perceived barriers to promoting nutrition in classrooms (Cohen's d=0.52, p=0.018 for baseline-to-follow-up). While there was no significant impact of the intervention on dietary behaviors (intake of fruits and vegetables, desserts, sugary beverages, and junk food), we observed trends in desired direction with small to medium effect sizes for these variables (Cohen's d: 0.15 to 0.46 for baseline-to-post-test; 0.01 to 0.28 for baseline-to-follow-up). The enrollment rate was 94% with 87.5% module completion rate, and 83.8% retention rate across 111 participating teachers.

Conclusion: Create Healthy Futures demonstrated high feasibility and acceptability of professional development among ECE professionals using online platform. A study with a larger sample size, stringent group-RCT design, and a longer-term follow-up are currently underway.
Opportunities and barriers for building community-capacity in a school-setting aimed at stimulating physical activity and healthy dietary behavior

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: To determine opportunities and barriers for building community-capacity in a school-setting as perceived by school personnel, parents and students. Building community-capacity is considered necessary for empowering these stakeholders to design and implement activities to promote healthy dietary and physical activity behavior. Thus, ownership is created and school health-promotion can potentially be structurally embedded.

Methods: Qualitative study in four schools engaged in a capacity-building intervention for PA and dietary behavior. 23 semi-structured interviews with school personnel and parents and 7 focus groups with pre-vocational students using photo-elicitation methodology were conducted. Data were analyzed using selective analysis with regard to four capacity-building strategies: identifying leaders, creating participatory school-cultures, designing and implementing tailored activities, and creating local networks.

Results: In all schools, leaders can be identified in existing structures such as teachers of health-related subjects, parent- and student-councils, and managerial functions. Because health promotion is not a formal task for any stakeholders, designating leaders is predominantly based on intrinsic motivation. In order to create a participatory school culture, stakeholders expressed a desire for a shared vision on school health, a concrete action-plan and more actively engaging students. However, leading stakeholders (such as healthy-school coordinators) expressed that it is difficult to engage other stakeholders in activities for building strategies. The needs and opportunities for designing health-promotion activities differ between schools, depending on their ability to identify opportunities and the level or type of existing activities. Students make suggestions for improvements of existing activities, such as practical-based health-education and schoolyards that invite physical activity. Although schools already have local partners (public health- and sport services), they do not create local networks to join forces. For example, local supermarkets were not seen as a potential partner, but only as a threat to a healthy lifestyle of students.

Conclusion: In all schools, cues for building community-capacity exist. However, school communities find it difficult to identify and translate these cues to widely supported activities, and to broaden or activate local networks. Therefore, schools should be supported by local public health services to identify opportunities and needs and to facilitate dialogue between stakeholders.
Adherence to 24-Hour Movement Guidelines among Portuguese Preschool Children: The Prestyle Study

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: 24-Hour Movement Guidelines were developed for the Canadian group with the target of improving health and future health outcomes in children. These guidelines provide specific recommendations, including physical activity (light to vigorous), screen and sleep time, which preschoolers should achieve for a healthy day (24 h). The aim of the current study was to analyse preschooler's adherence with the 24-Hour Movement Guidelines.

Methods: The sample comprised 659 preschool children (mean age = 4.9 ± 0.8 years, 47% girls) that participate in the PreStyle Project. Physical activity was accelerometer-derived. Screen and sleep time were parent-reported through questionnaires. Preschoolers were classified as meeting/not meeting in each guideline and as well as for the overall 24-Hour Movement Guidelines where they were classified as meeting the recommendations for physical activity (= 180 min/day of TPA including = 60 min/day of MVPA), screen time (= 1 h/day), and sleep time (10, 13 h/day).

Results/Findings: Altogether, preschool children were physically active for 156 ± 42 minutes per day on average, spent a little more than 2 hours (128 ± 76 minutes) on screen time and sleep time was around 10 hours and half (10.28 ± 0.43 hours) per night on average. On average, significant differences were found between boys and girls regarding physical activity and sleep time (p < 0.05). According to the Guidelines, we found high percentages of preschoolers that met sleep guidelines (80.4%), only around 1/3 of preschool children met physical activity (28.4%) and a low proportion that met screen-time guidelines (17.8%). We found that 30.7% of the children met at least 2 of the recommendations and that more than half only one (54.5%). Overall, 3.6% of Portuguese preschool children complied with the 24-Hour Movement Guidelines and 11.2% of the children did not comply with any of the three recommendations.

Conclusions: Few preschoolers met physical activity guidelines and screen time recommendations which deeply impacts the preschoolers adherence to the 24-Hour Movement Guidelines. Future work should focus on finding solutions for promoting better adherence and mainly identifying ways to reduce screen time and increase PA at these ages.
International comparison of the levels and potential correlates of objectively measured sedentary time and physical activity among 3-4-year old children

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Physical activity (PA) patterns track from childhood through to adulthood. There is a dearth of literature looking at the levels and correlates of sedentary time (ST) and PA in under-fives; which could be used to inform the design of behaviour change interventions. The accelerometry data from the studies within the International Children's Accelerometry Database (ICAD) have been processed in the same way which enables fair comparisons of levels of ST/PA across different countries, which has not been previously possible. The aim of the study was to determine the levels and correlates of ST, total PA (TPA) and moderate-to-vigorous PA (MVPA) in children aged three-to-four years old.

Methods: We conducted cross-sectional analyses on 1052 children from six studies included in the ICAD. The percentage of children meeting daily guidelines, specified in Canada, Australia, USA and the UK, of ≥180 minutes of TPA and ≥60 minutes MVPA were compared across categories of each correlate using chi-squared tests. Graphs were plotted looking at ST/PA patterns by hour. Multilevel linear regression models adjusting for age, gender, season, minutes of wear time and study clustering effects were used to estimate associations between 10 potential correlates and the daily minutes spent in ST, TPA and MVPA.

Results/findings: Across the UK, Switzerland, Belgium and the USA, children spent an average of 490.18 minutes in ST per day; 30.0% and 21.2% of children did not meet the recommended daily TPA and MVPA guidelines. Graphs showed that minutes spent in ST decreased throughout the day. Figures suggested that dips in TPA and MVPA levels generally observed between 11:00-15:00 were more prominent on weekdays compared to weekends. Dips were also more prevalent in the USA compared to the other three countries. There was evidence for an association between age, gender, country, season, ethnicity, parental education, day of the week, time of sunrise, time of sunset and hours of daylight and at least one of the outcome variables; either average daily minutes spent in ST, TPA and/or MVPA.

Conclusions: These correlates can inform the design of public health interventions internationally to decrease ST and increase PA in preschool aged children.
SUNRISE International Surveillance Study of Movement Behaviours in the Early Years: Preliminary 24-Hour Movement Behaviour Results from the Canadian Pilot

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Early care and education (SIG)

Purpose: To determine the feasibility of the SUNRISE Study movement behaviour protocol in a sample of Canadian 4-year-old children in Ottawa, Canada. Additionally, we examined the proportion of sampled children that met the Canadian 24-Hour Movement Guidelines for physical activity (PA), sedentary behaviour (SB), and sleep in the early years.

Methods: Participants were recruited from childcare centres (n=4) and schools (n=6). Anthropometric and movement behaviour data were collected following a standardized protocol. SB and sleep were assessed with a modified WHO STEPS Questionnaire, and PA was measured with activPAL and Actical accelerometers worn continuously for 3 days. Mean step counts were compared between devices, however mean steps from Acticals only were used to determine PA recommendation adherence.

Results: Of a target sample of 100 children, only 50 (23 female, mean age=4.5 years) participated in the study. As a result of low recruitment at childcare centres, recruitment was shifted to schools. Skin irritation associated with wearing activPALs resulted in device wear procedure adjustments, and their brief removal from the protocol. Additionally, ambiguous questionnaire items were identified. Mean weight-for-age z-score was 0.63 (SD=1.03); with 29.1% of children classified as overweight/obese, 68.8% normal-weight, and 2.1% underweight. Relative to Actical, activPAL mean measurement bias score was -269 steps (CI=-1696.8 to 1157.8 steps). Among 38 participants with complete Actical (2 days with 24-hour wear) and questionnaire data; 42.1% met all three movement behaviour recommendations, 42.1% met two, 10.5% met one, and 5.3% met none. SB was the most frequent parameter not met with 63.1% exceeding the recommendation of no more than one hour of recreational screen time. There were no significant sex or weight category differences in mean recommendations met (p>0.05).

Conclusions: New approaches must be taken to facilitate the enrollment of children from both childcare centres and schools in Ottawa. In addition, new algorithms must be developed in order to ensure that reduction of activPAL PA data is accurate and reliable. Moreover, while many children were meeting published guidelines, even more children were not meeting the SB recommendation, which emphasizes the need for increased awareness concerning screen time and SB in the early years.
Idea Bank for Healthy Life Centers - a practical tool for health personnel for sharing knowledge and experiences

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Keywords
Health service, prevention, health promotion, best practice, innovation, sharing of experience

Background
Sixty percent of municipalities in Norway have established a Healthy Life Center (HLC). This is an interdisciplinary primary health care service, which offers effective, knowledge-based programs for health behavior change, and coping with health problems and chronic diseases. The Norwegian Directorate of Health has published a guide for HCLs who describes recommendations for quality and content of the service and provides information on their website. In addition, a web-based tool for sharing best practice was needed.

Method
The idea bank for HLCs is a web-based tool, which provides HLC employees opportunity to share measures, methods and experiences from their municipality and employ ideas from other municipalities in their own context. The website was initiated and developed by the Norwegian Directorate of Health in cooperation with HLCs in 5 municipalities. The idea bank is run by a HLC in the Modum municipality. The website is continually developed by its contributors. This poster shows the innovation, content and experience with the idea bank.

Results
The idea bank for HLCs is a resource and a practical tool for sharing knowledge and experience. By sharing and reusing best practices, local HLCs contribute to quality and development of HLCs nationally. More than 80 examples of best practice from 22 HLCs all over the country have been published so far during the idea bank's 10-months of existence. By the end of 2017, there were 83 registered subscribers. Users and contributors receive a newsletter every other month.

Conclusion
Take a look at http://idebank.frisklivssentralen.no/
Information in English is available.
Study on Nutrition and Activity in U.S. CACFP Child Care Settings: Methods and Response Rates

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Early care and education, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: The Study of Nutrition and Activity in Child Care Settings (SNACS) is a nationally representative study of childcare providers participating in the US Department of Agriculture’s (USDA) Child and Adult Care Food Program (CACFP). SNACS had four objectives: 1) Assess meal quality and activity policies/practices for infants and children in CACFP programs; 2) Describe food and nutrient intakes of children in CACFP centers and outside of childcare, and assess the feasibility of collecting these data in family daycare homes (FDCH); 3) Determine meal costs and revenues in CACFP programs; and 4) Describe and assess plate waste.

Methods: The sampling scheme selected 20 regionally-dispersed States, CACFP providers within States, classrooms within providers, and children within classrooms, and examined five provider subgroups: sponsored/independent, urban/rural, share of minority children residing in the area, and program size. Assessment instruments and measures included: a provider web survey based on NAPSACC; a paper menu survey based on the Family Childcare Home Legislative Changes Study; a structured childcare observation based on NAPSACC Environmental Policy Assessment Observation (EPAO); observed dietary intake and meals (Early Childhood and Child Care Study, NAPSACC); parent-recorded food diary; telephone interview with parent about demographics, use of assistance programs, and physical activity outside of childcare; child body mass index; and assessment of meal cost based on USDA's School Nutrition and Meal Cost Study methodology.

Results: Data were collected between Dec 2016 and Dec 2017 and are being analyzed. A total of 1,235 providers were recruited; 1,085 completed provider web surveys (87.8%), 1,021 completed menu surveys (82.7%). Onsite data collection occurred in 652 programs, including 354 recruited for dietary intakes, 315 of whom completed environmental observations (89.0%) and 348 completed full-day meal observations (98.3%). A total of 2,274 parent interviews (68.4% response rate (RR)) were completed, 2,309 children (70.3% RR) completed BMI measurements, and food diaries were completed on 2,353 childcare days and 2,242 non-childcare days (70.7% and 67.4% RR, respectively).

Conclusions: This poster presentation will describe the methodology, identify lessons learned, highlight response rates and data that will be publicly-available for future research on nutrition and activity in childcare settings.
The Neighborhood Social Environment and Physical Activity: A Systematic Scoping Review

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Objective: Perform a systematic scoping review to (1) provide an inventory of studies that assessed the influence of the neighborhood social environment on physical activity since 2006; (2) describe the methodology employed; and (3) formulate recommendations for advancing the field.

Methods: Two databases were searched using terms related to 'physical activity,' 'neighborhood,' and 'social environment' in January 2017. Eligibility criteria included: 1) physical activity as an outcome; 2) neighborhood social environmental construct as a predictor; 3) healthy population (without diagnosed clinical condition or special population); 4) observational or experimental design. Of 1,352 studies identified, 181 were included. Textual data relevant to the social environment measurement and analysis were extracted from each article into qualitative software (MAXQDA) and coded to identify social environmental constructs, measurement methods, level of measurement (individual vs. aggregated to neighborhood), and whether authors explicitly recognized the construct as the social environment. The following summary measures were generated for each social environmental construct: number of unique measurements; % of times measured at an aggregate level; % of times authors referred to the construct as the social environment. Social environmental constructs were then grouped into larger descriptive dimensions.

Results: Fifty-nine social environmental constructs were identified and grouped into 9 dimensions: Crime & Safety (n=133 studies; included in 73% of studies); Economic & Social Disadvantage (n=55, 33%); Social Cohesion & Capital (n=47, 26%); Social Relationships (n=22, 12%); Social Environment (n=16, 9%); Disorder & Incivilities (n=15, 8%); Sense of Place/Belonging (n=8, 4%); Discrimination/Segregation (n=3, 2%); Civic Participation & Engagement (n=2, 1%). Across all articles, the social environment was measured using 176 different methods, was measured at an aggregate-level 38% of the time, and referred to as the social environment 23% of the time.

Conclusions: Inconsistent terminology, definitions, and measurement of the social environment and the lack of explicit language identifying constructs as the social environment make it challenging to compare results across studies and draw conclusions. Improvements are needed to increase our understanding of social environmental correlates and/or determinants of physical activity and facilitate cross-disciplinary conversations necessary to effectively intervene to promote physical activity.
P3, P3.113

Designing parks to promote active visits among older adults

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose Neighbourhood parks are important settings for older adults to engage in physical activity and interact with others. Despite this, few older adults visit parks and little is known about what park features are important to promote park visitation among this age group. The aim of this study was to gain an in-depth understanding of park features that may encourage older adults (65+ years) to visit parks and be active and engage with others during their park visit.

Methods: Qualitative one-on-one walk-along interviews were completed between October 2017-February 2018 with 30 older adults (mean age 74.9 years (sd 5.4), female n=17). The interviews were conducted in nine parks of varying size (range 1-30 ha) and amenities located in low, middle and high socio-economic status areas of Melbourne, Australia. Participants included both regular and irregular visitors to parks. As they walked through the park with the researcher, participants discussed features they liked and disliked and shared experiences and opinions regarding park characteristics that may encourage or discourage their visitation, park-based physical activity and social interaction. The interviews were recorded and transcribed verbatim and thematic analysis was performed using NVivo 12 software.

Results: Park features most highly valued for visitation included: a well maintained attractive and relaxing natural environment with established trees, gardens and landscaping; seating; paths; toilets; café facilities; a water feature; shade/shelter; facilities for their grandchildren; and the presence of other people. A location that was close to their home and/or other services such as libraries and shops was also important. Features most valued for physical activity included walking paths, organised activities and fitness equipment. Features most valued for social interaction included picnic/bbq facilities, organised events, a café and aesthetics.

Conclusions: These findings will help inform the planning and (re)design of parks to optimise park visitation, park-based physical activity and social interaction for older adults. This evidence is important for policy and decision makers, urban planning, landscape architects, and local, state and national government organisations to ensure our parks are designed to support older adults to lead healthy and active lives.
P3, P3.114

Neighborhood walkability and changes in cardio-metabolic risk markers: a longitudinal mediation analysis examining the role of physical activity

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose: Living in walkable neighborhoods can provide long-term benefits to residents' cardio-metabolic health. However, little empirical research has addressed how physical activity is involved in this relationship. This longitudinal study examined the indirect associations of neighborhood walkability with changes in cardio-metabolic risk markers, mediated through physical activity.

Methods: The Australian Diabetes, Obesity and Lifestyle study collected data from adults, initially aged 25+ years, in 1999, 2000, 2004, 05, and 2011, 12. We used 12-year follow-up data from 2,023 participants who did not change their place residence during the study period. Outcomes were 12-year changes in waist circumference (WC), systolic blood pressure (SBP), 2-hr post-load plasma glucose (2-hr PG), and high-density lipoprotein cholesterol (HDL-C). A walkability index was calculated, using dwelling density, intersection density, and destination density, all within 1 km street-network buffer around participant's residence. Using self-reported time spent in moderate to vigorous physical activities (including walking) at each time point, and 150 min/week as the cut point, participants were categorized into four groups: "stayed inactive"; "transitioned from sufficiently active to inactive"; "transitioned from inactive to sufficiently active"; "stayed sufficiently active". Multilevel linear and multinomial models were used for regression analyses. The joint significance test was used to assess mediation.

Results: Higher walkability was associated with higher odds of being "stayed sufficiently active" compared to being "stayed inactive" (P=0.005), which, in turn, was associated with smaller increases in WC (P<0.001), 2-hr PG (P=0.036), and greater increases in HDL-C (P<0.001). Higher walkability was marginally associated with higher odds of being "transitioned from inactive to sufficiently active" compared to being "stayed inactive" (P=0.058), which, in turn, was associated with smaller increases in WC (P<0.001), 2-hr PG (P=0.002), and greater increases in HDL-C (P=0.002). No indirect association between walkability and changes in SBP through physical activity was observed, but there was an association of walkability with smaller SBP increase, which is not mediated through physical activity (P<0.001).

Conclusions: Our findings indicate that the protective effects of living in high-walkable areas against the increase of cardio-metabolic risk may be partially attributable to sustained sufficient physical activity and to increases in the level of activity.
Residential relocation trajectories and longitudinal associations between neighborhood walkability and walking and bicycling in the Northern Finland Birth Cohort 1966

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Objective: Walkable neighborhoods with high density, mix of land uses and good access networks have been associated with enhanced walking and cycling. The objectives of our study were to model and visualize subjects’ residential relocation trajectories based on neighborhood walkability, and to assess longitudinally how changes in walkability of the neighborhood are associated with changes in self-reported regular walking and cycling.

Methods: We used population representative data from the Northern Finland Birth Cohort 1966 between 31 and 46 years of age (N = 5,947). Self-reported regular walking and cycling (i.e., 4 times per week or more) were used as the main outcome variables and objectively measured physical activity at the age of 46 as a secondary outcome. Objectively assessed neighborhood walkability was the main explanatory variable that combined population density, number of destinations and intersection density. We conducted sequence analysis with TraMineR to visualize and cluster participants according to residential relocation trajectories based on neighborhood walkability. Generalized linear mixed models were used for the longitudinal analysis and Fisher’s exact test to examine the odds of starting regular walking and cycling between different clusters.

Results: Increased neighborhood walkability was associated with increased regular walking (OR 1.03; 95% CI: 1.00, 1.06; p < 0.05) and cycling (OR 1.17; 95% CI: 1.12, 1.23; p < 0.001). After adjusting for sociodemographic factors, only the association with cycling remained statistically significant. Residential relocation trajectory from lower levels of walkability into the highest quartile was associated with two times higher odds of starting regular walking and four times higher odds of starting regular cycling compared to the trajectory indicating relocation into the lowest walkability quartile. We did not find correlation between neighborhood walkability and objectively measured moderate to vigorous physical activity and daily step count at 46 years of age.

Conclusions: Our results provide high level of evidence supporting the hypothesis that increasing walkability of cities could enhance regular walking and cycling at population level and improve public health. The findings have implications for zoning and transportation policies suggesting creation of dense and diverse neighborhoods with good access networks to support regular walking and cycling.
Acceptability of the Stanford Discovery Tool app for identifying barriers and facilitators of active living of older adults from Curitiba, Brazil

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: To analyze the acceptability of Stanford Discovery Tool app (SDT), a tablet-based participatory tool, designed to engage residents in identifying neighborhood elements that affect active living opportunities among older adults from Curitiba, Brazil. Methods: A sample of 41 older adults (≥360 years old) were selected according a balanced distribution of neighborhood walkability and income, and individual levels of walking and education in Curitiba, Brazil. The acceptability was measured with a post-use survey of the app that included nine items with a 6-level Likert scale ranging from 1 "not at all" to 6 "very". The survey items captured perceptions on SDT interest, comfort, nervousness, confidence, danger, enjoyment, and also if the users would recommend it to friends, would use it again and if would use it for a longer time. Descriptive statistics (mean ± standard deviation) were computed for all nine items. The Mann-Whitney U Test was used to compare the acceptability based on participants gender, educational level and engagement in walking behavior for leisure and commuting purposes. Results/Findings: The highest mean acceptability scores were given to the items "interesting" (5.54±0.55), "comfortable" (5.29±1.14), "confidence" (5.54±0.80), "enjoyment" (5.61±0.49), "would recommend it to friends" (5.61±0.58) and "would use it again" (5.29±0.64). The lowest scores were given to the items "feel nervous" (1.37±0.94) and "feel endangered" (2.02±1.35) by using the SDT presented lowest scores as expected (low scores indicate low feeling of danger and nervousness). No differences were observed in acceptability mean scores by gender or educational level. However, participants who did not walk for both leisure or commuting purposes (<10 min/week) reported higher scores of "feeling in danger" while using the app than those who reported walking (2.20±1.38 vs. 1.00±0.00; p=0.013). Conclusions: The SDT app showed high acceptability in a sample of older adults from Curitiba, Brazil. Acceptability scores did not vary by gender and educational level indicating that SDT. The results indicate that SDT has potential to be used with Brazilian older adults living in urban settings. The findings have promising implications on advancing studies on aging friendly environments in middle-income countries.
Dose-response relationship between park use and physical activity in four U.S. cities

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Objective: Parks and green space are critical components of community infrastructure that can promote population-level physical activity (PA). Few studies have explored the dose-response relationship between park use and PA. The purpose of this study was to examine associations between total park visits and meeting PA recommendations.

Methods: Data were collected in Fall 2017 in four U.S. cities (Brooklyn, NY; Greenville, SC; Raleigh, NC, and Seattle, WA). An electronic, map-based survey (Maptionnaire) was administered to randomly selected adults and was used to collect park use and PA data. Each participant indicated which specific parks they visited within their neighborhood (0.5 mile from block group centroid) in the past 30 days (unique park visits) and the number of times that they visited each park in the past 30 days (summed to total park visits). The number of days and total time spent in moderate and vigorous PA was collected via the International Physical Activity Questionnaire (IPAQ) and used to calculate whether individuals met the 2018 United States US PA Guidelines. Logistic regression examined the association between meeting PA recommendations (yes/no) and unique park visits and total number of park visits, separately. All models adjusted for age, gender, race/ethnicity, education level, and city.

Results: The majority of respondents (n=360) were female (58%), non-Hispanic White (79%), and college-educated (82.2%). Of all respondents, 60.6% reported visiting at least one park in their neighborhood in the past 30 days, with an average of 1.45 unique park visits (SD=2.0) and 8.4 total park visits (SD=15.1). After controlling for covariates, no significant association was found between the unique number of park visits and meeting PA recommendations (OR=1.16, 95%CI=0.9-1.4). However, a significant, positive association was found between total number of park visits and meeting PA recommendations (OR=1.04, 95%CI=1.01-1.07).

Conclusions: This study measured unique and total park visitation with a map-based survey. Findings indicate that more park visits per month is associated with increased likelihood of meeting PA recommendations, contributing to the evidence suggesting the importance of creating and maintaining quality green spaces that attract users, facilitate PA, and promote health.
Purpose: In the US, only 45% of Latinos report meeting the national physical activity (PA) recommendations. Among Latinos, the US-born often report more leisure-time PA but less transportation PA than the foreign-born. One potential explanation for these disparities is that Latinos vary in their neighborhood environmental attributes deemed relevant for leisure or transportation PA. However, few studies have examined this hypothesis, and most have been limited to small samples in specific geographic areas. To address this limitation, the purpose of this study was to examine how neighborhood environments differ by nativity and other individual characteristics among a nationally-representative Latino sample.

Methods: Cross-sectional data came from 5,155 self-identified Latinos in the 2015 National Health Interview Survey. Respondents reported the presence (yes/no) of two types of transportation infrastructure (e.g., sidewalks on most streets) and four different types of destinations (e.g., bus or transit stops) in their neighborhood. The survey also assessed nativity status, socio-demographics (age, gender, education), and walking behaviors for transportation or leisure. Logistic regression models examined associations of the socio-demographic, nativity, and walking variables in relation to each of the six perceived environment attributes. Models used the sample weights and accounted for the complex survey design.

Results: Adjusted models showed a significantly higher prevalence of both perceived infrastructure attributes among Latinos with high education than those with lower education [e.g., adjusted prevalence ratio or APR (95% CI) for perceived sidewalks = 1.07 (1.02-1.13)]. Adjusted models also showed significantly lower prevalence of each of the destination variables among the older (40 years and over) than younger age group (18-40 years) [e.g., APR (95% CI) for perceived bus or transit stops = 0.94 (0.89-0.98)]. All the perceived environment attributes were positively related to reporting any walking (for leisure or transportation) and none were significantly related to nativity.

Conclusion: Among Latinos in the US, those with low education, older age groups, and those who report no walking (for leisure or transportation) may be at a disadvantage of reaping the health benefits of walkable neighborhoods. Findings suggest promoting PA equitably among Latinos may need to focus on socio-demographically disadvantaged groups rather than nativity.
Causal Impacts of an Urban Greenway on Bicycle Use in Downtown Vancouver

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: To assess the cycling impacts of the Comox Greenway in Vancouver. The two-kilometer retrofit included one-way shared on-street with counterflow lanes (22% of route), one-way protected (29%), and two-way shared on-street (49%).

Methods: Sampling was during fall and winter for both survey periods to control for seasonality. Experimental and control group were defined based on residential distance from the greenway (Benton et al., 2016; Humphreys et al., 2016). A sample of 239 cases within 300 meters and 285 controls between 300-500 meters from the corridor were recruited at baseline and followup exceeding power analysis of a minimum of 381 subjects (0.05 level). Age, gender, ethnicity, employment status, educational attainment, vehicle ownership, bicycle ownership, and carshare membership were reported. Travel diaries were used to collect trip data. Logistic models estimated the effect of greenway on bicycle use, and negative binomial (NB) and zero-inflated negative binomial (ZINB) models on cycling trip frequency.

Results: Median age was 45 in control and 43 in experimental groups and percent female 59 in control and 55 in experimental groups. Experimental group completed 0.15 cycling trips at baseline, increasing by 72.2% to 0.26 trips at follow-up (t=-us;1.79, p= 0.075). The control group completed 0.24 cycling trips at baseline, increasing by 11.6% to 0.27 trips at follow-up (t=-us;0.60, p= 0.547). The largest change in trip frequency were for subjects that neither owned a vehicle or were carshare members, with a non-significant increase of 380.0% in trips from 0.05 to 0.24 trips (t=-us;1.24, p= 0.218). Subjects 65 and older (OR = 0.22, 95% CI = 0.05, 0.99) biked less whereas white subjects (OR = 2.10, 95% CI = 1.04, 4.23) and those with carshare membership biked more (OR = 1.79, 95% CI = 1.09, 2.95).

Conclusion: Preliminary analyses suggest that greenways can increase cycling for those within close proximity and have less access to cars. Final analyses are underway that will add considerably to these initial results. Distance thresholds assessing areas of impact can be detected using advanced spatial methods. Results suggest significant impacts of car sharing on active travel.
Grab Goodness Vending: A pilot research program to stimulate healthy snacking in tertiary education settings.

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Vending machines are becoming increasingly prevalent in public places, including in the education setting. Vending machines have been identified as an obesogenic factor by contributing to the increased availability and over-consumption of energy-dense nutrient poor (EDNP) foods and beverages throughout the day. This study is based in a large, urban tertiary education institute. This study investigates the effect of increasing the availability of healthier snack and beverage vending options, to increase the sales volume of healthy options in proportion to unhealthy options.

Methods: An audit of the standard machines (n=29) at the tertiary education institute was carried out to assess the nutritional quality of these vending machines. Healthy competitive snacks and beverages to be included in new 'Grab Goodness' vending machines were researched and assessed by dietitians based on healthful criteria (National Healthy Food and Drinks Policy). The availability of healthy assortment was increased through the addition of 'Grab Goodness' vending machines (n=4). These vending machines containing only healthy ('Green' and 'Amber' category) snacks and beverages, were introduced alongside existing standard vending machines (n=7). The monthly sales data from each of the healthy vending machines and co-located standard machines were captured electronically.

Results: The audit found the assortment of snacks and beverages offered by standard vending machines were of poor nutritional quality, with only 16% of all products rated as 'healthy'. On average, more than 90% of the assortment offered through new Grab Goodness machines were healthy. The increase in availability of healthy snacks and beverages through the addition of 'Grab Goodness' machines resulted in an increase in the proportion sales of healthy products by 30%. The sales volume of vending machines was also increased over the same period.

Conclusions: Increasing the availability of healthy competitive assortment increased the sales of vended healthy snack and beverages by three-fold, accounting for 44% of all vending machine purchases. The introduction of new 'Grab Goodness' vending machines improves the food environment and may, therefore, be an effective and feasible strategy to increase the uptake of healthier food and beverage options by vending machine clients in the university setting.
A repeated cross-sectional survey assessing changes in diet and nutrient quality of English primary school children’s packed lunches from 2006 to 2016

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objectives: School meals standards were introduced in 2006 in England, however, no legislation exists for packed lunches. This study analyses provision and consumption of foods and nutrients in packed lunches in 2016 to highlight differences in diet and nutrient quality since 2006.

Methods: Two cross-sectional surveys of children's packed lunches were conducted in 2006 and 2016. Data were analysed using multilevel regression models taking into account the clustering of children within schools. Data were collected from 1148 children attending 76 schools across England in 2006 and from 323 children attending 18 schools across England in 2016. Children were included if they regularly ate a packed lunch and were in year 4 at primary school, aged 8-9 years, for both surveys.

Data collected included provision and consumption of weight and type of food, nutrients and proportion of lunches meeting individual and combined school meal standards.

Results: Frequency of provision and portion size of some food types changed substantially between surveys. Frequency of provision of confectionery in lunches reduced by 9.9% (95%CI -20.0 to 0.2%), sweetened drinks by 14.4% (95%CI -24.8 to -4.0%) and cakes and biscuits not containing chocolate increased by 9.6% (95%CI 3.0 to 16.3%). Vegetable provision in lunches remained low. Substantial changes were seen in the percentage of lunches meeting some nutrient standards; Non-milk extrinsic sugars (NMES) (19%, 95%CI 10 to 29%), vitamin A (-8%, 95%CI -12 to -4%), vitamin C (-35%, 95%CI -42 to -28%) and zinc (-8%, 95%CI -14 to -1%).

Conclusions: Packed lunches remain low quality with few meeting standards set for school meals. Provision of added sugars has reduced, due to reductions in provision and portion size of sugary drinks and packaged sweet foods; however provision of some nutrients has worsened. Stakeholder collaboration is needed to further improve packed lunch quality.
Online grocery shopping behaviors, knowledge and attitudes of SNAP participants

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective
To inform policy proposals to allow online grocery shopping with SNAP benefits by examining relevant behaviors, knowledge and attitudes of SNAP recipients.

Methods
This qualitative study was guided by the theory of planned behavior and used a purposive recruitment strategy to conduct four one-hour focus groups with three to six participants each from March through May 2018 in Las Cruces, New Mexico. Participants were SNAP recipients with children who do the shopping for their family. Focus groups were video and audio recorded, transcribed, and coded, with coding cross-checked by coders to establish reliability.

Results
Few participants had shopped for groceries online although all were familiar with online shopping more generally. Participants were generally uninterested in grocery shopping online themselves but considered it could have value for the elderly or disabled. Themes identified in the analysis included barriers to online grocery shopping, motivators of online grocery shopping, and preferences around online grocery shopping. Identified barriers were cost, quality control for produce and perishable foods in particular, and distrust of the overall process. Participants suggested services such as a shopping list builder, filters for dietary restrictions, or healthy recipe ideas to increase interest in online grocery shopping.

Conclusions
SNAP recipients in this study have not adopted online grocery shopping for various reasons. Additional research could inform policy by investigating which participants would benefit from using SNAP benefits online and what strategies would encourage healthful food purchases.
Monitoring the online food and beverage marketing environment in Singapore

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Despite being identified as one of the main drivers of the obesity epidemic, the digital food marketing environment is largely uncharacterised. To inform policymakers, we conducted an environmental scan, characterising key marketing techniques used by major food industry players.

Methods: Using freely-available information on internet traffic ranking in April 2018, we identified and accessed 24 top food and beverage (F&B) websites (including F&B brands, delivery services, retailers, and bloggers) and 25 top non-F&B websites (including 22 traditional websites, and 3 websites with user-generated content) in Singapore. Two coders adapted a published coding framework for marketing techniques by pilot-testing across all site types. On traditional websites, coders followed a standardised flow. Social media space (YouTube, Facebook, and Instagram) of popular F&B companies in Singapore was characterized by coding all posts or videos displayed over a six-month period (Jan 2018, June 2018) for marketing techniques. Top F&B companies were identified based on followers/views, and/or brand value and sales revenues. Food type was coded according to an adapted version of WHO food classification frameworks.

Results: On F&B websites, the most common marketing technique was membership/loyalty rewards (83% of sites). Website communities (72%), online stores (72%), use of characters such as celebrities/sports people (44%), and advercation (33%) were frequently present. On traditional non-F&B websites (e.g. banks, news providers), 117 F&B ads were observed. Most were part of the published content (75%), rather than banner ads/pop-ups. Links to other forms of media marketing existed in 74% of F&B ads. Health claims (24% of F&B ads) and use of promotional characters/events (29% of F&B ads) were also present. Ads most frequently displayed beverages (26% of F&B ads), western-style fast food (22% of F&B ads), and sweets/desserts/confectionary/savoury snacks (18% of F&B ads). Results from user-generated social media sites are in preparation.

Conclusions: The F&B industry uses a wide range of marketing techniques to encourage consumer engagement and retention. The use of website communities, and links to more interactive platforms is favoured by a vast majority of companies. Further work on the extent and impact of consumer's digital interactions with F&B brands would be valuable.
Takeaway food outlets around secondary schools in the UK: using different methods for evaluating the takeaway food environment

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Different studies have used different methods to evaluate density, proximity and accessibility of fast food outlets around secondary schools. This study aims to investigate the differences between the road network and straight-line methods to measure the density and proximity of takeaway outlets. Also, we evaluate the use of the Hansen Index to measure the accessibility of takeaway outlets.

Methods: All of the 88 schools and the Hot Food Takeaways (HFTs) were spatially located using the Geographical Information System (GIS) software 10.4. GIS was also used to spatially measure the density and proximity scores applying both road network and straight-line methods. In addition, the Hansen Accessibility Index was used to measure the accessibility score of each of the schools. All of the nonparametric statistical analysis tests including Wilcoxon test, agreement (Kappa statistic) test and correlation test were carried out using Stata software version 15.0.

Results: More than half of the schools had no takeaway outlets within 200, 400, and 600 metres when the road network buffer was used. Wilcoxon signed ranked test results showed statistical significant differences in the density and proximity of HFTs between both circular and road network methods. The results also showed that there were fair and moderate agreement between straight-line and road network densities within 800 and 1000 metres, respectively. Also the agreement between both methods to measure the proximity was fair to moderate. In addition, correlation test showed that the accessibility score was not dependent on the distance between the school and the nearest takeaway outlet using either the straight-line or the road network distances.

Conclusions: We recommend the use of 800 and 1000 road network metres and based on our findings the agreement between both methods to measure the density and proximity was not strong. A consistent approach to the methods used to measure the density, proximity or accessibility of food outlets, particularly around schools, is needed. This may help to enable promising policies to be implemented by governmental organisations and all related stakeholders and to effectively evaluate the impact of limiting the number of takeaway outlets around schools.
Improving societal health through measurement and monitoring of food poverty

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Objective

Food poverty in developed countries has been declared characteristic of a public health emergency on a national scale (Furey, 2019; Taylor-Robinson et al, 2013). Although food insecurity is routinely measured in North America, there is currently no agreed definition or measurement in the UK. Without an established indicator, monitoring of trends over time and the identification of the population experiencing food poverty is not possible (Carney and Maitre, 2012). Subsequently, interventions and strategies with the purpose of alleviating food poverty and tackling diet-related health inequalities in society therefore may not be effectively implemented. The objective of this study is to investigate stakeholder perspectives on food insecurity definitions, measurement and predictors in order to develop a conceptual framework for food poverty that is culturally appropriate for NI and the UK, and provide recommendations for measurement approaches.

Methods

In-depth, semi-structured interviews were conducted with policymakers, public health practitioners and campaigners (n=19). These elicited stakeholders' perspectives on food poverty addressing existing measurement approaches; the predictors/causes of food poverty; government responsibility; and what they perceived to be the implications for business of varying food poverty levels. Each interview was transcribed and uploaded to NVivo11. Data was then thematically analyzed using a deductive coding approach.

Results

Three overarching themes were identified: defining to understand, measuring to improve and making meaningful change. Stakeholder opinions as to what should constitute definition and measurement varied, for some the social exclusion element is an essential component, while others recognised its importance but were of the opinion that to gain traction for policy change a headline indicator may be preferable to one with solely experiential measures. Poor health, as both a cause and consequence of food poverty, was a dominant theme discussed, seventy-nine per cent of respondents mentioned health, and of these eight per cent referred to mental health.

Conclusions

There was a consensus among stakeholders that defining and measuring food poverty are important actions, and that doing so would help improve overall societal health and provide long-term public health cost benefits.
Investigating food insecurity practice globally to inform practice locally

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Objective
Food insecurity is becoming a key concern within developed countries with a range of measurements being used to report on the severity of the issue. There is a need to understand the components of these measurements and their effectiveness to inform future work in this area in order to address societal inequality and ultimately improve societal well-being. The objective of this review was to examine the methods used to measure food insecurity globally, to inform considerations relating to constructing a novel, or reviewing an existing, cross-cultural food insecurity measurement approach in the United Kingdom.

Methods
This study uses a Rapid Evidence Assessment (REA) methodological approach to systematically review the literature on FI measurement. Key words (n=23) were searched in relevant databases (n=11) using inclusion criteria, and those papers which passed initial title/abstract screening (n=135) proceeded for full abstract review. Abstracts were reviewed and scored according to screening criteria, resulting in thirty-four papers being deemed methodologically robust to progress to full review. Each paper was read several times to ensure a comprehensive understanding of the study. A deductive coding approach was applied and all papers were analysed for the following information: geographical jurisdiction, methodological approach, sampling strategy, measurement components, and associated policy responses.

Results
Results found that the majority of papers reviewed emanate from North America with the US Household Food Security Scale Module (HFSSM) and its various adapted forms: the 6-item short form questionnaire, and area-specific adaptations, being the most commonly reported measurement tool. Measures examining dietary diversity (e.g. the Household Dietary Diversity Score) were the second most commonly cited category, and coping strategies measures (e.g. the Coping Strategies Index) appeared least frequently.

Conclusions
This review contributes to knowledge on food insecurity measurement by providing a concise overview of current food insecurity measurement nationally and internationally, highlighting the most commonly used measurement approaches, and summarising associated policy responses to inform future intervention design or policy development and evaluation.
Labeling of sugars and sweeteners on ultra-processed food products targeting children in Brazil

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose: To (1) evaluate the different forms of added sugars and artificial sweeteners displayed on the list of ingredients on ultra-processed food products (UPF) and compare the amounts of these ingredients against current recommendation; (2) determine consumers' opinions regarding the presentation of added sugars and sweeteners on these products.

Methods: Three approaches were employed to meet study aims: (1) a secondary literature review of the nomenclature of sugars and sweeteners and their recommended consumption; (2) an analysis of the list of ingredients of 10 UPF items commonly consumed by children, across three food categories (powdered juices, jellies, flavored milk); (3) a thematic analysis of focus group discussions on UPF labeling, conducted in 4 different Brazilian cities.

Results: Twenty-one different types of sugars and 15 different types of artificial sweeteners are permitted for use by Brazilian regulatory agencies. The 10 products assessed, all regular, non-diet/light, had three different types of added sugars and five different types of artificial sweeteners. Seven of these products contained both added sugars and artificial sweeteners, six products combined two or more artificial sweeteners, but only two products displayed the quantities of artificial sweeteners. In these two cases, the amounts of artificial sweeteners presented nearly exceeded the recommended daily allowance. Focus groups highlighted several barriers that prevented consumers from fully understanding the composition of the UPFs. This included difficulty in understanding the technical terms used, unfamiliarity with the nomenclature, small size of the displayed information and the lack of standardization of placement.

Conclusions: The study highlighted the wide variation in the nomenclature of added sugars and artificial sweeteners, terms that contributed to consumer confusion. Regular products targeting children offered reduced calories at the expense of increasing the variety and concentration of artificial sweeteners, which is a cause for concern, since the effects of chronic intake of artificial sweeteners among children is currently unknown. Limited consumer awareness about artificial sweeteners and their pairing with caloric sugars further contributed to consumer misunderstanding. More effort must be made to present nutrition information in a simple manner that is easy to interpret, to help consumers purchase healthier products.
Are weight management intentions and weight perceptions related to dietary quality among young adults? An analysis of the Canada Food Study

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Efforts to lose, gain, or maintain weight are highly prevalent among young adults, but little is known about the relationship between weight management efforts and overall dietary quality. Attempts to manage weight are typically driven by weight perceptions, which may also uniquely affect overall diet. The objective of these analyses was to explore associations between weight change intentions and perceptions with dietary quality among young adults.

Methods: Cross-sectional data were drawn from the first wave of the Canada Food Study, a national cohort study of young adults (aged 16 to 30) recruited in five Canadian urban centres. The Healthy Eating Index-2015 (HEI-2015) was used to characterize dietary quality among participants who completed a self-administered 24-hour recall (n=2,040). Respondents reported their weight change efforts over the past year (lose, gain, maintain, or do nothing about their weight) and their weight perception (underweight, just about right, or overweight). Multiple linear regression analyses were conducted to investigate the relationship between weight change intentions and weight perceptions, separately, and dietary quality, controlling for known covariates.

Results: The average HEI-2015 score was 52 of 100 possible points. Nearly one quarter (24%) of respondents reported not trying to do anything about their weight, while 16% reported trying to maintain, 16% trying to gain, and 44% trying to lose weight. Approximately two-thirds reported their weight was just about right (65%) and one-quarter felt they were overweight (26%). Trying to gain or maintain weight were each significantly associated with higher HEI-2015 scores, indicative of higher dietary quality, compared to not making an effort to manage weight. Weight perceptions and HEI-2015 scores were not significantly related. Respondents who were younger, male, non-White, and who had missing height and weight data or had "obesity" based on body mass index had lower dietary quality scores.

Conclusions: Efforts to manage weight, which are very common among young adults, are associated with dietary quality. Future behavioural nutrition research may provide insights into the strategies used by youth to manage weight, helping to guide interventions that recognize links among weight-related behaviours, dietary quality, and other determinants of health.
Changes in the use of free sugars and sweeteners in the Canadian food and beverage supply 2013 to 2017

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Background: Changes to intake guidelines, along with changes to nutrition labelling regulations that relate to sugars, can promote adjustments to the nutritional composition of the food supply through product reformulation, introduction, or discontinuation. Such upstream changes may present a more equitable way to reduce population intakes, and understanding the main sources of sugars in Canadian foods will allow for monitoring Canadian intakes of sugar overtime. Data are lacking on the degree to which free sugars and sweetener contents are changing within the Canadian food and beverage supply.

Objective: To investigate changes in the proportion (%) of foods and beverages containing free sugar ingredients (FSI) and sweeteners between 2013 and 2017.

Methods: A repeated cross-sectional analysis of the University of Toronto's Food Label Information Database 2013 and 2017 collections (n=15,259 and n=17,606, respectively, after exclusions) was used to determine the proportion (%) of prepackaged foods and beverages containing FSI and sweeteners in the ingredient list by food category and overall. Changes from 2013 baseline data were calculated using the z-test of two proportions. Bonferroni adjusted alpha levels of 0.0125 (0.05/4) were used to correct for multiple comparisons.

Results: Between 2013 and 2017, the proportion (%) of products containing: (i) FSI decreased by 2.6% (p<0.0001); (ii) sweeteners did not change (p=0.2579); (iii) both FSI and sweeteners increased by 0.5% (p=0.0007); and (iv) no FSI or sweeteners increased by 2.0% (p<0.0001). In 2017, the same major food categories had the highest proportion of products containing FSI as in 2013, which included desserts (94.0%*), sugars and sweets (92.5%*), and bakery products (83.0%*); however, two out of the three major food categories which had the highest proportion of products containing sweeteners in 2017 differed from 2013, and included beverages (8.7%*), other foods and beverages (7.2%*), and fruits (4.4%*). (*Percentages shown for 2017)

Conclusions: Although there were statistically significant changes between 2013 and 2017, the small magnitude of these changes may not translate to a reduction in population intakes of sugars. More research is needed to examine changes in sugars levels among the Canadian food and beverage supply, particularly as labelling amendments come into force.
U.S. College and University Responses to Student Food Insecurity: A National Inventory of Strategies

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Recent reports estimate that over 40% of U.S. college students experience food insecurity (Broton & Goldrick-Rab, 2017). High rates of student food insecurity have been reported in other industrialized countries (e.g., 35-90% in Canada, 13-48% in Australia; Bruening et al., 2017; Lee et al., 2018). Student food insecurity has been linked to poorer diet quality (Bruening et al., 2018) and lower rates of degree completion (Farahbakhsh et al., 2017). Colleges and universities have begun to address this issue. However, little is known about the nature and scope of their strategies and programs. The purpose of this study is to document the range of strategies and programs for addressing student food insecurity implemented at U.S. colleges and universities and compare two-year community colleges, four-year public, and four-year private universities. We anticipate that community colleges will have more strategies as, generally, they serve lower-income students.

Methods: Data were collected from 450 randomly selected U.S. colleges and universities. A comprehensive, systematic web search was conducted to identify evidence of 18 types of on-campus food assistance programs and strategies (e.g. food pantries, emergency grants). Means and frequencies were used to describe the strategies and programs. The number of strategies used by community colleges, four-year public, and four-year private schools was compared using OLS regression.

Results: Preliminary analyses suggest that, on average, schools used six strategies. The two most popular strategies were food pantries (used by 88% of the sample) and offering non-credit courses in financial management (73%). Offering a single, central campus location for all basic needs resources (8%) and providing information about where to find low-cost campus dining options (12%) were the two least frequently used strategies. Four-year private colleges and universities (M=5.33, STD=3.44) offered fewer strategies than community colleges (M=6.15, STD=4.36) or four-year public schools (M=6.00, STD=3.96). These differences were not statistically significant.

Conclusions: Results suggest that food pantries and non-credit financial management courses should be targets for evaluation efforts to determine their effectiveness and reach. Future research should examine the quality of strategies being used, whether they match student need, and barriers to implementation.
The availability of cultural foods in convenience stores and non-traditional food stores serving Black/African American, Asian, Hispanic and East African residents

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Neighborhood food disparities contribute to high rates of obesity and chronic disease among populations of color. Due to persistent housing segregation, neighborhood food stores may offer culturally preferred foods based on community demographics, which in turn may increase consumption of fruits, vegetables and grains versus processed foods. The purpose of this analysis was to describe availability of cultural foods in convenience and small non-traditional stores (e.g., corner stores) serving Black/African American, Asian, Hispanic and East African residents in a Midwestern US metro area.

Methods: We used baseline data collected from a random selection of 140 convenience and small non-traditional food stores in Minneapolis and St. Paul, Minnesota, USA to evaluate the implementation of an ordinance requiring specific stocking requirements for food stores. Data collectors visited stores to assess food availability. Store geolocation data were merged with tract-level American Community Survey data including estimates of racial/ethnic composition and languages spoken. Census tracts (CT) were categorized as Black/African American, Asian or Hispanic if >=20% of residents identified as one of those race/ethnicities. In addition, East African CT were designated as >20% Black/African American and >10% speaking a language other than English, Asian or Spanish and validated using geolocation data. Common cultural foods were based on previous scientific literature and included items such as chard, green cabbage, corn tortillas and fufu respectively. Descriptions of availability of 49 culturally specific foods for Black/African American (n=21 items), Asian (n=12 items), Hispanics (n=23 items) and East African (n=8 items) CT are presented.

Results: There were 44 stores in Black/African American CT; 27 stores in Asian CT; 20 stores in Hispanic CT and 20 stores in East African CT. The proportion of stores that carried at least one cultural food item was limited in Black/African American CT (mean=6.6%, range=0-56.8%); Asian CT (mean=10.4%, range=0-38.5%); Hispanic CT (mean=10.9%, range=0-60%) and East African CT (mean=15.6%, range=0-55.0%). Further analysis will assess changes in availability of cultural foods following ordinance implementation.

Conclusion: These results suggest that dietary intake patterns may be restricted by the limited options in general and specifically limited culturally preferred offerings in convenience and non-traditional stores in cultural communities.
Development of a tool to measure the healthfulness of common food service environments in Singapore- the Food Environment Assessment in Singapore Tool (FEAST) study

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Frequent eating-out has been associated with poor dietary quality, excess weight gain, and worse cardio-metabolic health. Validated tools to assess the healthfulness of food-service environments in western countries are available. However, these are unable to sufficiently characterize Asian food environments, because of ubiquitous independent food vendors and differences in the types of food sold.

Methods: To evaluate the healthfulness of hawker-centers, a common food service environment in Southeast (SE) Asia, we used the NEMS-R tool developed for American restaurants as a framework, and adapted it considerably. Modifications included (i) the use of a food-based method for rating the healthfulness of the menu contextualized to foods commonly available in SE Asia, and (ii) altered ratings schemes to accommodate the limited variety of foods sold by a single hawker. As hawker centers are complexes that house multiple independent hawker-stalls, we also developed assessment and rating protocols to evaluate the healthfulness of the hawker center as a whole. Four experts provided feedback on the tool and the rating schemes. After incorporating expert feedback and pilot testing, trained raters administered the FEAST tool. By design, the centers had varying proportion of hawker-stalls (32% to 100%) participating in the Healthier Dining Programme, a national initiative to improve the healthfulness of food service environments in Singapore. This will allow us to examine the criterion validity of the tool. We will also assess the test-retest and the inter-rater reliability of the tool.

Results: The finalized tool comprises of four domains (menu-7 items, price-5 items, supports-6 items and barriers-7 items) with a total score of 50 points. Hawker interaction is limited to information such as type of oil used, and off-menu items. The tool was successfully administered for 244 hawker-stalls in 8 hawker centers and took an average of 5-7 minutes to complete for each stall.

Conclusion: The developed FEAST tool is a feasible method for assessing the healthfulness of common SE Asian food environments. Once validated, this tool can be used for surveillance, evaluating the effectiveness of national programs and examining the relationship between food environments and health outcomes.
Purpose: Adolescents dietary behavior and weight status may be influenced by access to different foods through various types of outlets and services in low- and middle-income countries, such as Brazil. Therefore, we identified the association between weight status and food environment of adolescents.

Methods: Data was obtained from the 2015 Health Survey of São Paulo - a population-based study with a probabilistic sample of individuals from São Paulo. Weight status was calculated and classified according to the World Health Organization percentiles. Food outlets and services were obtained from the Municipal Register of Health Surveillance (São Paulo, Brazil), with the exception for data referring to street markets, obtained from the Municipal Department of Labor and Entrepreneurship. Geocoding of adolescent residence addresses was performed in Google Earth Pro version 7.1 software, using a geographic coordinate system with WGS 84 datum. Presence of food establishments to adolescents' household areas was verified through buffers with radii of 500m created in the QGIS software and density of these establishments in each of these areas was counted. Multiple logistic regression analyses were performed using STATA software with a significance value of p<0.05. Results: Participated in this study 504 adolescents and the majority were in the age range of 12 to 15 years old, male (51.4%), and have a per capita family income = 1 minimum wage per month (US$ 300,00). In total, 2,064 food establishments were in buffers of 500 meters. Although there were no significant differences between the presence of establishments and weight status, 14.3% reported consuming at least one meal in some food restaurant. Regarding multi-level regression models, the presence of fast-food restaurants within 500m of their homes was the only establishment positively associated with being overweight or obese (OR 2.5, 95%CI 1.0, 6.3, p=0.04), regardless of sex, race, violence in the neighborhood, years of residence, physical activity, and intra-municipal human development index. Conclusion: Identifying different types of food establishments near the home of the adolescents can help researchers, practitioners, policymakers and other stakeholders to identify successful strategies to promote healthy eating and maintain a healthy weight status.
P3, P3.141

Parental perceived travel time to and reported use of food retailers in association with schoolchildren’s dietary patterns

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose: Exposure to the food environment can be assessed using different methods. For instance, while the use of objective measures is an important way to determine exposure, individual's perceptions on the availability of food retailers may differ from what is objectively available. A current limitation in the food environment field is the predominately lack of information on the perceived food environment and use of food retailers by the participants. In this study we aimed to assess the association between parents' reported use of food retailers by their children, and, parental perceived travel time to food retailers, with their children's dietary patterns. Methods: This was a cross-sectional survey that recruited a probabilistic sample of 2,484 schoolchildren aged 7-14y from Florianópolis, South Brazil. Parents reported on children's use of full service and fast food restaurants and their own use of supermarkets and perceived travel time (in minutes walking from home) to these food retailers. Schoolchildren's food consumption was assessed using a previous-day dietary recall. Factor analysis was conducted to identify dietary patterns. To test the association between reported use and perceived travel time to supermarkets, full service restaurants and fast food restaurants and schoolchildren's dietary patterns, we performed adjusted multilevel linear regression analyses. Results: Five dietary patterns were identified, named: "Fast Food", "morning/evening meal", "Traditional Brazilian", "Healthy/Fresh Foods" and "Bread and Chocolate Milk". Parents' reported use of supermarkets was associated with children's higher score in the "morning/evening meal" pattern. Use of full service and fast food restaurants was associated with children's higher score in the "Fast Food" pattern. Higher parental perceived travel time to full service and fast food restaurants was associated with children's lower score in the "Fast Food" pattern. Conclusions: Our results indicate that although the use of restaurants and fast food restaurants may be associated with the "Fast Food" pattern, perceiving to live further away from these food retailers might have a positive influence on schoolchildren's diet. These findings highlight the importance of evaluating the perceived food environment and use of food retailers, which can provide a complementary understanding on the relation between the food environment and diet.
The power of participation: Community support for innovative interventions to promote healthy food access

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Policies and environments (SIG)

Purpose: Food security exists when all people at all times have sufficient access to safe, nutritious, and acceptable foods. Mobile food markets (MFMs) are innovative interventions which can support healthy eating within lower-income communities. MFMs enhance food security through increased access to nutritious food by alleviating travel costs in areas where accessing healthy food may be challenging. One such MFM operates within Halifax, Canada. It began in May 2016, as a 21-week pilot project in response to a healthy and sustainable food movement in Halifax, a city in the Canadian province of Nova Scotia. Pilot evaluation data suggested that community partnerships play a critical role in sustaining the MFM, but little is currently known about how such partnerships function in this context. The purpose of this research was to identify how the positive outcomes of the MFM can be sustained through effective participation in partnerships. This study explored how power relations influence partnerships within the MFM.

Methods: Thirteen community partners were purposefully sampled and interviewed, based on their involvement with the MFM. Interviews were conducted in a one-on-one, in-person format and were audio-recorded. Recordings are currently being transcribed verbatim and will be analyzed using discourse analysis. Arnstein's Ladder of Citizen Participation will be used to gain an understanding of how partnerships and power are related within the MFM. This will offer insight into the relationship between citizen participation and citizen power. A feminist poststructural approach, which seeks to understand relations of power, will be applied to allow further exploration of the significance of power relations within partnerships in the MFM. Final results will be available at the time of the conference.

Anticipated Results: Research findings will offer insight into how partnerships in Halifax's MFM function, and will provide an understanding of how to sustain effective, long-term partnerships within the MFM. Analysis of power relations will give perspective into how these may affect the sustainability of partnerships and ultimately the future operation of the MFM.

Conclusion: The results of this research will be used to inform strategies to develop and sustain effective partnerships within the MFM in Halifax.
P3, P3.143

Eat, Play, Live: a RCT embedded within a natural experiment to assess the impact of nutrition policy and capacity building on food environments in recreation and sports facilities.

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Some Canadian provincial governments have released voluntary nutrition guidelines to enhance the food environment in recreation and sport facilities. The purpose of the Eat, Play, Live trial was to examine the impact of passive exposure to these guidelines versus active exposure (18-month capacity building intervention (CBI) to support guideline implementation) on facility capacity, policy development and food environment quality. Methods: Recreation and sport facilities in three guidelines provinces were randomized into a guidelines only (GL-ONLY; n=15), or guidelines plus CBI (GL+CBI; n=17) condition. Facilities in a non-guideline province served as the comparator (NO-GL; n=17). Changes in facility capacity, policy development, and audited vending food and concession food environment quality (Nutrition Environment Measures Survey, Restaurant reduced item) over time were compared across the three conditions using repeated measures ANOVA and Chi-square statistics. Healthfulness of vending items was rated based on provincial guideline nutrient profiling schemes as Do Not Sell (least nutritious), Sell Sometimes or Sell Most (most nutritious). Results: There were significant time by condition effects for facility capacity (F=8.191, p=.001), quality of the concession food environment (F=8.191, p=.001) the proportion of Sell Sometimes (F=15.529, p<.001), Sell Most (F=4.310, p=.002), and Do Not Sell vending snacks (F=15.629, p<.001). Post hoc analyses showed significant increases in GL+CBI facilities compared to GL-ONLY and NO-GL in: facility capacity (mean±smn;SD: 30.8%±smn;15.6% to 62.3±smn;22.0%; p<0.01), overall quality of the concession food environment (14.7±smn;8.4 to 17.5±smn;7.2; p<.001), and in the proportion of Sell Sometimes (22.4±smn;14.4% to 43.8±smn;15.8%; p<.001) and Sell Most vending snacks (3.7±smn;4.4% to 11.0±smn;9.0%; p=.002); and a significant decline in Do Not Sell vending snacks (74.0±smn;16.6% to 45.2±smn;20.1%; p<.001). Nutrition policy development was significantly associated with condition (17.6% GL+CBI developed new policies compared to none in GL-ONLY and NO-GL; X2 = 6.015, p = .049). Conclusions: Capacity-building enhanced the impact of voluntary nutrition guidelines and appeared essential to change. Improvements were modest with food environments remaining overwhelmingly unhealthy, suggesting the need for ongoing implementation support.
Stakeholders’ view on implementing a healthy worksite cafeteria intervention in the Netherlands.

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Policies and environments (SIG)

Objective: The worksite cafeteria is a suitable place to evoke healthier purchase behavior. To create healthier worksites that will be successfully implemented, stakeholders like professionals from catering organizations, nutritional experts and facility managers play a key role. Therefore, the aim of this study is to gain insights in the factors for the adoption and continued implementation of a healthy worksite cafeteria intervention by key stakeholders.

Methods: We conducted eight qualitative semi-structured interviews with fourteen stakeholders to explore their opinions about factors influencing the adoption of a healthy worksite cafeteria intervention. Furthermore, we obtained barriers and facilitators influencing the continued implementation in which feasibility plays a role. Constructs of the Diffusions of Innovation Theory were included in the interview guide. Interviewed stakeholders were caterers, nutrition researchers, facility managers and health management consultants.

Results: Thematic analysis identified that important factors for adoption are warranting the freedom of choice, the profitability and the availability of attractive healthy options. Executing a healthy worksite cafeteria intervention seems compatible and not too complex. Furthermore, it can be used as a unique selling point for caterers. For the continued implementation informing catering employees about the aim and the execution of the intervention is important. Based on the results, implications for actual intervention development and the continued implementation were formulated.

Conclusions: Key stakeholders have a positive attitude towards a healthy worksite cafeteria, as long as it does not violate the profitability and a broad range of attractive healthy options is available. Furthermore, successful implementation could be enhanced by convincing employers to shift towards a healthy worksite cafeteria, by explaining the aim of the intervention to all executing professionals and by proven effectiveness.
Nutritional quality of foods and non-alcoholic beverages advertised on the major Brazilian free-to-air television channels


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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Evidence shows that foods marketed on television (TV) are often low-nutrient-dense foods associated with poor nutritional quality of diets, obesity and non-communicable diseases. However, little research has been undertaken in Brazil around this issue. The aim of this study was to assess the nutritional profile of foods and non-alcoholic beverages advertised on Brazilian television by applying the Pan American Health Organization (PAHO) and the World Health Organization (WHO)-Europe nutrient profiling (NP) models.

Methods: Cross-sectional based on the International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support (INFORMAS) protocol. A total of 432 hours on the three major Brazilian free-to-air TV channels was recorded from April 1st to 30th 2018. Recordings were done for eight non-consecutive and randomly selected days from 6am to 12am. All food-related ads were coded using a systematic approach and classified according to the PAHO and the WHO-Europe NP models as "eligible"/"not eligible" for marketing restrictions. Absolute and relative frequencies were used to describe the proportion and types of food and beverage ads. The nutritional profile of foods was compared by day (weekday/weekend day), time of the day (morning/afternoon/evening) and types of TV program.

Results: A total of 1,610 food and beverage ads were broadcasted, representing 18.1% of the total ads shown on the three selected channels. Over 80.0% of all foods and beverages advertised on Brazilian TV channels did not meet the PAHO and the WHO-Europe nutritional quality standards and were considered eligible for marketing restrictions. Although there was consistency between the two models in identifying the major food categories contributing to unhealthy food advertising, the PAHO model was more aligned with the Brazilian Dietary Guidelines when selecting items to be targeted for marketing restrictions. The proportion of unhealthy food ads was significantly higher on weekends, in the afternoon, and during soap operas programming.

Conclusions: The findings of the present study indicate a high exposure of the Brazilian population to unhealthy food marketing and an inefficient enforcement of existing regulations. Legal experts need to be sensitized to work in conjunction with public health actors to guarantee that current policies are effectively implemented.
The impact of armed conflict on nutrition related mortality and morbidity rates: a global longitudinal analysis

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective
Armed conflicts are becoming increasingly common and protracted. The excess burden of death and disease from armed conflicts has seldom been studied. This study sought to model the impact of armed conflict on nutrition related mortality and morbidity rates globally.

Methods
A longitudinal study of 195 countries between 1990 and 2018 was conducted. National armed conflict data were taken from the Uppsala Conflict Data Program. Country-level health data were taken from the Global Burden of Disease study. The main outcome measures were age-standardised mortality and disability-adjusted life year (DALY) rates from nutritional deficiencies. Fixed-effects panel regression methods tested the association between national-level armed conflict and health data, adjusting for covariates. Sensitivity analyses assessed differential impacts of armed conflict types. Robustness checks used alternative sources of armed conflict data.

Results
The presence of armed conflict nationally increased mortality rates from nutritional deficiencies by over two-fold (B coefficient 2.63, 95% CI 0.76-4.51). The impact on DALY rates were also significant (B coefficient 146, 95% CI 53.4-240). Both mortality and DALY rates increased significantly with increasing intensities of armed conflict. However, these patterns were seen only for civil conflicts; international, and internationalised civil conflicts showed no significant relationship with mortality or DALY rates from nutritional deficiencies. Results remained consistent following the use of alternative armed conflict data.

Conclusions
Armed conflict, and in particular civil wars and armed conflicts of high intensity, are associated with an excess burden of death and disease from nutritional deficiencies. These data can inform the health impact assessment of armed conflict, in addition to post-conflict reconstruction efforts.
An accountability evaluation for the International Food & Beverage Alliance’s Global Policy on Marketing Communications to Children to reduce obesity: a narrative review to inform policy

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Background:
In 2004, the World Health Organization Global Strategy encouraged governments to work with non-state actors, including the private sector, to address unhealthy food marketing to children. United Nations organizations have urged governments to restrict the marketing of unhealthy food and non-alcoholic beverage products to children in May 2010 by the endorsement of the Resolution WHA63.14.

Objective:
To study conduct an accountability evaluation for the International Food & Beverage Alliance's (IFBA's) Global Policy and Marketing practices targeted to Children, by comparing the Global Policy with the 2010 Resolution WHA63.14 and best-practice recommendations.

Methods:
We used the National Academy of Medicine's LEAD (i.e., locate, evaluate, assemble evidence to inform decisions) framework to identify evidence (January 2004 to October 2018). We adapted an accountability evaluation framework previously used for global obesity and assigned a progress score (i.e., none, limited, some and extensive) for five accountability steps.

Results:
No progress was made to appoint an empowered body to evaluate IFBA's Global Policy. IFBA and the Access to Nutrition Foundation made some progress to take and share the account. Diverse actors made no progress to hold IFBA to account for non-adherence or to strengthen accountability structures for future compliance.

Conclusion:
IFBA could strengthen its Global Policy to align with best practices. UN organizations and other stakeholders should encourage IFBA firms to restrict the marketing of unhealthy food and beverage products to reduce children's obesity risk. This evaluation approach is relevant to other firms and industry associations that market unhealthy products to children that undermine their diet and health.
Bringing Community Voices to the Table: Food Access in Vallejo, California

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective:
Food Empowerment Project in partnership with community organizations conducted a focus group study to assess residents' experiences in purchasing/obtaining healthy food in low-income neighborhoods in Vallejo, California. A central aim was to listen to "community voices" to collectively develop recommendations and next steps for improving access to healthy food for all residents in Vallejo.

Methods:
Collaborative processes were used to develop focus group methods. Six focus groups were conducted with 33 ethnically diverse primarily low-income residents in each of Vallejo's low-income neighborhoods in May-September, 2017. Questions focused on barriers and strategies related to access to healthy food and recommendations for possible solutions. Focus groups were audio-taped and transcribed. Touro University California, Public Health faculty and graduate students assisted with data analysis. Initial codes were developed using a hybrid coding scheme including developing an initial list of codes deductively and using inductive coding based on participants responses, followed by developing conceptual themes and final codes through an iterative process with multiple coders. Final coding and analysis was completed using Microsoft Excel.

Results:
Key barriers focused on store location and transportation difficulty, affordability, and lack of full-service grocery stores. Long lines in grocery stores, lack of reliability of food selection, safety concerns and spoiled produce were problems with individual stores. Many residents had to shop at multiple stores and spend significant time/resources in travel to obtain healthy foods resulting in having to adapt meals or buy poor quality foods. Strengths of the food environment included the presence of community gardens and farmer's markets in some neighborhoods. Churches were also a source of access to healthy food and neighbors often helped each other through using group shopping strategies.

Conclusion:
Recommendations included engaging community members as partners in developing strategies, next steps and policies focused on locating full services grocery stores and increase the presence of high-quality fruits and vegetables throughout Vallejo neighborhoods. Cultural and language accessibility was prioritized as essential for all communications related to improving the food environment. To make improvements in the accessibility of healthy food "community voices" must be part of the conversation.
University environments that promote activity and healthy eating.

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Objective: The environment in which people live, work, study and recreate plays an important role in individual and population health and well-being. Yet there is limited research exploring how university students' feel about their campus environment in terms of promoting physical activity (PA) and healthy eating. To address this gap we focused on capturing the student voices using a citizen science community-based participatory research (CBPR) approach.

Methods: Twenty-one students (Females =19; Males =2) participated using The Stanford Healthy Neighbourhood Discovery Tool mobile app, collecting microscale data about walking routes, environmental features and destinations. During self-led walks, students identified barriers and facilitators to being physically active and eating healthily. Participants completed two online surveys on physical activity and nutrition. Subsequently, participants were invited to attend an action group (N range = 5-10) to review their data, prioritise issues to address and brainstorm potential solutions. Qualitative thematic analysis was used for narrative data obtained.

Results: 256 photos were taken around the campus. Barriers identified included lack of accessible and affordable healthy food choices onsite. In several instances, an outlet deemed 'healthy' by some was viewed as 'unhealthy' by others. Campus isolation (closest supermarket ~1.6km away) was a prominent barrier due to perceived distance to walk to during breaks. The gym was viewed both positively (cheap) and negatively (restricted times). Despite the campus having abundant green space, there were insufficient benches to sit on or developed green space to engage in physical activity. The desire for a campus environment to provide positive mental well-being was frequently mentioned. 81% met the recommended MPA (150mins/pw), however only 14% met the recommended daily 5+ fruit and vegetable intake.

Conclusion: Integrating citizen science with a CBPR approach empowers students not only to collect significant and meaningful local information about their campus environment, but prioritise their concerns, their own interpretations of the data and engage in cross-sector conversations to generate practical solutions impacting on their own community. Findings will be presented to the student union who will advocate on behalf of the student to AUT University senior management to advance change in 2019.
Objective: School districts that participate in the US Child Nutrition Program are required to have a wellness policy. Many state agencies provide model wellness policies to aid school districts in writing wellness policies. However, use of model wellness policies has not been associated with higher quality policies. Therefore, the purpose of this project was to assess the strength and comprehensiveness of model wellness policies and to determine if federal regulations are more likely to be included in model wellness policies than evidence-based best-practices that are not required per federal regulation.

Methods: Model wellness policies available online through state agency websites in January 2019 were analyzed for comprehensiveness and strength using the Wellness School Assessment Tool 3.0 (WellSAT). The percentage of model policies that included each WellSAT item was calculated and item status as a federal regulation or best-practice was assigned. Linear regression was used to determine if federal regulation status was associated with inclusion in model wellness policies.

Results: Thirty-four states had model wellness policies available online. The total comprehensiveness and strength of model wellness policies was 59 ±smn; 17 and 21 ±smn; 18, respectively, out of 100 possible points. Among policy sections, comprehensiveness was highest within Nutrition Education (NE) (73 ±smn; 32) and lowest in Wellness Promotion and Marketing (50 ±smn; 27). The NE section had the highest strength (31 ±smn; 31) and the Physical Education and Physical Activity section had the lowest strength (15 ±smn; 14). Of the 67 WellSAT items, 20 were included in ≥75% of model policies. Ten items were included in ≥25% of model policies. On average, WellSAT items that were federal regulations (n=18) were covered in 71% of model policies, while best-practices (n=49) were only covered in 54% of model policies (p=.008).

Conclusions: There is a need to improve the comprehensiveness and strength of model wellness policies provided to school districts by state agencies. The development of a uniform model policy may be warranted to provide school districts with a comprehensive list of federal requirements and best-practices, written with strong language, for inclusion within their district wellness policy.
Development of a County-Level Childhood Obesogenic Environment Index across the United States

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Diverse environmental factors are associated with physical activity (PA) and healthy eating (HE) among youth. However, no study has created a comprehensive obesogenic environment index for children that can be applied at a large geographic scale. The purpose of this study was to describe the development of a childhood obesogenic environment index (COEI) at the county level across the United States.

Methods: A comprehensive search of review articles (n=20) and input from experts (n=12) were used to identify community-level variables associated with youth PA, HE, or overweight/obesity for potential inclusion in the index. Based on strength of associations in the literature, expert ratings, expertise of team members, and data source availability, 10 key variables were identified, six related to HE (# per 1000 residents for grocery/superstores, farmers markets, fast food restaurants, full-service restaurants, and convenience stores; as well as percentage of births at baby(breastfeeding)-friendly facilities) and four related to PA (percentage of population living close to exercise opportunities, percentage of population <1 mile from a school, a composite walkability index, and number of violent crimes per 1000 residents). Data for each variable for all counties in the U.S. (n=3,142) were collected from publicly-available sources. For each variable, all counties were ranked and a percentile assigned to each county ranging from 0-100. Positive environmental variables (e.g., grocery stores, exercise opportunities) were reverse scored such that higher values for all variables indicated a more obesogenic environment. Finally, for each county, a total obesogenic environment index score was generated by calculating the average percentile for all 10 variables.

Results: The average COEI percentile ranged from 24.5-81.0 (M=50.02,s.d.=9.01) across US counties and was depicted spatially on a choropleth map. Obesogenic counties were more prevalent in the South region of the U.S. (M=53.0,s.d.=8.3) versus the Northeast (M=43.2,s.d.=6.9), Midwest (M=48.1,s.d.=8.5), and West (M=48.4,s.d.=9.8). When examined by rurality, there were also significant differences (F=175.86,p<.0001) between metropolitan (M=46.5,s.d.=8.4), micropolitan (M=50.3,s.d.=8.1), and rural counties (M=52.9,s.d.=8.8) across the U.S.

Conclusions: The COEI can be applied to benchmark obesogenic environments and identify geographic disparities and intervention targets. Future research will examine associations with obesity and other health outcomes.
Defining the commercial determinants of obesity in adolescence: a scoping review and consensus building process protocol

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose: The commercial determinants of health have been recently identified as important factors affecting obesity prevalence. However, there has not been a comprehensive definition or review that summarises these factors and the ways in which they can have an influence on obesity in adolescents. This study aims to conduct a systematic scoping review to identify key terms and definitions of the commercial determinants of health and through a consensus building process, develop a taxonomy and definition for the commercial determinants of obesity in adolescence.

Methods: Relevant databases will be searched using adapted versions of piloted search strategies to identify pertinent documents that refer to the commercial determinants of obesity in adolescence. A first search strategy involved searching through MEDLINE for the search term "commercial determinants of health/obesity". Relevant key terms from the first search were extracted and annotated to run a second search. In a third search 'obesity outcomes' and 'adolescence' terms were added. A refined search is being developed through an iterative process involving pilot searches to find relevant trace papers and discussions of possible amendments to the strategy. Data will be extracted using a piloted form. Findings will be synthesised and presented to an expert advisory group, discussed and adapted through a focus groups and a Delphi consensus building process.

Findings: The first search strategy in MEDLINE found 15 articles relating to 'commercial determinants of health' and 7 additional articles were included by searching through their reference lists. A total of 36 key search terms were identified (i.e. 'food labelling', 'price promotion'), which were included in the second search resulting in 42,703 articles. The third search strategy included obesity and adolescence terms resulting in 817 articles. Initial screening of articles shows inconsistent usage of terms and no comprehensive definition or taxonomy to address the commercial determinants of obesity in adolescence.

Conclusion: The resulting definition and taxonomy from this review can be used by policymakers, practitioners and researchers to facilitate understanding and cooperation between disciplines and contribute to a more successful approach to tackling the complex system of obesity in adolescence.
Sedentary Behaviour and the Mix of Destinations in Adults living in Sao Paulo city, Brazil.

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PURPOSE: The objective of this study was to examine the relationship between sedentary behaviour and the mix of destinations in adults that living in Sao Paulo city, Brazil.

METHODS: This study was a cross-sectional analysis that used Sao Paulo Health Survey dataset (n=3,145 adults). The sedentary behaviour was evaluated by two questions: sitting time during 1) one day in the week, and 2) one day on weekends. We calculated buffers (500m) around the residences addresses to verify the presence and number of the variables: 1) bus stops; 2) train and subway stations; 3) parks; 4) squares; 5) public recreation centres; 6) bike paths; 7) primary health care units; 8) supermarkets; 9) food stores; 10) bakeries; and 11) coffee-shops. We calculated the mix of destination score for 500m buffers with basis in the median for each built environment variable and the people that were above the median had score=1 and the people that were equal or below had score=0. We worked with the minutes of siting time during the week and weekend (dependent variable) and the score of the mix of destinations in ordinal form (independent variable). We used linear multilevel model account clustering by census tract and households and adjusted by social, demographics, and health characteristics.

RESULTS: The mean of sitting time during one day in the week was 279.8 minutes (SD=199.2) and during one day in the weekend was 260.5 minutes (SD=183.5). The mix of destination score was associated significantly with sitting time during the week (βa=-7.3; p=0.009) and in the weekend (βa=-5.2; p=0.049) after adjusted by sex, age, education, car/motorcycle ownership, body mass index, total physical activity, safety perception, time living in the residence and place where living in Sao Paulo.

CONCLUSIONS: The mix of destinations including open spaces, food stores, supermarkets, coffees, bakeries, recreation centres, health services, and transportation was inversely associated with sedentary behaviour in adults from Sao Paulo. These results are important to discuss healthy environments to fighting against sedentary behaviour in megalopolis like Sao Paulo city.
The development of the Comprehensive Analysis of Policy on Physical Activity (CAPPA) framework

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Purpose: Policy analysis is considered essential for achieving successful reforms in health promotion. The only framework for physical activity (PA) policy analysis was developed at a time when the field of PA policy research was in its early stages. PA policy research has since grown as a research area, and our understanding of what elements need to be included in a comprehensive analysis of PA policy is now more refined. The purpose of this study was, therefore, to develop a new conceptual framework for PA policy analysis, the Comprehensive Analysis of Policy on Physical Activity (CAPPA) framework.

Methods: The development of the CAPPA framework was based on: (i) an extensive review of literature; (ii) an open discussion between the authors; and (iii) three rounds of a Delphi process.

Results: The CAPPA framework specifies 35 elements of a comprehensive analysis of PA policies in the following six categories: (i) purpose of analysis (including auditing and assessment of policies); (ii) policy level (including international; national; subnational; local; and institutional policies); (iii) policy sector (including education; environment; health; research; sport, recreation and leisure; tourism; transport; urban planning and design; and work and employment); (iv) type of policy (including formal written policies; formal unwritten policies; written standards; formal procedures; and informal policies); (v) stage of policy cycle (including agenda setting; formulation; legitimation; implementation; evaluation; maintenance; termination; and succession); and (vi) scope of policy (including availability; context; processes; actors; content; and effects). Based on the CAPPA framework, we also proposed broad and inclusive definitions of PA policy and PA policy analysis.

Conclusions: The CAPPA framework may be used to guide future studies related to PA policy and to provide a context for the analysis of its specific components. The framework can be used in the same way for sedentary behaviour policy research. Future research should examine the extent to which PA policy analysis has covered each of the elements specified in the CAPPA framework and whether the existing tools for PA policy analysis allow for auditing and assessment of all the elements.
How physical activity, television viewing and active play mediate the relationship between parental perception of the environment and children’s weight status


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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

**Policies and environments (SIG)**

Purpose: A healthy lifestyle, including more physical activity (PA) and less sedentary behaviors (SB), should be promoted infancy, and is associated with a number of health benefits, including a low prevalence of childhood obesity. However, despite worldwide recommendations, evidence suggests that children are relatively inactive. This study aimed to investigate whether parental perceptions of neighborhood characteristics were associated with child's weight status and weight-related behaviors.

Methods: Data from 8472 children (50.8% were males) aged 3 to 11 years old were collected during 2016-2017 in continental Portugal. Weight and height were measured and body mass index (BMI) was calculated for specific sex and age. Extracurricular sport participation, outdoor play and television (TV) viewing were self-reported by the parents, who also completed the 'Environmental Module' standard questionnaire of the International Physical Activity Prevalence Study. Structural equation modeling was used to estimate the associations between parents perceived neighborhood characteristics (latent variables: unsafety and built/physical environment) and child's BMI z-score, PA and screen time.

Results: Positive features of the physical environment were not significantly associated with PA, play out, TV time or children's BMI. However, parental perception of the environment as unsafe (e.g., excessive traffic, pedestrian unsafety, and crime) was significantly associated with decrease time in PA (SC=−0.09) outdoor plays (SC=−0.03) and increase time in front of the TV (SC=0.04). Children's weight status was predicted by the 'unsafety environment' both directly (SC=0.04) and indirectly, having TV time as a mediator (SC=0.04).

Conclusions: In light of the present findings, changes in the environment (e.g., like an improvement in pedestrian-centric transportation infrastructures) and educational programs focusing on improving parental perceptions of crime-related safety, may have a positive impact on parental perception of the neighborhood which, in turn, may promote healthier lifestyles and a healthy weight among children.
Mediating effects of objective physical activity and sedentary time on the association of the perceived environment with BMI: the IPEN adult study

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: A large body of research examined associations of the neighbourhood physical environment with physical activity (PA), sedentary behaviour (SB) and weight outcomes in adults. Except for the well-established association with moderate-to-vigorous PA (MVPA), results are inconsistent. To clarify previous findings, it may be helpful to examine the pathways between the physical environment, PA, SB and weight outcomes. The main aim was to examine accelerometer-based PA and SB as mediators of associations between neighbourhood physical environmental perceptions and BMI in adults in 10 countries worldwide. Additionally, we examined if these mediating effects and associations varied by study site.

Methods: Data from the International Physical Activity and the Environment Network (IPEN) Adult study were used. IPEN is an observational multi-country study with comparable protocols and measures across countries. All participants wore an Actigraph accelerometer for seven days and filled in a validated questionnaire about environmental perceptions (NEWS). BMI was calculated based on self-reported (7 countries) and objectively-assessed (3 countries) height and weight. Data were analysed using generalized additive mixed models in R.

Results: Single mediation models showed that MVPA was a significant mediator of the associations of perceived street connectivity, land use mix-diversity, infrastructure/safety for walking and aesthetics, but not of traffic safety and safety from crime, with BMI. Sedentary time did not mediate any of the associations between neighbourhood attributes and BMI. Multiple mediation models revealed that MVPA mediated only the relationship between land use mix-diversity and BMI. None of the identified associations/mediations varied by study site.

Conclusions: Although most associations of the built environment with BMI were mediated by MVPA in single variable models, mediation effects were limited in the multiple models. This may be due to shared variance between several physical environmental factors. Furthermore, future studies should consider other variables like food intake as a potential mediator in future studies. The fact that no mediating effects of SB were identified confirms the inconsistent associations previously found between the physical environment and SB. If confirmed in future longitudinal studies, improving aspects of the physical environment in cities worldwide may have positive effects on weight outcomes, partly through MVPA.
Does domain matter? Combined effects of walkability at home and work on accelerometer-derived physical activity and sedentary behaviour

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

The built environment has been shown to influence health by encouraging people to become more physically active. Previous research has focused on the residential built environment despite only a fraction of physical activity occurs in the residential domain. Research has also focused on urban settings and relied heavily on self-reported measures of physical activity. Addressing these limitations can enhance the understanding of the interaction between the built environment and physical activity in various domains. Data was collected from the Neighborhood Environment in Waterloo Region: Patterns of Transportation and Health (NEWPATH). This study examined the additive and combined effect of the built environment at home and work and occupational type on moderate to vigorous physical activity (MVPA) and sedentary behavior (SB). Results suggest that walkability at work attenuate the effect of residential walkability on MVPA and SB. With respect to the occupational type, there were positive interaction effects between walkability at work and professional, managerial or technical occupation types. Our findings support the idea that interventions aimed at increasing physical activity in a suburban setting differ from that of the urban context, and that workplace walkability and occupation type are important to consider when planning for supportive built environments.
Meeting the Canadian 24-hour movement guidelines among Czech Children and Youth

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Movement guidelines state the basic criterions for people how to easily integrate healthy movement behavior across their casual day. People should benefit from the healthy behavior outcomes not only in present, but through whole life. Due to the lack of evidence, the purpose of this study was to evaluate the proportion to the recommendations and their combinations among Czech children and youth.

Methods: Results were based on 514 children and youth (57.8% girls) age 9, 18 years from the three elementary and three secondary schools in the Czech Republic. Moderate-to-vigorous physical activity (MVPA) was assessed using accelerometry. Screen time and sleep time were captured through self-report. Participants had to fulfill three criterions to meet the 24-hour movement guidelines: at least 60 minutes/day of MVPA, 9 to 11 hours/night of sleep, and less than 2 hours/day of screen time. Means and standard deviation of descriptive characteristics were computed. Cross tables were used to calculate the proportion of participants meeting each single recommendation and combinations of these recommendations. Comparison of proportions was used to compare the differences in meeting recommendation between boys and girls.

Results: The mean MVPA time was 74.6±smn;30.9 minutes per day, the mean sleep time was 8.2±smn;1.0 hours per day, and the mean screen time was 2.9±smn;2.0 hours per day. The mean adherence to the MVPA, sleep time (SLT) and screen time (SCT) were 65.8, 39.3 and 39.9%, respectively. The proportion of participants meeting MVPA, SLT, SCT, and combinations of these recommendations are as follows: none=14.0%, only MVPA=24.3%, only SLT=8.0%, only SCT=7.4%, MVPA+SLT=13.8%, MVPA+SCT=15.0%, SCT+SLT=4.9%, MVPA+SLT+SCT=12.6%. The statistical differences in meeting the recommendations between boys and girls were found in SCT: met by 24.8% boys and 50.7% girls (?;2= 10.65, p=.001, r=.228), and in only MVPA: met by 34.1% boys and 17.3% girls (?;2=.039, p=.360, r=.197).

Conclusions: Despite higher proportion in meeting MVPA recommendation, only small percentage of Czech children and youth met all three recommendation. The results from this study correspond to other studies from different countries. Future efforts should aim to find how to raise the proportion of meeting all three recommendations.
P3, P3.159

Potential impact of autonomous vehicles on movement behavior: An updated scoping review

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Policies and environments, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Policies and environments (SIG)

Purpose: To explore the potential impact of autonomous (i.e., driverless) vehicles (AVs) on movement behavior (i.e., physical activity, sedentary behavior, sleep). Guided by ecological models of health behavior, we conducted a scoping review of the literature as it related to AVs and impact on movement behavior (MB) or mode choice (e.g., public transit), beliefs about MB or mode choice, or impact on environments that may influence MB or mode choice.

Methods: An extensive search revealed 953 possible studies which were then reduced to 97 after a title and abstract scan and to 37 after a full-article scan. The studies were then coded by two reviewers for characteristics of the design, participants, and findings. The purpose and main findings were recorded as text and subjected to content analyses.

Results: The majority of studies took place in North America (43.2%) or Europe (35.1%), involved simulation modelling (64.9%) or cross-sectional (21.6%) designs, and were mostly published in transportation (91.9%) journals or reports. Of the 123 findings, 8.9% related to the impact of AVs on movement behavior (e.g., increased sitting-related behavior), 59.3% on mode choice (e.g., shift from public transit and active transportation to shared AVs), 14.6% on beliefs about MB or mode choice, and 17% on environment (e.g., reduced demand for parking). With the use of AVs "walking can be avoided", a "modal shift from public transportation and walking to car" is observed, people expect to "be more productive" in the car and are concerned about "resources [that] may be diverted from public transportation or other more affordable options into AVs", and it is suggested that "less parking is needed" and influences on "land use… will be substantial".

Conclusions: Though no experimental studies have been conducted, the findings from the reviewed studies suggest that AVs will have a profound impact on mode choice and built environment of people residing in much of the developed world. As a result, the movement behavior of residents in urban areas will be altered. We speculate that people will take fewer steps on a daily basis.
A Role of the Participation in Organized Physical Activity in meeting the 24-hour Movement Guidelines among Czech Children and Youth

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Purpose: Meeting movement guidelines should have positive health benefits for people of any age. Participating in organized/structured physical (OPA) activity is reputed to be crucial in meeting movement guidelines. The purpose of this study was to evaluate the role of participation in OPA in the context of meeting 24-hour movement guidelines.

Methods: Overall, 492 children and youth (57.7% girls) aged 9, 18 years from the three elementary and three secondary schools in the Czech Republic were involved in the research. Moderate-to-vigorous physical activity (MVPA) was assessed using accelerometry. Screen time (SCT), sleep time (SLT) and a number of days participating in OPA were self-reported. Participants with two or more OPA per week were classified as engaged in OPA (46.5%). The 24-hour movement guidelines were defined as: at least 60 minutes/day of MVPA, 9 to 11 hours/night of SLT, and less than 2 hours/day of SCT. Means and standard deviation of descriptive characteristics were computed. Cross-tables, binary logistic regression with entering method, and T-Test were used to calculate the proportion of participants meeting the recommendations and their differences.

Results: Participants engaged in OPA had significantly more minutes of MVPA per day (t(490)=6.29, p< .001) and hours of SLT per day (t(490)=4.32, p< .001) compared to their peers who did not participate in OPA. This statistical difference was also confirmed for both variables in boys and girls separately. On top of that boys and girls engaged in OPA have higher odds ratio to fulfil the MVPA recommendation (boys: OR=2.67, 95% CI 1.42, 5.01, p=.002; girls: OR=4.64, 95% CI 2.69, 7.99, p< .001), and girls engaged in OPA has higher odds ratio to fulfill the SLT recommendation (OR=2.30, 95% CI 1.41, 3.73, p< .001). Only 46 (20.1%) participants engaged in OPA met all three recommendations.

Conclusions: This study confirmed the assumption that engagement in OPA among children and youth increases the chance to fulfill the movement guidelines. However, the overall proportion of participants engaged in OPA who met all recommendations is still low. Future studies should focus to find other factors that can positively influence fulfilling the guidelines.
Shifting time: Variations in time use in shift workers

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Background: Differences in how shift workers accumulate physical activity (PA) while at work and in leisure time, on days when they are working at night, during the day, or on non-work days, are largely unexplored. The aim of this study was to improve understanding of physical activity patterns in two groups of shift workers, and to measure variations according to their shift schedules. Methods: This pragmatic pilot study was conducted in two workplaces. Employees in Workplace 1 (n=10) were required to drive for most of their shift. Workplace 2 was a manufacturing company where most of the employees' (n=30) occupational tasks were completed while standing. Use of time was assessed using the adult version of the Multimedia Activity Recall for Children and Adults (MARCA) administered by telephone interview. Three MARCA interviews were conducted with each participant, in order to capture a typical profile of a day-shift day, a night-shift day and a non-work day, using a two-day recall for each interview. Participants were asked to wear the activPAL3TM activity monitor, for 7 consecutive days. Paired and independent t-tests were used to compute significant differences between day-shift, night-shift and non-work days within and between workplaces. Results: The total number of days quantified for the MARCA data was 192 days (64 day-shift, 60 night-shift and 68 non-work days). Workplace 2 participants reported more physical activity and less sedentary behaviour on day-shift and night shift workdays than on non-work days. Workplace 1 participants were more sedentary (p=0.003) and engaged in more light intensity PA (p=0.031) on day-shift and night-shift workdays, than those from Workplace 2. Sleep times were lowest on day-shift days. Conclusion: As the occupational tasks for participants in Workplace 2 involved physical activities, the findings do not support the conventional view that shift workers are more sedentary than those who only work during the day. Rather occupational tasks appear to be a more important determinant of physical activity patterns both on work and non-work days than varying shift patterns.
Application of Deep Learning to the study of performance

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Abstract:

Purpose:
The Multi-Stage Fitness Test, MSFT, is widely used to assess aerobic fitness levels among children. Whilst it provides insight, the output measure given to summarise fitness is rather crude, the length of time a child remains in the test. The study of the route to failure of equipment is a well understood problem in engineering, such an approach to the study of the MSFT would offer several important benefits including the ability to accurately predict how long a child will remain in the test after a short amount of time and a deeper understanding of the factors driving their performance. Deep learning has been used to study motion to excellent effect, however this work has largely been with the aim of identifying different types of activity from acceleration data. This is the first venture applying these algorithms to the study of fitness. This approach could potentially provide an important contribution to the field and applications are vast.

Methods:

100 children took part in the Multi-Stage Fitness Test wearing a tri-axial accelerometer attached to their right ankle. The LSTM neural network was trained using acceleration traces taken from 80 of the children and tested on unseen data taken from 20. Various models for route to failure were used to represent ground truth and compared. Predictions of children's overall performance from a subsample of their time trace were then made.

Results:

Our analysis demonstrates that accurate predictions of a child's overall performance in the test can be determined from just 50% of their trace (mean error 42 seconds, r = 0.8) or an absolute value of just over minute. Of the various models of route to failure used those based on Oxygen kinetics performed best and therefore it can be concluded that Oxygen uptake and lung capacity are important factors determining a child's performance.

Conclusions:

Not only does this work indicate that successful submaximal testing can become a reality but also provides important information about the driving factors of performance in the MSFT. This deeper understanding of a child's approach can inform intervention and provide insight into outliers.
A citizen science approach to determine perceived barriers and promoters of physical activity in a low income South African community

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: The objectives of the study were i) to determine factors that impact on physical activity and iii) to assess the feasibility of using "citizen science" as a tool to identify and address the ecological barriers to physical activity in low income South African communities.

Methods: We purposively selected 11 participants, (part of a larger cohort study) (18-45 years), who expressed interest in becoming physically active or who were already physically active, living in a low income, urban community in South Africa to participate in a study using mixed method approach for promoting physical activity. This pilot forms part of the "Our Voice" Global Citizen Science Network for Health Equity. Participants were recruited as "citizen scientists", and invited to use the Stanford Neighborhood Discovery Tool mobile application to take photos and provide audio narratives of factors in their community that were either barriers to or facilitated physical activity. Thereafter, a facilitated workshop was held where participants thematically reviewed their findings, prioritized issues, and suggested stakeholders that could be invited to an advocacy meeting. Physical activity levels, collective efficacy and social cohesion were also measured using standard questionnaires. Researchers also thematically coded the same data.

Results: None of the participants owned a car, their physical activity was either work- or transport-related, with most meeting the recommended levels of physical activity. Identified themes by the researchers and citizen scientists that impact on physical activity were vandalised equipment, illegal dumping, broken drainage, misused pavements, road traffic and safety as barriers and the presence of parks and stadiums as facilitators. Themes that were identified as priority that impacted negatively on physical activity in the community were dirt (rubbish, litter, dirty water run-off), sidewalks appropriated by vendors or homeowners (no access for walking), vandalization of parks and gym facilities and fear for personal safety. Citizen scientists identified their city ward councillor and street committee chairpersons as those they would invite for advocacy.

Conclusion: Community members from low-income settings can be empowered as citizen scientists, to gather information and work together (good collective efficacy) to identify potential solutions for an environment more conducive for physical activity.
Physical activity levels of German adolescent girls from the CReActivity project

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose:
The majority of German youth do not meet the national recommendation of 90 minutes of daily moderate-to-vigorous physical activity (MVPA). With growing age, adolescents engage less in physical activity (PA) with the decrease being even more severe in girls compared to boys (Finger, Varnaccia, Borrmann, Lange, & Mensink, 2018). Aim of the CReActivity-project is to promote PA of sixth grade girls by supporting the basic psychological needs autonomy, competence and relatedness in physical education (PE) and to identify mediating and moderating constructs of physical activity behaviour change. Purpose of the poster is to present analysis of objectively measured PA and its results.

Methods:
In the longitudinal randomized controlled trial participating classes were randomized on school-level to control and intervention group. At baseline 622 children (aged 11 to 12 years) wore accelerometers on their right hip (ActiGraph models GT3X, wGT3X-BT; Pensacola, FL, USA) for at least six consecutive days and answered a nine-scale questionnaire assessing basic psychological needs support and satisfaction in PE and leisure time, self-efficacy, social support, intrinsic motivation and environmental factors. During the 16-week intervention period, trained teachers carried out the intervention programme. It was evaluated by systematic observations of PE lessons with a modified SOFIT protocol and interviews with teachers and focus groups. The analysis of PA included baseline data from three survey periods between early 2016 and late 2018, if data had at least three valid weekdays and one valid weekend day with a minimum of eight hours wear time (n = 482).

Findings:
MVPA was higher on weekdays compared to weekend days. 90.87% of the participants reached the WHO recommendation of 60 minutes of MVPA during weekdays but only 60.17% for an average weekend day. 42.95% reached 90 minutes of MVPA on weekdays, while 21.58% fulfilled the German MVPA recommendation on weekend days. MVPA on weekdays was significantly higher compared to weekend days (z = -13.47, p < .001).

Conclusions:
Further statistical analysis and consideration of theoretical foundations, mediating constructs and moderating variables, will provide a direct link between intervention components and changes in physical activity behaviour.
Evaluating wrist- and hip-worn accelerometer cut-points for moderate-to-vigorous physical activity during organised sport in youth.

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Assessment and Methodologies in Behavioral Nutrition and Physical Activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Validity studies have investigated the accuracy of various accelerometers in laboratory settings, but few have examined criterion validity in more free-living settings. This study examined the validity of the Actigraph (AG) accelerometer worn on the hip and the GeneActiv accelerometer worn on the wrist compared to direct observation during organised sport in youth.

Methods: An observational design was used to assess the criterion validity of the accelerometer cut-points in measuring moderate-to-vigorous physical activity (MVPA) during practice sessions in four sports. The sports examined were boys' Australian Rules Football (AFL), girls' netball, boys' soccer and girls' soccer. Participants (n=115) wore both GT3X+ AG accelerometer on the right hip and a GeneActiv accelerometer on the non-dominant wrist in either one or two sport practice sessions, resulting in n=165 observations. Each participant was observed for a 10-min segment during the practice session. Continuous direct observation was undertaken from recorded video footage using the Children's Activity Rating Scale (CARS). Two MVPA cut-points each were evaluated for the hip-worn AG and the wrist-worn GeneActiv. Validity was assessed using equivalence tests and Bland-Altman analyses. ANOVA compared mean differences across sports.

Results: When pooling data across all sports, only the hip-worn AG Freedson cut-point was equivalent within +/-10% (p<0.05) of mean MVPA measured by direct observation (mean bias = -0.20, 95% LoA = -3.32 to 2.92 min). The hip-worn AG Evenson cut-point underestimated MVPA (mean bias = -0.51, LoA = -3.51 to 2.49 min) while the wrist-worn GeneActiv cut-points overestimated MVPA (Phillips mean bias = 0.78, LoA = -2.80 to 4.37 min; Hildebrand mean bias = 0.86, LoA = -2.75 to 4.47 min). Post-hoc ANOVA tests identified that the wrist-worn GeneActiv cut-points were less accurate in the sport of netball which requires more arm-movements during catching and throwing compared to the other sports.

Conclusions: This study provides insight into the validity of hip- and wrist-worn accelerometers during free-living youth sport settings. The differences in accuracy observed suggest wrist-worn devices may over-estimate MVPA in activities that require substantial arm movements. This finding has implications for studies using wrist-worn accelerometers particularly in youth populations.
Physical Activity or Exercise During Pregnancy in Relation with Self-Reported Health and Quality of Life

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: Regular, moderate intensity physical activity or exercise could help prevent gestational disorders, maintain healthy weight, preserve general health conditions, improve mental health, and positively affect pregnancy outcomes. The aim of the study was to accurately describe PA patterns in a Hungarian pregnant population to explore whether these women reach the 150-minute moderate intensity PA recommended by the American College of Obstetricians and Gynecologists (ACOG) and if it correlates with self-related health (SRH) and quality of life (QoL).

Methods: Cross-sectional survey was conducted between March and May 2018 to examine the socio-demographic, anthropometric, gestational, SRH, QoL, and PA data of 59 healthy pregnant women with uneventful pregnancy. Measurement of PA was examined using the Global Physical Activity Questionnaire (GPAQ). Weekly activity regarding domains and intensity of PA or fulfilment of recommendation of the ACOG and the correlation with social, psychological, physical, and environmental domains of QoL (WHOQoL BREF) were examined. Statistical analyses were performed using SPSS 22.0 software. Mann-Whitney U-test and Pearson's correlation coefficients were applied, significance level of p<0.05 was considered.

Results: QoL and SRH were reported good/very good by 77.97% and 81.35% of women (29.76±snn;3.64 years) respectively. In average, they spent more than four hours (252.63±snn;352.86 min/wk; 1010.51±snn;1411.46 MET min/wk) with moderate, one more hour (55.93±snn;121.73 min/wk; 447.46±snn;973.85 MET min/wk) with vigorous PA regarding GPAQ. 47.46% of women fulfilled the recommendation of ACOG reaching at least 150 min/wk MVPA. Any relationship could be detected considering fulfilment of the requirement itself regarding TOTAL MVPA with general SRH or QoL, however psychological domain of WHOQoL BREF showed positive significant correlation (r=0.263; p=0.046) with vigorous MET min/wk. Therefore, sporting habits were analysed separately and positive correlation was found between regular exercise and psychological domain of WHOQoL BREF (Z=3.045; p=.002 vs. general QoL (Z=2.238; p=.025).

Conclusions: Contrary to habitual PA, our results revealed positive effects of exercise particularly during pregnancy, highlighting the importance of specific PA interventions for pregnant women beside everyday PA.

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20699

P3, P3.168

The impact of tailored group activities within a physical activity intervention: A case study of Active Herts

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: Whilst it is becoming common for physical activity interventions to include motivational interviewing techniques and follow up conversations, few have explored the adjunct benefit of tailored group activities. This study evaluated the impact of a standard (12 months support, motivational interviewing techniques utilised), compared to enhanced intervention (standard intervention plus the addition of tailored activities), through a case study of the Sport England funded Active Herts intervention.

Methods: 1,896 participants took part in the evaluation for Active Herts between 2016 and 2018, from four districts of Hertfordshire, England. A mixed-methods research design was used. Primary data was collected through questionnaires completed at an initial consultation, 3 months, 6m, and 12m. The questionnaire included the IPAQ-SF, Euroquol EQ-5D-DL and the Warwick Edinburgh Mental Wellbeing Scale (WEMWBS). 8 focus groups with participants in both interventions, took place over the course of the three years. A phenomenological approach to analysis was utilized with focus group transcripts, to understand individual's experiences.

Results: Across the programme, statistically significant improvements were observed from baseline, to each point of follow up (P = <0.001 across outcomes, except EQ-5D-5L). For example, reported time spent in moderate to vigorous activity rose from 66.6mins at baseline, to 251mins at 12m. However, no statistically significant difference was apparent when comparing standard and enhanced models of delivery (P values all > 0.1). Despite this, participants in the enhanced intervention reported feeling more confident to participate in physical activity, through the belief of there being a more 'common ground' amongst their peers in the activity sessions.

Conclusions: The findings suggested that tailored group activities were well liked by participants but this did not appear to translate to higher levels of physical activity. Possible reasons and implications of this will be discussed.
Factors associated with young people’s compliance to accelerometry wear—findings from the Healthy High School study

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Objective Despite the benefits of using objective measures for physical activity (PA) in youth, accelerometers also have some disadvantages related to compliance and self-selection bias. The use of accelerometers as assessment tools implies for example a higher burden for study participants compared to surveys and may lead to non-participation in certain groups. A specific challenge related to accelerometer use among adolescents is their self-consciousness about their body and physical appearance in general. The purpose of this study was to examine potential sociodemographic, health-related, behavioral and contextual factors for young people's compliance of wearing accelerometers in a subsample of first year high school students (age 16-18 year) participating in an intervention study in Denmark.

Methods This study is a convenience sample of four schools participating in Danish "the Healthy High School study", a cluster randomised controlled trial that aimed to promote well-being by e.g. improving regular movement. The study presented here is based on baseline measures only. PA was measured objectively using the Axivity AX3 accelerometer attached directly to the skin of the front of the students' thigh using tape for up to seven consecutive days. Potential predictors for participation in the accelerometer study were measured by the student questionnaire. We conducted descriptive statistical analyses to investigate differences between students participating in the accelerometer study versus students not participating.

Results and conclusion A total of 222 students were included in the study, of whom 67.1% participated in the accelerometer study (a least one valid day). Significant predictors for students participation in the accelerometer study were: being a student in an intervention school (compared to a control school), being of Danish origin; prefer always, most of the time or sometimes to shower after PE classes; Agreeing on the following reasons for being physically active: To improve my physical fitness, To be healthy, Being physically active gives me more energy, Being physically active makes me feel less stressed. We did not find significant differences in participation with regards to social class, body image and self-reported weight status.
P3, P3.170

Objectively measured Physical Activity and its association with weight status among 6-10 years-old girls


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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Research on paediatric obesity and its association with lifestyle behaviours in children is potentially important for identifying subgroups of youth at risk and targeted for interventions. The aim of the present study was to analyse associations between the risk of overweight and the moderate-to-vigorous physical activity (MVPA) in Portuguese female children.

Methods: This cross-sectional study comprised a sample of 198 girls aged 6-10 years. Height, weight were measured, and BMI was calculated subsequently. Participants were classified as normal weight or overweight/obese, using age- and sex-specific BMI cut-offs of the International Obesity Task Force. A tri-axial accelerometer was used to obtain seven consecutive days of MVPA, as well as the weekly time being sedentary. Logistic regression analysis was used to examine the aforementioned relationship among the risk of obesity and MVPA, controlling for age, sedentary behaviour, and educational levels of parents.

Results: About 22.0% of the sample is overweight or obese. After controlling for potential confounders, MVPA was not significantly associated with the risk of being overweight in female children. The final regression model revealed that girls of mothers with high educational level were less likely to be classified as overweight girls.

Conclusion: Findings of this study revealed no significantly relation between MVPA and obesity risk in a sample of Portuguese female children. Future research should extend similar design to males to confirm or not some of the afore-mentioned findings.
Do self-reported measurements of height and weight lead to misclassification of weight status in young adults?

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: There is a growing problem of overweight and obesity in Australian young adults. There are suggestions their perspective of 'norm' has changed, and may explain why young adults are less concerned with their body weight. Alternatively, young adults could be unaware of their BMI category. The objective of this study was to determine the validity of self-reported anthropometric measurements for BMI classification in a young adult population.

Methods: Both self-reported and directly measured weight and height of 100 young adults aged 18 to 30 years were collected. Participants were blinded and measured at one of two university clinics by research dietitians and within two weeks, self-reported their current body weight and height by a questionnaire as part of a larger study. Body Mass Index was calculated and categorized according to the World Health Organization's cut-points for underweight, healthy weight and overweight/obesity. Cohen's Kappa statistics were computed to determine the degree of agreement between BMI categorization derived from self-reported and direct measurements. Overweight and obese participants were analysed together due to the sample size.

Results: The prevalence of overweight/obesity was 30% by direct measurement. Males had a higher BMI than females (25.2 ±smn; 4.4 versus 22.3 ±smn; 3.2; p<0.001). There was no significant difference between self-reported and measured BMI (23.9 ±smn; 4.3 versus 23.8 ±smn; 4.1; p =0.46). Cohen's Kappa demonstrated good agreement between BMI categories determined by self-reported and measured weight and height data (K= 0.76, 95% CI 0.63, 0.89; p <0.001). The classification of BMI from self-reported and direct measurements showed that 88% were placed in the same weight category and 12% were placed in the adjacent categories. Overestimation of height in four people led to misclassification, whereby self-report categorized them as "normal weight" and measured as "overweight/obese".

Conclusions: Findings showed that these young adults were aware of their current body weight status. The prevalence of overweight and obesity in this sample was 30%, below the national average (46%) but the mean BMI for males fell within the overweight category. Future studies may investigate whether overweight and obesity is becoming the accepted 'norm' for Australian young adults.
Twenty four hour diet recall for assessing dietary sodium: does behaviour change in different contexts and population groups?

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: To examine the validity of self-reported sodium intake assessed by 24 hour diet recall in different population groups, and research contexts.

Methods: A systematic literature review was used to identify studies that measured dietary sodium intake with 24-hour diet recall and 24-hour urine (the gold standard measure) in the adult participants over the same time period. Eligible studies included adults in free living settings and were published in English language. Studies which included participants who were pregnant, or had active disease states that may interfere with normal sodium metabolism were excluded. Medline, Embase, Cochrane Database of Systematic Reviews, and Scopus were searched with the following terms: sodium, sodium dietary, salt consumption, sodium intake, nutrition assessment, diet records, surveys and questionnaires and urine specimen collection.

Results: Of 3570 records retrieved up to July 2018, 384 duplicates were removed and 3187 were screened for eligibility, with 116 full text reviews. Eight of these were eligible for this review. These included five cross-sectional studies and three dietary intervention studies conducted in six countries with a total of 7414 participants. Intervention studies comprised trials of sodium reduction, weight loss, and healthy diets. Studies demonstrated that the difference between urinary and dietary sodium intake estimates was greater at follow up than at baseline in intervention groups, suggesting selective reporting, possibly due to social desirability bias. Five of the six cross sectional studies showed differences in reporting by BMI, with four showing greater under-reporting with higher BMI. Only one study had differences in under-reporting by sex, with greater differences in women than men.

Conclusions: Twenty-four-hour urine remains the gold standard method for dietary sodium assessment. Dietary intervention studies should use 24-hour urine to avoid selective under-reporting at follow up. Researchers should be wary of under-reporting in selected groups (particularly those with higher BMI) when using 24h diet recall to assess dietary sodium.
Do dietary perceptions match reality? The relationship between perceived and actual quality of household food purchases

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: To examine how accurate Americans' perceptions are about the diet quality of their food purchases, how well perceived diet quality explains variation in actual diet quality of purchases, and how accurately diet quality can be predicted from perceived diet quality. This research updates mixed evidence on the relationship between perceived and actual dietary quality and draws new conclusions around the use of reported diet quality in survey development.

Methods: This research used USDA's Food Acquisition and Purchase Survey (FoodAPS) to examine the relationship between the quality of household food purchases and the household food shopper's perceived household diet quality. Perceived diet quality was measured as ordered categories of self-rated household diet status ('excellent,' 'very good,' 'good,' 'fair,' or 'poor'). Diet quality was calculated using the HEI-2010. The analysis used descriptive statistics, multivariate models, and standardized coefficients to examine the relationship between perceived diet quality and HEI score (and diet quality category - "poor," "needs improvement," and "good" - as defined by the USDA) and the degree to which perceived diet quality accurately predicts dietary quality.

Results: Adjusting for factors thought to influence diet quality, the ordered categories of self-rated household diet status were significantly associated with HEI score. Compared to "excellent," reporting "good," "fair," or "poor" were associated with an expected 4.5, 6.5, and 6-point lower HEI score, respectively. Standardized coefficients showed that perceived diet quality questions drove more of the variation in HEI score than other variables. Finally, predicting HEI scores using perceived diet quality and covariates accurately categorized 25% more households into USDA-defined diet quality categories compared to perceived diet quality alone.

Conclusions: This study advances current scholarship on the accuracy of perceived diet quality by showing a relationship between self-rated diet quality and actual diet quality. It also suggests that self-rated diet quality may be a good predictor of dietary behavior. Further, the results have implications for questionnaire development; using self-rated diet quality along with other factors thought to influence food choice to predict diet quality scores can accurately categorize more households into USDA-defined diet quality categories than using self-rated diet quality alone.
20435

P3, P3.174

The socio-economic determinants of energy drink consumption and related health outcomes in Riyadh, Saudi Arabia

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Purpose: To estimate the prevalence and socio-economic determinants of energy drink consumption and related health outcomes in Riyadh, Saudi Arabia.

Methods: Participants were recruited from schools in Riyadh into a cross-sectional observational study during the academic year 2018 until the target sample size of 2,000 was achieved. The prevalence of energy drink consumption was estimated. Logistic regression analyses determined the relationship between the energy drink consumption, physical health and diet.

Results: In total, 54% of young people had consumed an energy drink at least once and 25.5% at least weekly; 38.65% drank energy drinks because they enjoyed the flavour, 31.7% consumed their first energy drink between ages of 11 to 15 years. Compared to female respondents, male respondents were more likely to consume energy drinks (OR = 1.26, 95% CI 1.08 to 1.46). Energy drink consumption was associated with an unhealthy diet (OR = 1.69, 95% CI 1.53 to 1.87), tobacco use (OR = 5.91, 95% CI 3.47 to 10.07), poor quality sleep (OR = 0.73, 95% CI, 0.47 to 0.99). Those who regularly ate breakfast were less likely to consume energy drinks (OR = 0.89, 95% CI 0.83 to 0.95).

Conclusion: Energy drink consumption has a high prevalence in Riyadh and consumption is associated with a poor-quality diet and negative health outcomes. The cluster of poor health behaviour suggests interventions could focus on health generally rather than energy drink consumption specifically.
Capturing the contextual factors associated with eating using wearable cameras and a smartphone application: a feasible study

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**Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM**

**Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)**

**Objective:**
Exposure to tempting food cues is linked to increased food intake. People are usually unaware of the factors that influence their food choices and intake, yet weight loss and obesity studies often rely on participants to recall the instances when they experience food temptations. We examined the feasibility and acceptability of using wearable cameras and real-time digital surveys to capture the environmental, social, and psychological factors associated with food temptations.

**Methods:**
Nine adults who were overweight or obese and trying to lose weight wore a camera during waking hours and completed surveys through a smartphone app on 4 days over a 2 week period. Participants were prompted to complete four digital surveys/day on their mood, hunger and appetite. Participants were also asked to fill in a survey when they experienced food tempting moments. Trained fieldworkers met with participants after Day 2 and Day 4 of data collection and used visual images to elicit instances of food tempting moments and the context in which they occurred. Participants were also asked about their experience of wearing the camera and completing the surveys.

**Results:**
Participants had a median age of 33, and BMI of 27.1kg/m2, and were mainly female (n=8). All wore the camera for four days, with an average wear time of 44.5 hours/day. Participants completed a median of 14 out of 16 surveys. In terms of number of tempting moments, participants reported a mean of 1.2 episodes/day in the survey, while image prompted interviews revealed 6.0 episodes/day. Images for one participant were excluded due to a camera fault. Participants reported being more aware of what they ate on Day 1 but camera awareness decreased subsequently. Participants also expressed a preference for text message reminders instead of a notification from the smartphone app for completing the surveys.

**Conclusions:**
The use of wearable cameras and real-time digital surveys to capture the contextual factors associated with food temptations was feasible and acceptable. Information collected through these methods could inform the design of an application that will predict food tempting moments and help individuals who are trying to lose weight.
Nutrition parenting practices item bank – Psychometric properties

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Assessment and Methodologies in Behavioral Nutrition and Physical Activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Parenting practices can influence children's dietary behaviours and thus represent important targets of family-based interventions. Understanding of how parenting practices influence children's dietary behaviours across studies is influenced by the lack of standardization in measurement. To address this limitation our team developed an item bank that measured nutrition parenting practices. This study reports on the factorial validity of measures derived from the nutrition parenting practices item bank.

Methods: Canadian parents (n=799) of 5-12-year old children were recruited from a web-based panel sample [Mean age=33yrs; 50% mothers; 51% white; 63% income £80,000] and completed the nutrition parenting practices item bank. The item bank included 128 items that measured three main domains of parenting: Control, Autonomy Promotion, and Structure. Based on our published conceptual framework which was expert informed, the nutrition parenting item bank was hypothesized to measure 17 factors and to assess Control with 5 factors, Autonomy Promotion with 3 factors and Structure with 9 factors. Confirmatory Factor Analysis (CFA) and Bi-factor Confirmatory Item Analyses (Bi-Factor) were conducted to confirm the factor validity of scores derived from the nutrition parenting practices item bank.

All analyses were conducted in MPlus (v8) and descriptive analyses were conducted in STATA (v15). Results: In general, the CFA findings supported our hypothesis with the exception that 1 construct from the Structure domain was split into 2 factors. [fit indices range RMSEA .071-.095; CFI .90-.96; WRMR 1.37-1.89]. As many of the factors were highly correlated, the Bi-Factor analyses reduced the solution to 10 factors [fit indices range RMSEA .075-.080; CFI .93-.98; WRMR 1.31-1.88]. The solution retained the integrity of the conceptual framework but collapsed factors that were highly correlated. The solution included: a) Autonomy Promotion with 2 factors measuring: involvement (aha;=.75) and encourage/teach (aha;=.92); b) Control with 2 factors measuring: restriction (aha;=.80) and behavioural/emotional control (aha;=.95) and c) Structure with 6 factors measuring: modeling/prompt (aha;=.85), exposure/access (aha;=.85), rule/redirection (aha;=.85), meal routines (aha;=.65), availability (aha;=.69) and permissiveness (aha;=.81).

Conclusion: The psychometric analyses support the expert informed conceptual framework for the nutrition parenting items and ultimately it will help standardize assessment of nutrition parenting practices.
A review of the measurement methods used to assess food provision within the school environment

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: Childhood obesity is a global epidemic with 38 million children overweight worldwide. The school food environment represents an effective setting for interventions to address overweight and obesity in children via the provision of healthy food options. Internationally the food provided at school varies between countries from school lunch programs to foods and beverages offered at tuck shops and canteens. Utilizing various measurement tools, studies examining the school food environment have described pricing and promotion strategies, food groups and availability and healthy food policies. The purpose of this study was to: 1) review and assess the quality of the measurement methods used to assess school food provision; 2) classify these methods according to the ANGELO framework (ANalysis Grid for Environments Linked to Obesity).

Methods: A systematic literature search was conducted using MEDLINE, EMBASE, Web of Science. Papers which described methods used to assess food and beverages provided at school canteens, tuck shops or cafeterias during lunchtime, school meals or before/after school programs were included. Exclusion criteria: settings other than schools, dietary assessment methods, reviews.

Results: The search identified 47 studies. Measures varied widely with menu audits most commonly used to assess foods and beverages provided at canteens. Other methods included direct observations of meal trays, qualitative interviews with principals/canteen managers about food policy practices. Of the four components of the ANGELO framework, the physical environment (e.g. food availability) was most frequently classified, followed by the policy environment (e.g. food guidelines), with the economic (e.g. price) and socio-cultural environments (e.g. importance of nutrition) the least. Only one methodology was grouped according to all four aspects of the framework.

Conclusion: This review provided a short-list of high quality measurement tools and has revealed there is no common method used to assess the heterogeneous school food environment. Categorising measurement methods according to the ANGELO framework facilitates an understanding of the obesity promoting school environments and is a useful framework when quantifying the potential impact of school environmental factors on the promotion of unhealthy weight gain.
Purpose: Previous study reported that dietary intake and physical exercise were associated with healthy behavior. However it was unclear how dietary habits affect daily training activities particularly in recreational middle-aged and elderly runners. This study examined the effects of dietary habits on daily training activities of the recreational middle-aged and elderly runners.

Methods: The participants included 41 male (ages 47.6 ±smn; 7.97 yrs) and 28 female (ages 49.9 ±smn; 10.06 yrs) middle-aged and elderly runners to participate Hokkaido Marathon in 2017. All these subjects who had an expected finishing time within the official time limit of 5 hours were eligible. The dietary intake was assessed by using a validated brief-type self-administered diet history questionnaire (BDHQ). The BDHQ estimates the dietary intake 58 food and beverage items was categorized according to previously validated food groups. Nutrient state indicators (34 items) were determined and finally evaluated on a scale of one (very poor) to five (very rich).

Results: As a result, the evaluations of unsaturated fatty acid, vitamin E, folic acid, potassium, and iron were significantly lower in female runners and conversely alcohol index were significantly higher in male runners. In particular, the lower evaluation of potassium and iron in middle-aged female runners tends to be resulted in "Female runner's anemia". It should be suggested that middle-aged female runners may have higher dietary needs to overcome their anemia without iron supplementation. In terms of the frequency of training activities, although the values of minerals (Ca, Mg) were significant higher in nutrient status of the highly trained male runners (over 5 times/week), the evaluations of some fatty acids, vitamins (A, B2), minerals (K, Ca, Mg) were significantly higher in nutrient status of the highly trained female runners. Thus dietary habits and nutrient status were associated with their vigorous training activities especially for female runners.

Conclusions: This study revealed that dietary habits were relatively associated with training activities in recreational middle-aged and elderly female runners. These findings suggest that the assessment of nutrient status may be recommended for the female runners to regularly perform vigorous endurance training.
Long-term weight loss maintenance: a systematic review of weight control registries

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Several countries established weight control registries, with the aim of identifying the main psychological and behavioral characteristics of successful weight loss maintainers in their contexts. The purpose of this study is to identify and systematically describe the existing weight control registries, including the sociodemographic, psychological and behavioral characteristics of their participants.

Methods: A comprehensive search of peer-reviewed articles was conducted in three electronic databases: PubMed, Web Of Science and SCOPUS (all articles published until November 2018). Searches included various combinations of the following terms: weight loss maintenance, weight control registry, national weight control registry, Portuguese, Greek, Finnish, German. Studies were selected for this review if the sample included participants of weight control registries.

Results/findings: The search yielded 187 potentially relevant studies after title and abstract screening. After full-text screening, 86 articles met the eligible criteria and were included. The MOOSE (Meta-analysis of Observational Studies in Epidemiology) guidelines were used to extract relevant information. Data extraction included information about the weight control registries (e.g., country of origin, year of implementation, sample size, recruitment procedure, period of recruitment, inclusion and exclusion criteria, and methodologies used) and relevant information about the participants (e.g., sociodemographic data, weight history, weight loss and weight maintenance strategies). The methodological quality of the studies was assessed using the EPHPP (Effective Public Health Practice Project) Quality Assessment Tool for Quantitative Studies.

Conclusions: Long-term weight loss maintenance has proven to be challenging for many individuals. Given that social, environmental, and cultural influences are thought to contribute to excess weight, systematically summarizing the characteristics of individuals already successful at long-term weight management from different populations may provide further insights into weight loss and maintenance-related processes, potentiating public health and obesity prevention and treatment initiatives in specific contexts.
Body dissatisfaction in "exerciser" eating disorder patients: An application of virtual reality

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Anorexia nervosa and bulimia nervosa are among the most common chronic diseases in adolescents and young adults (Garner, 2004). Studies report mortality rates as high as 21% (Huas, 2013), making ED one of the deadliest mental health disorders for young people (Fichter et al., 2008). Among inappropriate compensatory behaviors such as vomiting or laxative abuse used by ED patients, compulsive exercise (CE) is very worrisome for clinical teams since "exerciser patients" have a poorer prognosis than "non-exerciser patients" (Stiles-Shields et al., 2015). Some authors found that CE is linked with body dissatisfaction (Rizk et al., 2015, Solenberger, 2001), but no one measured body dissatisfaction (in relation with CE) with an immersive virtual reality tool.

Objective: This research aims to study the relation between CE and three different measures of body dissatisfaction.

Method: The sample of this cross-sectional study is composed with patients aged between 14 and 26 years old engaged in an ED intervention program. An Immersive and Embodied Cyberbody Rating Scale in Virtual Reality (ECR-VR; In preparation, Monthuy-Blanc et al., 2018), the Eating Disorder Inventory very short form (Maiano et al., 2015) and the Exercise and Eating Disorder test (Danielson et al., 2014) are used to measure the variables.

Results: Preliminary results based on 15 patients indicates that there are positive relations between CE and body dissatisfaction measured by third person ECR-VR ($r=0.569$, $p<0.05$) and CE and body dissatisfaction measured by first person ECR-VR ($r=0.637$, $p=0.019$). No relation was found between CE and body dissatisfaction measured by EDI-12. Results show a large effect size with ECR-VR measures.

Conclusions: These findings support empirical knowledge that patients with high levels of CE present high level of body dissatisfaction. Results suggest that virtual reality may be more effective than conventional paper tools in detecting this relation. Future studies should use immersive tools to evaluate body image.
20430

P3, P3.182

Associations between sedentary behaviour and markers of cardiometabolic health: A comparison of ActiGraph and activPAL assessed behaviour

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: To establish whether associations between total, prolonged and breaks in sedentary time and cardiometabolic health differ when assessed by thigh-worn (activPAL) and waist-worn accelerometry (ActiGraph).

Methods: This study reports data from three studies which recruited participants at a high risk of type 2 diabetes from the East Midlands area, United Kingdom (2010-2014) and assessed sedentary behaviour using two devices: activPAL worn on the thigh continuously and ActiGraph worn on the waist during waking hours. Average total, prolonged (bouts lasting =30minutes) and breaks in sedentary time were calculated. Cardiometabolic health markers included adiposity (waist circumference, BMI), lipids (total, LDL and HDL cholesterol, triglycerides), blood pressure and glucose (fasting, 2hr and HbA1c). A clustered cardiometabolic risk score was also calculated. Linear regression analysis examined the associations with cardio-metabolic health, adjusted for basic confounders.

Results/findings: 1457 participants (mean age: 59.38 ±smn; 11.85; 51.7% male; mean BMI: 30.19 ±smn; 5.59 kg/m2; 76% White European) with at least four valid days of both activPAL and ActiGraph data were included. ActivPAL and ActiGraph sedentary variables were moderately correlated (r= .416 to .648, p<0.01), however all variables, except average sedentary time (activPAL: 9.13 ±smn; 1.85 hrs/day vs ActiGraph: 9.22 ±smn; 1.58, p=0.063), were significantly different from each other (p>0.05). For total and prolonged sedentary time there was consistency in the direction and magnitude of associations for adiposity, HDL, triglycerides and cardiometabolic risk. Differences were observed across devices for diastolic blood pressure for total and prolonged sedentary time, 2hr glucose for total sedentary time and HDL for breaks in sedentary time. No other associations were observed for any other health markers for either device.

Conclusions: Our results suggest that associations with cardiometabolic health are largely comparable across the two common assessments of sedentary behaviour but researchers should be aware that some differences may exist for certain markers of health.
Development and application of a checklist to assess sex/gender considerations in interventions to promote physical activity and/or reduce sedentary behavior in children and adolescents

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Physical activity (PA) provides numerous health benefits, while sedentary behavior (SB) has negative impacts on both physical and mental health. There is increasing evidence of differences in both PA and SB among girls and boys. Therefore, sex/gender should be systematically taken into account in research on these health-related behaviours. However, there is no consensus on criteria to assess sex/gender in systematic reviews in the context of PA promotion/SB reduction. The aim of this contribution is to demonstrate the development and application of an innovative standardized checklist for the assessment of sex/gender in primary studies that promote PA/reduce SB in children and adolescents.

Methods: To assess sex/gender considerations in primary studies, a comprehensive checklist was developed in a three-step procedure. First, specialist databases were searched for existing instruments. Second, these were compiled in an overview and checked for their ability to assess sex/gender considerations in intervention studies. Third, a new sex/gender checklist was drafted and finalized through an iterative process among a multidisciplinary panel of 16 experts in the area of physical activity promotion, gender studies and systematic reviews (e.g., members of the Cochrane Sex/Gender Methods Group). To test for feasibility, three of the investigators applied the checklist to five randomly selected intervention studies. Subsequently, results were checked for consistency and discrepancies were discussed.

Results/Findings: The sex/gender checklist consists of ten items in the following categories: "background and concepts", "study design", "intervention planning and delivery", "presentation of findings" and "interpretation of findings". The items are rated on a three level scale: "no information provided", "basic" or "detailed". The testing of the checklist shows its feasibility in the context of systematic reviews in children and adolescents regarding promotion of PA/reduction of SB.

Conclusions: The checklist developed and the experience gained in the project represent a concrete and structured way of taking sex/gender into account in systematic reviews. The checklist could also be used as a planning instrument for intervention development and research designs in health research more broadly.
20501

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A sex/gender perspective on interventions to modify children's and adolescents' physical activity and sedentary behaviour: preliminary results of a systematic review

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: This systematic review aims to evaluate the effects of interventions on girls' and boys' physical activity (PA) and sedentary behavior (SB) and to appraise the extent to which the studies have taken sex/gender into account.

Methods: The review is registered in PROSPERO (CRD42018109528). Eleven electronic databases were searched to identify all relevant controlled trials, published in English peer-reviewed journals after the year 2000. Study outcomes had to be a quantified measure of PA and/or SB, and reported as sex/gender disaggregated data at baseline and/or follow up, and/or an explanation provided for how the analyses dealt with sex/gender variables. Data extraction covered study design, intervention content, approach and setting as well as outcomes and methodological quality of primary studies. Sex/gender considerations in primary studies were rated by a newly developed checklist.

Results: Of 24,834 records screened by two independent reviewers, 263 studies met the inclusion criteria. Of these, 85 adjusted analyses of PA and/or SB outcomes for sex/gender. The remainder analysed the intervention for boys and girls in detail (single sex/gender studies, stratified and interaction analyses, sex/gender disaggregated data). The preliminary results show that in terms of intervention delivery researchers often do not take sex/gender into account. Therefore, in intervention content, sampling and measuring the outcomes sex/gender is often not considered as important. In articles where the results show sex/gender specific intervention effects, the researchers are aware of potential differences in boys and girls and furthermore discuss potential underlying reasons.

Conclusions: The preliminary results indicate that sex/gender is not considered sufficiently in primary interventional research. To evaluate differential responses to interventions for boys and girls, more sophisticated analyses rather than adjustment for sex/gender are required, and better reporting about intervention content and delivery is needed.
Interventions on children’s and adolescents’ physical activity and sedentary behaviour from a sex/gender perspective: a systematic review protocol

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Purpose: The main objectives of this systematic review are to evaluate the effects of interventions on girls' and boys' physical activity (PA) and sedentary behaviour (SB) and to appraise the extent to which the studies have taken sex/gender into account.

Methods: Eleven electronic databases were searched to identify all relevant (randomized) controlled trials. Two independent reviewers identified 263 eligible studies, extracted data, and appraised the quality of the studies. The main outcome of the studies is a quantified measure of PA and/or SB. Risk of bias of individual studies was assessed using the Cochrane Risk of Bias Tool for Randomized Controlled Trials. Meta-analyses will be conducted when possible among studies with sufficient homogeneity. To evaluate sex/gender considerations in primary studies, we are using a sex/gender checklist that builds on existing tools and was developed during a two day, iterative process among a multidisciplinary panel of 16 experts.

Results/findings: To our knowledge, our systematic review is the first to analyse in detail how sex/gender is considered in interventions promoting PA and/or reducing SB in children and adolescents. The review will provide information on how sex/gender aspects have been considered in recent research and the extent to which sex/gender might impact study outcomes. Our findings will be of interest to stakeholders, health promoters, researchers and policy makers who wish to support more equal outcomes from interventions promoting PA and/or reducing SB.

Conclusions: The results of the review will help establish sex/gender guidelines on the development, implementation and appraisal of PA promotion and SB reduction interventions. The project will build both the field of PA promotion and SB prevention and methodology for conducting systematic reviews using a sex/gender lens.
Compliance with 24-hour movement guidelines and its relationship with anthropometry in Finnish preschoolers: The DAGIS study

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Objective: Recent 24-hour movement guidelines for the early years established recommendations for physical activity (PA), sleep, and screen time (ST). To date, less is known about the compliance with meeting the guidelines and their associations with health outcomes. Thus, we aimed to investigate: 1) the compliance with 24-hour movement guidelines, and 2) associations between compliance and anthropometry in Finnish preschoolers.

Methods: We utilized DAGIS survey data collected in 2015-2016 (N=864). PA was assessed over 24-hours during seven days using the hip-worn ActiGraph wGT3X-BT accelerometer. Sleep and ST were reported by the parents during the same seven days. Children were classified as meeting the guidelines if they averaged: at least 180 min/day of PA including at least 60 min of moderate-to-vigorous intensity, 10-13 hours/night of sleep, and a maximum of 60 min/day of ST. In total, 736 children (51.4% boys, mean age: 4.7 ± smn;0.9 years) had sufficient amount of valid data and were included in the study. Anthropometry was assessed using body mass index (BMI, kg/m2) and waist circumference (WC, cm). Descriptive statistics were used to examine the average time spent in PA, sleep, and ST. Furthermore, the compliance with children meeting the 24-hour movement guidelines was calculated for each behaviour separately and to their combinations. Adjusted linear regression analyses were applied to examine associations of compliance with BMI and WC.

Results: Children were physically active on average 390 (±smn;46.0) min/day and spent 86 (±smn;25.4) min/day in moderate-to-vigorous PA. They had on average 10:21 (±smn;0:33) h:min/night of sleep, and spent 75 (±smn;37.1) min/day on ST. The compliance with meeting all three movement guidelines was 23.8%. The highest compliance rate was found for PA (84.2%), followed by sleep (75.7%) and ST (35.6%). In addition, children who met the guidelines for PA and sleep (62.6%) had lower BMI (B= -0.26, p=0.018) and WC (B= -0.82, p=0.002) compared to children who did not meet the guidelines.

Conclusions: Meeting recommendations for both PA and sleep may have an important role in supporting healthy weight status in young children. However, there is a need to improve compliance with the 24-hour movement guidelines, especially for ST.
Health related quality of life among 13-14 years old adolescents with overweight - a mixed methods approach

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Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective:
Overweight is a public concern, with risk of adverse health outcomes including physical and psychosocial challenges. In general, Health related quality of life (HRQoL) is lower among adolescents compared to children, and worsened by increase in body mass index. The purpose of this study was to gain a more comprehensive understanding of HRQoL among adolescents with overweigh, using a mixed method research approach.

Methods:
The target group was participants, aged 13,14 years, in an internet-based intervention aiming to increase physical activity, reduce body mass index, and increase quality of life. Mixed methods were used in a convergent design, including quantitative and qualitative approaches in parallel. Quantitative post-intervention data on HRQoL were collected from 84 participants in the intervention and compared with a Norwegian reference population of 244 individuals. HRQoL was measured with KIDSCREEN 52, a generic questionnaire. The quantitative data were analysed using a non-parametric Mann-Whitney test. Qualitative semi-structured interviews were conducted in a subgroup of 21 adolescents. Data were analysed by directed content analysis. The ten main dimensions from KIDSCREEN 52 served as theoretical framework and analytical tool.

Results:
The intervention sample had significantly reduced HRQoL on the sub-scale of physical well-being compared to the reference sample. The reference sample scored significantly lower on the sub-scale of parent relations. On self-perception, girls in both samples had a significantly lower score than boys. No significant differences were found for the other dimensions. From the qualitative data, three of the ten sub-scales were particularly prominent; physical well-being, self-perception and school environment. For physical well-being, the qualitative data confirmed the results from quantitative analyses. As to self-perception, both girls and boys expressed negative body views. Girls were preoccupied with being slim, boys with building muscles. On school-environment, the adolescents mostly had positive views, but experienced increased pressure.

Conclusion:
Combining methods enabled a comprehensive approach to researching HRQoL, understanding complexities involved, and indicating better ways to help. Looking at both data sets increased our knowledge about the adolescents' quality of life, showing the participants vulnerability as well as resilience. Reduced HRQoL on physical well-being was the most prominent finding.
Decline in light-intensity activity is a major component of the longitudinal decline in physical activity in adolescent boys

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: It is known that population levels of physical activity (PA) are declining, especially among adolescents. In the IDEFICS cohort, the time in light-intensity activity declined by 50 minutes from 2 to 10 years of age, whereas moderate-to-vigorous activity (MVPA) was increasing at the same period (Konstabel et al, Int J Obes 2014, 38:S135-143). The aim of the present study is to investigate whether the decline in light activity continues in adolescence, and to calculate its approximate contribution to the decline in overall PA.

Methods: Measures: Actigraph GT1M was used to measure PA. At least 8 hours of measurement per day, and at least 1 weekday and 1 weekend day were required for inclusion. Sample: 313 boys aged 12.03 at the baseline; 112 of them were tracked through 2 years with complete data on PA (mean ages: 11.9, 12.9, 13.9).

Results: The boys had, on the average, 217.1 minutes of light activity at the first measurement, and 172.4 minutes at the third time (adjusted for differences in wearing time); the average yearly decline was thus 22.4 minutes. The average yearly decline in MVPA at the same period was 5.1 minutes. The rate of decline was similar in overweight/obese and normal-weight boys, as well as in weekdays as compared to weekends. In terms of approximate energy expenditure, the contribution of light activity was larger than that of the MVPA.

Conclusions: Light activity is potentially important target of PA interventions.
Dietary patterns and their impact on cardiovascular health factors among Spanish adolescents


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Assessment and Methodologies in Behavioral Nutrition and Physical Activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: The aim of this study was to describe dietary patterns and their cross-sectional association with cardiovascular risk (CVR) factors and health behaviours in high school students.

Methods: 1326 adolescents from Barcelona and Madrid (Spain) aged 12.0 ± smn; 0.04 years (48% girls) enrolled in a comprehensive program of health promotion (SI! Program) (http://programasi.org/en/scientific-study). Adolescents completed a self-reported food frequency questionnaire at baseline. Ward's method and k-means cluster analysis were applied based on the similarities between the relative frequencies of consumption of forty-three food items. BMI z-scores and blood pressure z-scores were calculated according to CDC standards. Fasting glucose and lipid profile were obtained from capillary blood samples. Moderate-to-vigorous physical activity (MVPA), sedentary time, steps count and sleep time were assessed with Actigraph wGT3X-BT activity monitors.

Results: Three clusters were obtained: 1) processed (higher frequency of consumption of soft drinks, savoury and sweet spreads, sauces and snacks); 2) sweet-low fibre (higher frequency of consumption of white bread, cold cuts, sweetened milk, and sweet products and lower frequency of consumption of vegetables, fruits and wholemeal products), and; 3) healthy (higher frequency of consumption of fresh, non-processed food and wholemeal products and lower frequency of consumption of snacks and processed products) (Figure 1). Compared to boys, the percentage of girls in the healthy cluster was higher (37.6% vs 27.6%, p<0.001), whereas the processed cluster was more prevalent in boys (33.0%) than in girls (21.8%) (p<0.001). No differences in CVR factors were observed between clusters except for z-BMI values, total cholesterol and no-HDL cholesterol, with processed cluster showing the lowest mean values. No differences in sleep time, sedentary time, steps count or MVPA were found between clusters (Table 1).

Conclusions: In this large sample of adolescents, cluster analyses allowed us to derive three stable dietary patterns which showed prevalence differences by gender, and weak/inconsistent associations with CVR factors and health behaviours. Given the limitations of the cross-sectional design (including the potential reverse causation in the association between dietary patterns and CVR factors), prospective associations might allow us to observe stronger associations between dietary patterns and CVR factors and health behaviours.
Developing a logic model for a natural experiment intervention

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Assessment and methodologies in behavioral nutrition and physical activity, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objectives: Evaluating an intervention that is a natural experiment can be difficult because evaluation was not considered when planning the intervention. We present a systematic approach to developing a controlled evaluation of an existing intervention addressing children's well-being and obesity.

Methods: The population consists of 7-14-year-old children having problems with different aspects of well-being and for the vast majority also overweight. The intervention consists of a 10-week stay at the Liljeborg home which has existed for more than 50 years and which is continuously updated. The intervention at the home focuses on relations, self-efficacy and healthy habits with healthy food, physical activity and very limited sedentary life.

After the stay a new 10-week intervention has been developed to improve the way the children get back into their own home environments and help maintain their new healthy habits and positive experiences. To be able to evaluate this new intervention a systematic approach was needed. I interviewed the coordinators as experts, studied literature to find predictors of well-being and overweight and interviewed two groups of children to identify important factors for well-being and maintaining healthy habits.

Results: We developed a logic model for each target group the coordinators would be working with children, parents and resource people at school, community and after school activities. For each model we looked at the activities performed, mechanisms and moderators, output and outcome. In the final logic model the targets groups were combined and this model formed the basis for the development of questionnaires to do a process and effect evaluation.

Conclusions: A logic model is an effective and systematic approach in creating an overview of a natural experiment intervention at times where evaluation of an on-going experiment is needed.
The effects of continuous compared to accumulated exercise on health: a meta-analytic review

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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose

Public health guidelines suggest that physical activity can be accumulated in multiple short bouts dispersed through the day, however a synthesis of the evidence for this approach is lacking. The purpose of this study was to examine if there are different effects of exercise interventions consisting of single bout of exercise compared with interventions comprising multiple bouts of exercise accumulated over the course of the day, on health outcomes in adults.

Methods

Six electronic databases were searched (Jan 1970 - 29 August 2018). Two authors identified studies that evaluated the effects of a single bout of exercise compared with the same intensity, total duration, and mode of exercise accumulated in multiple bouts over the course of a day, in community-dwelling adults. Pooled effects were reported as standardised mean differences and 95% confidence intervals using a random effects model.

Results

19 studies involving 1080 participants met the inclusion criteria. There were no differences between accumulated and continuous groups for any cardiorespiratory fitness or blood pressure outcomes. A difference was found in body mass changes in favour of accumulated exercise (MD -0.92 kg, 95% CI -1.59 to -0.25, I² =0%; 5 studies, 211 participants). Accumulating >150 min of weekly exercise in multiple bouts per day resulted in small effects on body fat % (combined post-intervention and change from baseline values; MD -0.87 %, 95% CI -1.71 to -0.04, I² = 0%; 3 studies, 166 participants) compared with 150 min of exercise amassed via single continuous bouts per day. There was a decrease in LDL-cholesterol with accumulated versus continuous exercise (MD -0.39 mmol/L, 95% CI -0.73 to -0.06, I² = 23%; 2 studies, 41 participants). No differences were observed for total cholesterol, HDL-Cholesterol, triglycerides, fasting blood glucose, or fasting insulin.

Conclusions

Our findings suggest that adults are likely to accrue similar health benefits from exercising in a single bout or accumulating activity from shorter bouts throughout the day. This review will inform public health guidelines for physical activity at global and national level.
Physical activity in Sami and non-Sami populations in Northern Norway - The SAMINOR 2 Clinical Survey

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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: In Norway, the prevalence of adults that reached the national recommendations for physical activity (PA) was in 2014 estimated to 34% for women and 29% for men. The Sami and non-Sami of Northern Norway have undergone lifestyle changes, including an increase in sedentary lifestyle. However, we lack contemporary levels of PA in rural regions of Northern Norway. The aim of this study was to describe the PA levels and investigate whether there are differences in PA over ethnicity and geographical areas.

Methods: The data was collected from the second survey of the Population-based Study on Health and Living Conditions in Regions with Sami and Norwegian Populations, the SAMINOR 2 Clinical Survey (2012, 2014), and the following municipalities are included: Kautokeino, Karasjok, Evenes, Skanland, Kafjord, Storfjord, Lyngen, Porsanger, Tana, and Nesseby. Participants were in the age interval 40-69. Information on ethnicity and several modifiable lifestyle factors were collected. In total, 12 455 individuals were invited and 6004 participated (response rate: 48.2%). Differences were tested with chi-square tests and linear regression models.

Results: Among 5 628 participants 41.1% and 40.9% of men and women, respectively, were defined as Sami. The characteristic of the population showed that Sami men reported more cardiovascular diseases and had a higher BMI compared to their non-Sami counterparts. Sami women reported less chronic pain, had higher BMI and education level compared to non-Sami women. We found no differences in self-reported PA in men overall, however, if we separated by geographical areas we found that men situated at the Finnmark cost areas (Porsanger, Tana, and Nesseby) reported a significantly higher PA compared to non-Sami men in the same area. For Sami women there was an overall lower PA levels compared to non-Sami women, and this finding was especially pronounced in the inland of Finnmark (Kautokeino, Karasjok).

Conclusion: This study showed that there are small differences in PA levels between Sami and non-Sami men, but some geographical areas gave differences. As for women, the Sami had lower PA levels compared to their non-Sami counterparts. This is important in planning targeted interventions with physical activity in the future.
Disease prevention and management (SIG)

Purpose: Even incremental increases and maintenance of physical activity has been shown to offset declines in lung health seen in African American (AA) smokers at risk for lung disease. Yet, interventions to improve physical activity levels in AA smokers have had limited success. Recent work has suggested a positive association between better sleep health with higher capacity for physical activity.

Objective: We tested the association between sleep health metrics with physical activity capacity and lung health in a sample of AA smokers at risk for lung disease.

Methods: Cross-sectional data from a sample of 106 AA smokers were used for the current analysis. Participants were AA adults aged 40-65 years, with no evidence of sleep disorders or lung disease. Sleep efficiency and duration were evaluated by WatchPAT™ devices (Itamar Medical), lung function and physical activity capacity were measured using spirometry, and 6-minute walk test (6MWT), respectively. Bivariate analytic techniques were used to test the association between sleep health (i.e., sleep duration, sleep efficiency), with physical activity capacity and lung health. We also examined the association between physical activity capacity and lung function in smokers with short sleep duration (<7 hours).

Results: In a sample of 106 AA smokers, the mean age was 56.6 years (SD=5.03), and the mean cigarettes per day was 8.3 (SD=6.6). The majority (93%) had short sleep duration, and mean sleep efficiency was 70.1% (SD=13.7). The mean 6MWT was 337.6 meters (SD=90.7). Physical activity capacity (6MWT) was negatively associated with lung function (r= -.23), and positively associated with sleep duration (r= 0.18), and sleep efficiency (r= 0.17) (NS). Among short sleepers, heavier smokers (>10 cpd) had shorter 6MWT than light smokers (333.6 ±smm;89.5 vs. 358.2±smm;90.9m, p=0.74). Likewise, among those with poor sleep efficiency (<85%), heavier smokers (>10cpd) had shorter 6MWT than light smokers (336.7 ±smm;90.6m vs. 352.8±smm;93.4m, p=0.45).

Conclusions: Most of this high-risk population have poor physical activity capacity, and poor sleep health may further reduce capacity for increased physical activity in heavier smokers. Sleep health may need to be considered as an adjunctive intervention target for physical activity interventions in AA smokers.
20652

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Hit the chronic… physical activity: Cannabis associated mental health change in adolescents offset by physical activity maintenance

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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Disease prevention and management (SIG)

Objective
Evidence suggests that cannabis use in youth may impact future emotional well-being; whereas, physical activity (PA) appears beneficial for depression, anxiety, and subjective well-being. The purpose of this study, therefore, is to examine whether changes in cannabis use affect mental well-being in adolescents age 13-18, and if so, whether PA moderates this change.

Methods
Data from the COMPASS study year 5 (2017) and 6 (2018) were used to track secondary school student (grade 9-12, 14 schools in Ontario and BC, Canada) health and health behaviours longitudinally. Participants (n= 2874 complete cases) were categorized as having "maintained abstinence" at year 6, "already used" at year 5, or "initiated" cannabis use within the observation period. Meeting PA guidelines (self-reported 60-minutes/day) was similarly categorized as "never meeting", "began meeting", "no longer meeting", or "maintained" guidelines. Stepwise regression analysed depression symptoms (10-item Center for Epidemiological Studies; Depression scale Revised), anxiety (7-item Generalized Anxiety Disorder scale) and subjective well-being (8-item Flourishing Scale) at year 6 with the first step controlling for demographic factors and respective year 5 mental health score. Cannabis use was added in step 2, followed by PA adherence in step 3, and an interaction between cannabis and PA adherence in step 4.

Results
In step 2 and 3, those who initiated cannabis use between year 5 and 6 showed small adverse effects on depression (bstep3=0.91, p =0.006) and subjective well-being (bstep3=-0.69, p=0.008) scores compared to those who maintained abstinence, after controlling for covariates and initial mental health scores. In step 3, maintaining PA guidelines improved depression (b=-0.58, p=0.028) and subjective well-being (b=0.47, p=0.026) scores compared to never meeting guidelines. No interaction effects were significant. Cannabis use and PA were unrelated to anxiety scores.

Conclusion
Results provide further evidence of an association between cannabis use and reduced mental health, even within one-year. While no moderation effect was found, continued PA guideline adherence predicted reduced depressive and improved subjective wellbeing scores regardless of cannabis use status. Therefore, maintaining PA adherence in youth may help offset negative mental health outcomes associated with cannabis use.
Physical activity of adolescents at risk of depressive symptoms

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Objective
The aim of the study is to analyse the associations between depressive symptoms (DS), well-being and different types of physical activity (PA) in adolescents and to propose measures to improve the physical behaviour of adolescents who are at the highest risk of DS.

Methods
Overall, 368 girls and 228 boys aged 15, 19 years were involved in the research. To explore the composition of weekly PA, we used the IPAQ-Long Form questionnaire, and a pedometer was used to monitor weekly PA. The prevalence of DS was diagnosed by the Bern Subjective Well-Being Questionnaire and the WHO-5 Well-Being Index.

Results
The girls and boys who reported the most DS and the lowest level of well-being had significantly less weekly recreational PA. Unlike the boys, the girls with the lowest level of well-being reached significantly fewer daily steps than did the girls with the highest level of well-being ($F(18.2184) = 1.74$, $p = 0.027, \gamma^2 = 0.014$). The girls who reported the fewest DS had a 2.12 times greater odds of meeting the 11,000 steps/day recommendation than did the girls with the most DS (OR = 2.12, CI = 1.14, 4.14, $p = 0.018$), whereas we did not detect statistically significant differences in rates of meeting the recommendation in the boys with distinct levels of DS. Analogically, the girls with the highest well-being are 2.80 times more likely to do 11,000 steps/day than are the girls who report the lowest well-being, i.e., the most DS (OR = 2.80, CI = 1.50-5.21, $p = 0.001$), which is similar among the boys (OR = 2.19, CI = 1.50-4.67, $p = 0.042$).

Conclusions
The study confirms the stronger negative associations between DS and PA, especially among girls. The greatest opportunities for behavioural change in adolescents at the highest risk of DS are in the promotion of recreational PA and, with regard to PA volume, in increasing the daily step counts, especially on Mondays and the weekend days.
Changes in the mode of travel to work and the severity of depressive symptoms: a longitudinal analysis of UK Biobank

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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Background
Although commuting provides an opportunity for incorporating physical activity into daily routines, little is known about the effect of active commuting upon depressive symptoms. This study aimed to determine whether changes in commute mode are associated with differences in the severity of depressive symptoms in working adults.

Methods
Commuters were selected from the UK Biobank cohort if they completed ≥2 assessment centre visits between 2006 and 2016. Modes of travel to work were self-reported at each visit. Participants were categorised as 'inactive' (car only) or 'active' commuters (any other mode(s), including walking, cycling and public transport). Transitions between categories were defined between pairs of visits. The severity of depressive symptoms was defined using the two-item Patient Health Questionnaire (PHQ-2). Scores were derived between zero and six. Higher values indicate more severe symptoms. Separate analyses were conducted in commuters who were asymptomatic (zero score) and symptomatic (non-zero score) at baseline. The analytical sample comprised 5474 participants aged 40-75 at baseline with a mean follow-up of 4.65 years.

Results
Asymptomatic commuters who transitioned from inactive to active commuting reported less severe symptoms at follow-up than those who remained inactive (βa; -us;0.10, 95% CI [-us;0.20, 0.00]; N = 3145). A similar but non-significant relationship is evident among commuters with pre-existing symptoms (βa; -us;0.60, 95% CI [-us;1.27, 0.08]; N = 1078). After adjusting for transition category, longer commutes at baseline were associated with worse depressive symptoms at follow-up among symptomatic participants.

Conclusions
Shifting from exclusive car use towards more active commuting may help prevent and attenuate depressive symptoms in working adults.
Associations of natural and free sugar intakes with cardiometabolic risk factors in the Québec population: Insights from the PREDISE study

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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: The objective of this study was to explore, for the first time, associations of natural and free sugar intakes with cardiometabolic risk factors in an age and sex representative sample of French-speaking adults from 5 regions of the Province of Québec, Canada.

Methods: Men and women were enrolled as part of the cross-sectional PREDISE study (n=1147, 18-65 years of age; 50% women). Natural and free sugar intake estimates were assessed using validated, self-administered, web-based 24-hour dietary recalls repeated on three occasions. Total sugars were manually differentiated into free and naturally occurring sugars using an algorithm based on previous work recently published in the literature. Waist circumference (WC) as well as office systolic and diastolic blood pressures were measured. Blood samples were collected in the fasting state to measure glucose, insulin, triglyceride and cholesterol concentrations. Insulin resistance (HOMA-IR), insulin sensitivity (HOMA-IS) and a continuous metabolic syndrome (MetS) score were calculated. Pearson correlation analyses were used to assess associations between sugar intakes and cardiometabolic risk factors, in men and women separately. Participants using medication known to affect cardiometabolic risk factors were excluded.

Results: In men, percentage of daily calories from natural sugars correlated positively with HOMA-IS (r=0.12, p=0.01) and inversely with WC (r=−0.12, p=0.01), triglycerides (r=−0.19, p=0.0001), total cholesterol/HDL-cholesterol ratio (r=−0.12, p=0.01) and MetS score (r=−0.17, p=0.001) No significant associations between percentage of daily calories from natural sugars and cardiometabolic risk factors were observed in women. The percentage of daily calories from free sugars was associated with HDL-cholesterol (r=−0.11, p=0.02) in men and with fasting insulin (r=0.12, p=0.01), HOMA-IR (r=0.10, p=0.03) and diastolic blood pressure (r=0.11, p=0.02) in women.

Conclusions: Our data revealed that correlation coefficients between sugar intakes and cardiometabolic risk factors are generally of small magnitude in both sexes. Yet, intake in natural sugars correlated favourably with the cardiometabolic profile in men but not in women, suggesting the presence of a potential sexual dimorphism. Further analyses will be conducted to determine whether the intake of some specific food sources of natural or free sugars are more closely associated with cardiometabolic risk factors.
Cheese Consumption Positively Predicts Aortic Stiffness in Men and Women

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Disease prevention and management (SIG)

OBJECTIVE: To determine if dietary fat consumption predicts aortic stiffness in 18-60 year old men and women.

METHODS: This study consisted of a cross-sectional analysis in men and women 18-60 years of age. Dietary intake was determined by the National Institute of Health's Dietary History Questionnaire-II (DHQ-II), and aortic stiffness was measured as carotid-femoral Pulse Wave Velocity (cfPWV). To determine dietary correlations with cfPWV, univariate linear regression analyses were conducted; partial correlations were implemented to adjust for traditional risk factors. All statistics were conducted with SAS 9.4.

RESULTS: Subjects were normal weight to obese (Body Mass Index, BMI = 23.9 ±smn; 3.7 kg/m2), young and middle-aged (22.6 ±smn; 5.9 years) men and women (n = 53, 71.7% women). Mean cfPWV was 6.0 ±smn; 0.8 meters/second, and cfPWV was significantly correlated with age (R2 = 0.121, P = 0.01), BMI (R2 = 0.121, P = 0.04), SBP (R2 = 0.189, P = 0.001), and DBP (R2 = 0.296, P = <0.0001). Average daily caloric intake was 1,832.1 ±smn; 955.2 calories, composed of 69.6 ±smn; 37.1 grams of fat, 212.8 ±smn; 120.4 grams of carbohydrate, and 73.8 ±smn; 43.6 grams of protein. Greater cheese consumption was positively associated with increased cfPWV (R2 = 0.079, P = 0.04). However, neither total fat consumption (R2 = 0.002, P = 0.77) nor total saturated fat consumption (R2 = 0.008, P = 0.52) was correlated with cfPWV. The correlation between cheese and cfPWV remained after adjustment for age, SBP, DBP, and BMI (R2 = 0.085, P = 0.041).

CONCLUSIONS: Greater habitual cheese consumption predicts aortic stiffness in 18-60 year old men and women. While cheese consumption may be a novel contributor to aortic stiffening, no other dietary fat-related measures predicted aortic stiffness.
Sex differences in dietary behaviours and their relationship to hypertension, in seven low- and middle-income countries


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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Background: The burden of cardiovascular disease is increasing in low-and middle-income countries (LMICs). Given diet is a modifiable risk factor for hypertension and therefore cardiovascular disease, we investigated dietary behaviours and their relationship with hypertension across seven LMICs, hypothesizing effect modification by sex.

Methods: Nationally representative surveys of adults (=15yrs) conducted from 2005-2017 were included. Dietary behaviours were classified as: good salt behaviour (reporting measures to reduce salt consumption for ≥50% of the seven available salt behaviour questions), meeting the WHO fruit and vegetable (F&V) recommendation (400g a day), and use of vegetable oil (in comparison to animal-based fats and no oil/fat use). Hypertension was defined as systolic blood pressure [SBP] >140mmHg or diastolic blood pressure [DBP] >90mmHg or on medication, and undiagnosed hypertension as SBP >140mmHg or DBP > 90mmHg with no diagnosis. Logistic regression analyses were conducted adjusted for age, body mass index, education, working status, physical activity, alcohol and tobacco use with interaction terms to investigate effect modification by sex. All analyses took into account the complex survey design, with each country weighted equally.

Preliminary Results: Data from 25,324 people (63.3% women, unweighted) from Bhutan, Georgia, Guyana, Kenya, Nepal, St Vincent and the Grenadines and Swaziland were included. 27.8% (CI 25.4-29.8%) of the population reported good salt behaviour, 14.1% (CI 12.9-15.4%) met F&V recommendations and 93.3% (CI 92.2-94.3%) used vegetable oil. More women reported positive salt behaviours (29.2% vs 26.0%, p-value<0.001) and met F&V recommendations (13.3% vs 14.9%, p-value<0.05) than men, however no sex differences in oil use were noted. SBP was higher for men than women (128.4 vs 123.2mmHg, p-value<0.001), with no sex differences in DBP. Analyses showed odds of hypertension or undiagnosed hypertension were lower among women than men (OR 0.76, CI 0.68-0.85 and 0.61, CI 0.53-0.70, respectively); and higher among those with poor salt behaviour (OR 1.26, CI 1.12-1.42 and 1.43, CI 1.23-1.66, respectively) with no significant effect modification by sex.

Conclusions: Small but significant differences between men and women for dietary behaviours were found. The data suggest that positive salt behaviour is protective for hypertension, without modification by sex. Longitudinal research is needed to confirm findings.
Objective: This study aims to investigate whether appetitive behaviors among 7 year-olds influence their cardiometabolic health years later, independently of weight status. Previously, ‘Food approach’ behaviors have been positively related with obesity, whereas ‘Food avoidant’ behaviors have been negatively associated. We predict that these appetitive traits could have similar associations with cardiometabolic parameters; very scarce evidence exists at young ages.

Methods: This study included a sub-sample of 3700 children from the Generation XXI birth cohort (northern Portugal). Satiety Responsiveness (SR), Food Fussiness (FF), Enjoyment of Food (EF), Food Responsiveness (FR), Slowness in Eating (SE), Emotional Under-and Overeating (EUE, EOE) were accessed through the Children’s Eating Behavior Questionnaire, at 7y. At 10y, systolic blood pressure (SBP) was measured, and blood samples were drawn to analyze cardiometabolic parameters, standardized for age and sex (z-scores). A cardiometabolic risk score was calculated. Those in the upper quartile of triglycerides, HOMA-insulin resistance, waist circumference and SBP and in the first quartile of HDL-cholesterol were in the cardiometabolic risk group. Logistic regressions, stratified by sex, were run. Estimates were controlled for maternal BMI and education, physical activity and fruits and vegetables consumption at 7y. Further adjustment for BMI z-scores at 10y was performed.

Results: Food avoidant behaviors showed a protective effect in cardiometabolic risk, independently of BMI, but only among boys (SR: OR=0.51, 95%CI: 0.29;0.97, FF: OR=0.61, 95%CI: 0.37;1.00, EUE: OR=0.55, 95%CI: 0.32;0.96, SE: OR = 0.49, 95%CI: 0.29;0.81). Food approach behaviors (FR, EF and EOE) increased cardiometabolic risk after initial adjustment; however, after further adjustment for child BMI, the associations were no longer significant. In girls, child BMI totally explained the effect of these appetitive behaviors in cardiometabolic risk.

Conclusions: To our knowledge, this was the first study investigating appetitive behaviors at school-aged children and their relation to cardiometabolic health years later. Appetitive behaviors of 7y-olds influence cardiometabolic risk three years later, but this association is largely dependent of child’s BMI, a strong predictor of cardiometabolic health. Only less appetitive boys seem to have lower cardiometabolic risk, independently of weight.

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Metabolic health and energy balance responses to an 8 week apparatus-free high-intensity intermittent exercise intervention in inactive, overweight females

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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Acute high-intensity intermittent exercise (HIIE) has been shown to suppress appetite in the transient period post-exercise. If undertaken strategically prior to meal times, this could reduce energy intake to facilitate weight loss in an inactive, overweight/obese population. The purpose of this study was to explore the effects of time-efficient apparatus-free HIIE undertaken in free-living conditions prior to meal times on energy balance, weight loss and metabolic health.

Methods: Data collection is ongoing and a complete dataset will be presented at the time of the conference. 16 overweight/obese, inactive females (34.6±smn;6.2 years; 74.4±smn;7.2kg; 28.2±smn;2.0kg·dot;m-2; 23.3±smn;3.2ml·dot;min·dot;kg-1) were instructed to undertake 4x30 seconds "all-out" star jumps twice a day on three days per week, for 8 weeks. 'Pre-meal' participants were instructed to do within 30 minutes prior to a meal (current n=3), while 'anytime' participants were instructed to exercise outside of 60 minutes before a meal (current n=4). Baseline and post-intervention measures of body mass, HbA1c and VO2peak were assessed. Self-reported daily energy intake and objectively-measured daily energy expenditure were also measured at baseline, week 4 and week 8 of the intervention.

Results: Preliminary data (n=7), before statistical analysis, is presented as mean±smn;SD. 'Anytime' achieved 0.6±smn;1.8kg weight loss, a 2.6±smn;1.8% reduction in HbA1c and a 14.5±smn;6.2% improvement in VO2peak while 'pre-meal' achieved 1.1±smn;0.2kg weight loss, a 4.3±smn;8.1% reduction in HbA1c and a 13.5±smn;8.1% improvement in VO2peak, respectively. Average daily energy intake (kcal) was 1667±smn;256, 1528±smn;154 and 1377±smn;246 for 'anytime' and 2261±smn;552, 2601±smn;235 and 2760±smn;201 for 'pre-meal'.

Conclusions: Preliminary results suggest similar improvements in HbA1c and VO2peak, in both groups. Undertaking 4x30 seconds apparatus-free HIIE prior to a meal for 8 weeks may induce greater weight loss than when undertaking HIIE not in close proximity to meals. Findings will enhance understanding and implications of energy balance and metabolic health responses to strategically-timed apparatus-free HIIE in free-living conditions. This may inform effective physical activity strategies for improving weight status and metabolic health in inactive, overweight females.
Effects of combinations of health-related behaviors on weight status among Chinese children and adolescents: findings from the 2017 physical activity and fitness in China—the Youth Study

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Disease prevention and management (SIG)

Background: Western-based studies compared the effects of different combinations of meeting the Canadian 24-hour Movement Guidelines (moderate to vigorous physical activity, MVPA; screen time, ST; sleep) on weight status among children and adolescents. However, little is known among Chinese children and adolescents. This study aimed to compare the effects of different combinations of meeting the guidelines on weight status among Chinese children and adolescents.

Method: Large-sample study was conduct from October to December in 2017, using multi-stage stratified and non-probability sampling method. Behavioral and demographics information of 131,859 Chinese 4-12th graders were collected by a reliable and valid questionnaire. Height (cm) and weight (kg) were measured by portable electronic device. Combinations of meeting the guidelines were categorized into: 1) meeting none; 2) meeting one of the guidelines; 3) meeting two of the guidelines; 4) meeting all three guidelines. Weight status was dichotomized into: 1) non-overweight or obesity (non-OW/OB); 2) overweight or obesity (OW/OB). Logistic regression was used to examine the relationships between combinations of meeting the guidelines and weight status after controlling sex, ethnicity, age, school group, residence location, parental education, family composition and family income.

Results: Of all included school-aged children and adolescents in this study (n = 111,748, %boys = 49.1), 24.39% (95% CI: 24.13-24.65) of participants were defined as OW/OB. 15.7% (95% CI: 15.5-15.9) of participants met neither of the guidelines; 45.8% (95% CI: 45.5-46.1) of participants met one of the guidelines; 32.4% (95% CI: 32.1-32.7) of participants met two of the guidelines; 6.1% (95% CI: 6.0-6.3) met all three guidelines. Compared those who met all three guidelines, children and adolescents meeting none (OR = 1.70, 95% CI: 1.49-1.93), meeting one of the guidelines (OR = 1.48, 95% CI: 1.31-1.67) and meeting two of the guidelines (OR = 1.16, 95% CI: 1.03-1.31) were more likely to be overweight or obese.

Conclusions: Meeting all three guidelines may be most effective in preventing Chinese children and adolescents unhealthy weight status. Future efforts should help Chinese children and adolescents promote MVPA, limit ST and concurrently promise sufficient sleep duration to reduce the health burden resulted from OW or OB.
The Feasibility and Acceptability of Using Sit-to-Stand Desks in a Self-Contained Classroom for Students with Emotional Disturbances: A Pilot Study

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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Objective: Traditional school classroom environments promote sedentary behavior among adolescents. Previous research in this setting has focused primarily on the use of sit-to-stand desks and energy balance and cardiometabolic risk, with scant research regarding sedentary behavior reductions, prosocial behavior, and cognitive development. The primary purpose of the current pilot study was to investigate the feasibility and acceptability of sit-to-stand desks in a self-contained classroom for students with emotional disturbances. Secondary outcomes included the impact of sit-to-stand desks on sedentary time (SED), physical activity (PA), and classroom behaviors.

Methods: Four participants (ages 12, 14yrs; 2 females) alternated weeks of using traditional or sit-to-stand desks in a 10-week crossover design across one school year. Feasibility and acceptability were assessed using teacher-reported time spent standing while using the sit-to-stand desks, and teacher- and student-reported attitudes toward use of the desks. SED and PA were assessed using ActiCal accelerometers worn on the non-dominant wrist for five days during each assessment period. Classroom behaviors (quality of work, mood states, positive behaviors, disruptive behaviors) were determined using the Revised ATTAIN Lab Sit-to-Stand questionnaire. Differences in primary and secondary outcomes between traditional and sit-to-stand desks were determined using paired samples t-tests, adjusting for multiple comparisons.

Results: While using sit-to-stand desks, three out of four students spent more than 75% time standing, reported enjoying using the desks, and wanting to continue using them "very much."
Less couch, less grouch? Exploring the relationship between sedentary behaviour and subjective well-being.

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Disease prevention and management, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Purpose: Research suggests that overall sedentary behaviour (SB) and higher self-perceived SB are negatively associated with outcomes of subjective well-being (SWB), such as affect and life satisfaction. However, the context, or domain, of SB may influence this relationship. Hence, the purpose of this study was to determine the strength and direction of the relationship(s) between outcomes of SWB and overall, self-perceived, and domain-specific levels of SB.

Methods: Full-time university students (M age=20.45, SD=2.84, n=516 females, n=99 males) from across Canada completed an online questionnaire. Life satisfaction (Satisfaction With Life Scale), affect (Positive And Negative Affect Scale), overall weekly SB (International Physical Activity Questionnaire, 7 Day Short Form), and weekly self-perceived and domain-specific SB (Modified SIT-Q 7d) were assessed. SB variables that showed significant bivariate relations with SWB variables (p<0.05) were entered into standard multiple regression models to determine their overall and unique predictive capability of SWB outcomes.

Results/findings: Positive affect correlated with overall SB, self-perceived weekly SB and weekend (WD) social, weekday (WY) and WD breakfast, and WY lunch SB. Overall model fit was R²=0.090 with self-perceived SB being the only significant predictor (Beta=-0.163, p=0.000). Negative affect correlated with self-perceived weekly SB and WY breakfast, WY and WD reading, WY and WD chores, WY and WD childcare, WY and WD hobbies, WY and WD social, WD music listening, WY videogaming, WY and WD TV, and WD computer SB use. Overall model fit was R²=0.088 with self-perceived weekly SB (Beta=0.136, p=0.001), WD computer use (Beta=0.121, p=0.007), and WY breakfast (Beta=-0.080, p=0.042) being significant predictors. Life satisfaction correlated with WY and WD breakfast, WY lunch, WY sleep, WD chores, WD childcare, WD social, WD TV, WY and WD computer use, and total transportation SB. Overall model fit was R²=0.128 with total transportation (Beta=-0.168, p=0.005), WD social (Beta=-0.129, p=0.041), WY sleep (Beta=-0.161, p=0.009), and WY breakfast (Beta=0.173, p=0.037) being significant predictors.

Conclusions: Domain/context of SB appear to uniquely influence outcomes of SWB. Interventions modifying SB to improve SWB may be more effective if domains that are correlated with SWB are targeted.
Economic burden of physical inactivity in Hungary

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Background
In this paper the economic burdens caused by physical inactivity are examined. There are direct cost and other indirect losses the society suffers in relation to sickness and several sickness types are in close connection with physical inactivity.

Methods
The research was to quantify the different costs and indirect losses the different stakeholders of the Hungarian national economy suffers, and the types and complications of diseases stemming from physical inactivity using data from the National Health Insurance Fund. Research conducted on this subject in Hungary and abroad confirms that the improvement of public health through physical activity is one of the most cost-effective tools. PAR indicator was used to give an estimate of the mortality or morbidity rate that occurred due to the risk factors identified in this study.

Results/ findings
The national economic burden of certain types of illnesses in Hungary is 3 220 billion HUF (2017). The direct cost covered by the budget is 56% of the total national burden with around 3% indirect burden is associated with the government. The remaining 1 310 billion HUF is associated with the individuals, the employers and the society.

Conclusion
Increasing physical activity, thus decreasing physical inactivity will have an effect on decreasing sickness, number of sick days and the direct costs and indirect burdens as well. Our research confirms that in Hungary, an attempt to increase physical activity can be considered a long-term investment which will even offer financial return on societal level.

Acknowledgement
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Comparison of Sport Expenditures in Hungary, Poland and Germany

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Socio-economic inequalities, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Socio-economic inequalities (SIG)

Objective: The paper supposes that economical and cultural differences in different countries result in differences in their sport expenditures too. The purpose is to analyse these differences and their relation.

Methods: A sport expenditure survey was conducted in Hungary, Poland and Germany in a written form. 566 respondents filled out the questionnaire (388 from Hungary (68.6%), 110 from Poland (19.4%), 68 from Germany (12%)). The questionnaire was analysed by the SPSS for Statistics 22.0 software package. The ratio of men and women was almost equal (49.8% and 50.2%). Most of the respondents participated in high level education (46.1%) or middle level education (38.5%). 41.5% were single and 50.6% were married or lived in a common-law marriage.

Results: Disposable leisure time for the full sample was very similar. The most frequent category was the 11-20 free time hours a week but in general Hungarian respondents had the less free time regarding the frequency of other categories too. The summarized sport expenditures were the highest among German respondents (131,397 HUF), then Hungarians (89,986 HUF) and Polishes (73,681 HUF) were coming. Germans spent the most for sport services (54,926 HUF) similar to Hungarians (35,911 HUF), but Polishes had the highest spending in the category of sport shoes (22,363 HUF) which is nearly the same as in category sport clothing (21,181 HUF).

Conclusions: The results show that there is an absolute and structural difference in spending of the different nations. Germany has a leading role in the households' sport expenditures which is resulted maybe from the highest living standards among these nations. German households spend more intensively for sport services (e.g. fitness services, passive sport consumption etc.) and Hungarian households seems to close up to their spending structure. However Polish households spend more than a half of their sport related expenditures for clothes and shoes which belongs primary to the active sport consumption.

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Development of the Adolescent Food Parenting Questionnaire

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Behavioral nutrition assessment in youth, Club C, June 5, 2019, 2:30 PM - 3:45 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective
In the transition from childhood to adolescence, dietary quality deteriorates and unhealthy dietary habits develop. Parents play a fundamental role in children's dietary intake, mainly through food parenting practices (FPPs). Three overarching dimensions in food parenting have been distinguished: structure, coercive control and autonomy support. Though most existing instruments are limited to assessing coercive control, recent research shows that structured FPPs are important factors determining children's diet. Current instruments concentrate on parents of (young) children. To our knowledge, there are no instruments examining structured FPPs for parents of adolescents. The aim of this study is therefore to develop and test a new self-report measure of FPPs of parents of adolescents, the Adolescent Food Parenting Questionnaire (AFPQ).

Methods
In this cohort study data from 435 mothers and 149 fathers and their adolescent children (Mage=12.91 years; SDage=0.66 at T1, 47% male) was used. Items were identified from existing questionnaires and selected based on the three higher order constructs of food parenting. Items were adjusted for parents of adolescents. Exploratory (EFA) and confirmatory factor analysis (CFA) was conducted to test the factorial structure of the AFPQ. Correlations between subscales and adolescent's food intake were examined. Test-retest reliability was established by comparing scores of parents on the AFPQ during T1 (fall 2017) and T2 (spring 2018).

Results
The EFA resulted in a 5-factor model based on 17 items, representing the subscales autonomy support (cronbach alpha=.77), coercive control (cronbach alpha=.69), structure snacking (cronbach alpha=.69), structure healthy eating (cronbach alpha=.53) and structure modeling (cronbach alpha=.59). CFA confirmed this model. Significant correlations were found between structured healthy eating and fruit intake (r=.10), coercive control and candy intake (r=.10) and sugar-sweetened beverages intake (r=.10), structured snacking and candy intake (r=.10) and warm snack intake (r=.10). The test-retest reliability was reasonable to good when comparing AFPQ scores between T1 and T2: autonomy support (r=.50), coercive control (r=.60), structure snacking (r=.70), structure healthy eating (r=.40) and structure modeling (r=.50).

Conclusion
The Adolescent Food Parenting Questionnaire provides a promising new measure of (structured) food parenting among parents of adolescents, though further validation in more diverse samples is needed.
P3, P3.247

Light vs. Moderate Intensity Physical Activity and Executive Functioning among African American Older Adults

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Healthy ageing, Congress Hall Foyer Level 2, June 7, 2019, 10:50 AM - 12:05 PM

Ageing (SIG)

Background: Physical activity (PA) recommendations for older adults often endorse participation in moderate intensity PA. However, health disparities are evident such that African American older adults engage in lower levels of PA, have a higher prevalence of chronic health conditions and cognitive impairments including Alzheimer's disease. Given the presence of comorbidities in this population, the role of light PA in promoting physical as well as cognitive health needs to be investigated.

Objective: The purpose of this study was to examine the associations between light versus moderate intensity PA with measures of executive function, which are known to decline with age. It was hypothesized that both light and moderate intensity PA would predictive the cognitive outcomes.

Methods: Participants (N=110, mean age=64.78 ± 5.7, males=14) visited the research lab to completed measures of executive functioning, including the Trail Making and Flanker task that assess attention, task switching and inhibitory control and the n-back task assessing working memory. Additionally, participants completed a 6-minute walk test to estimate their cardiovascular fitness and were given an Actigraph accelerometer (NHANES cut offs for light PA and MVPA) for 7-days to objectively assess their levels of PA.

Results: Linear regression analyses controlling for age and fitness demonstrated that higher levels of light PA but not MVPA predicted better cognitive performance, i.e. faster reaction times on the incongruent flanker condition (βa=-.25, p=.01), trails B (βa=-.26, p=.01) and 1-back accuracy (βa=.29, p=.003). Both light PA and MVPA predicted faster reaction times on the 1-back (light PA: βa=-.22, p=.03; MVPA: βa=-.29, p=.006) and 2-back conditions of the working memory task (light PA: βa=-.20, p=.04; MVPA: βa=-.29, p=.006). No speed accuracy trade-off was observed.

Conclusion: These findings provide preliminary cross-sectional evidence that light PA demonstrated similar or better associations than MVPA with executive function measures of cognition. Designing and promoting light PA based interventions in African American older adults maybe more practical and feasible given the prevalence of health disparities in this population. Intervention studies testing the efficacy and effectiveness of light PA are needed and could have a significant public health impact in aging African Americans.
A web-based intervention to promote and increase physical activity level of Hungarian healthy adults

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Purpose: In the aging European societies maintaining the population's good health status is indispensable. One successful way for healthy lifestyle is to reduce sedentary behaviour and promote physically active life. In Hungary one third of the adult population do sports regularly and more than half of them is overweight. This facts led us to examine and promote physical activity among healthy adults in Hungary developing a web-based health promotion program addressing behavioural change based on Social Cognitive Theory of Bandura.

Methods: A one-year longitudinal, observational web-based designed study was conducted among healthy adults (18-64) in Hungary. The physical activity level of the participants was measured by the International Physical Activity Questionnaire; Hungarian long version (mean ±smn; standard deviation). The assessment of the web-based health promotion program was measured by with Wilcoxon test using SPSS 24.0 program where the level of significance was set on p<0.05.

Results: The sample of our study consisted of 497 Hungarian healthy adults. The total physical activity level of the participants at the end of the program was 5906.85±smn;4791.17 MET min/week (-19.529, p<0.001), which means a 10.43% improvement in activity level during the examined year. The reason of this favourable change was the higher level of walking MET that increased by 608.64±smn;346.50 MET mint/week on average (-18,566, p<0,001). While the leisure time activity also increased but only 177.24±smn;1899.70 MET mint/week on average (-15,538, p<0,001).

Conclusions: The 78% of Hungarian people use internet facilities regularly, which is an easy and effective way in health promotion. We found 10% increase in physical activity level and if we measure this rising it would be a large benefit in health care and economy of our country besides people's healthier lifestyle, and more years spent in health.

Acknowledgement: This research was partially supported by the Human Resource Development Operational Programme, grant No.: HRDOP-3.6.2-16-2017-00003, Cooperative Research Network in Economy of Sport, Recreation and Health.
FRIDAY JUNE 7 2019
ORAL SESSIONS
Randomized Controlled Trial Evaluating the Effect of Implicit and Explicit Taxes on the Purchasing of ‘High-in Calories’ Products

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How to impact energy dense food intakes? (Chair: Kathelijne Bessems), South Hall 2A, 12:05 PM - 1:20 PM

Policies and environments (SIG)

Objective:
Sin taxes on select foods have been shown to be reduce purchases. However, it is unclear if observed reductions result from the price increases or the accompanying messaging. To address this question, we conducted a randomized controlled trial evaluating the incremental effectiveness of 3 different tax/messaging strategies on the proportion of high-in-calorie products purchased and whether effectiveness is moderated by level of support for the tax.

Methods:
936 adults were randomized to shop in an on-line grocery store. The four arms are 1) no tax control; 2) implicit taxes showing only post-tax prices (i.e., 20% higher than control prices) on high-in-calorie products; 3) fake taxes showing pre-tax prices and a label falsely indicating that the price includes a 20% tax on high-in-calorie products; and 4) explicit taxes showing the same label as in 3) and an actual 20% price increase applied to high-in-calorie products. In each intervention arm, 20% of products highest in calories within each product category (e.g., within beverages) are targeted. Multivariate regression models were used to estimate effects.

Results:
The proportion of high-in-calorie products purchased was 11.72% in the control arm. It was a non-statistically significant 0.04 percentage points lower in the implicit arm compared to control (95% CI -2.42 to 2.34), 3.01 percentage points lower in the fake tax arm compared to the control (95% CI -5.26 to -0.76), and 3.38 percentage points lower in the explicit tax arm compared to the control (95% CI -5.72 to -1.03). Individuals who actively support the taxes showed much greater responsiveness to the explicit and fake taxes than those who did not (p<0.001).

Conclusions:
Results show that reductions in proportions and quantities of high-in-calorie products purchased are largely attributable to explicit messaging rather than to price increases. This suggests that non-salient small taxes are unlikely to improve diet quality, but if taxes are salient, they can improve diet quality even if suppliers absorb much of the tax. However, because responses are much larger for those who support the tax, it is possible that those most likely to benefit may be least influenced by the tax, salient or not.
Differences in consumption of sugary drinks and attitudes towards sugary drinks across five countries

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How to impact energy dense food intakes? (Chair: Kathelijne Bessems), South Hall 2A, 12:05 PM - 1:20 PM

Policies and environments (SIG)

Objective
Sugary drink intake contributes to overweight and obesity. Policy approaches to reducing sugary drink intake include taxes, enhanced nutrition labeling, and public education campaigns to inform consumers about the effects of sugary drink consumption. Evaluating the impact of these policies across countries as they are introduced is essential.

Methods
Adults ages 18 to 65 years completed online surveys in December 2017 in Canada (n=2761), Australia (n=3271), UK (3,255), USA (n=4068) and Mexico (n=3214) to examine beverage intake as part of the International Food Policy Study (IFPS). A validated beverage intake questionnaire was used to estimate the number and volume of beverages consumed in the past 7 days across 22 beverage categories. 'Sugary drinks' were defined as regular soda, sweetened fruit drinks, flavoured/vitamin water with calories, sports drinks, energy drinks, chocolate/other flavoured milk, specialty coffees, sweetened smoothies/protein shakes/drinkable yogurt, and 100% fruit or vegetable juice. Participants were also asked how 'healthy' they thought a bottle of soda was.

Results
Overall, 76% of the entire sample consumed at least one sugary drink in the past 7 days. The greatest mean volume of sugary drinks/week/person was consumed in Mexico (4408 mL), followed by Australia (2564 mL), USA (2422 mL), UK (2210 mL), and Canada (2052 mL). Regular soda and 100% fruit juice were the most commonly consumed sugary drinks (by 38% and 35% of participants, respectively). Younger respondents, males, those in minority groups, and those who found it more difficult to make ends meet consumed greater volumes of sugary drinks. In Mexico, 72% of participants thought that a bottle of soda was 'unhealthy' or 'very unhealthy', significantly lower than in the USA (79%), UK (83%), Australia (86%) and Canada (88%). Changes in trends from 2017 to 2018 will examine post-implementation trends after the introduction of a sugary drinks tax in the UK.

Conclusions
There are considerable differences in sugary drink intake between countries, likely due to both policy and cultural influences. This study provides baseline data to track changes in consumption and attitudes over time as additional efforts to reduce sugary drink intake are implemented.
Political and social acceptability of a sugar-sweetened beverages tax: a mixed-method systematic review and meta-analysis

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Objective: Taxation of sugar-sweetened beverages (SSBs), as component of a comprehensive strategy, has emerged as an apparent cost-effective intervention to counteract the rising prevalence of overweight and obesity. Several countries have introduced an SSBs tax, while no such policy has yet been introduced in other countries. Insight into the political and social acceptability may help adoption and implementation in countries that consider an SSBs tax. Hence, we aimed to conduct a systematic review and meta-analysis to synthesize the existing qualitative and quantitative literature on political and social acceptability of an SSBs tax.

Methods: Four electronic databases (PubMed, Embase, Scopus and Web of Science) were searched till November 2018 using terms related to 'SSBs', 'tax' and 'acceptability'. The methodological quality of the included studies was assessed using the Mixed Methods Appraisal Tool. Qualitative studies were analyzed using a thematic synthesis. Quantitative studies were analyzed using a random-effects meta-analysis for the pooling of proportions.

Results: Forty studies were eligible for inclusion. Five themes that impact the political and social acceptability derived from the qualitative thematic synthesis: (i) beliefs about effectiveness and cost-effectiveness, (ii) beliefs about appropriateness, (iii) beliefs about accompanying consequences, (iv) beliefs about implementation, and (v) mistrust. Results of the quantitative synthesis indicated that 42% of the public (95%CI = 0.38-0.47) supports an SSBs tax, 39% (95%CI = 0.29-0.50) supports an SSBs tax as a strategy to reduce obesity, and 66% (95%CI = 0.60-0.72) supports an SSBs tax if revenue is used for health initiatives.

Conclusions: Beliefs about effectiveness and cost-effectiveness, appropriateness, accompanying consequences, implementation, and public mistrust of the industry, government and public health experts have important implications for the political and social acceptability of an SSBs tax. Four policy recommendations are developed based on these findings: (i) address inconsistencies between identified beliefs and scientific literature, (ii) use raised revenue for health initiatives, (iii) communicate transparently about the true purpose of the tax, and (iv) generate political priority for solutions to the challenges to implementation. These recommendations are useful to increase acceptability and enhance successful implementation of an SSBs tax, which ultimately could improve population health.
The effectiveness of food taxes and subsidies on consumer purchases: results from an experimental study

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How to impact energy dense food intakes? (Chair: Kathelijne Bessems), South Hall 2A, 12:05 PM - 1:20 PM

Policies and environments (SIG)

Purpose
Most evidence on health-related food taxes and subsidies relies on observational data and effects on single nutrients/foods instead of total diet. This study measured the impact of five different fiscal food policies on total supermarket food purchasing, including substitution effects, using a large randomized experiment.

Methods
Adult participants (n=1038) completed up to five weekly shops in a Virtual Supermarket, with a total sample of n=4258 shops. Each shopping occasion was randomly allocated to control (no change in prices), or one or more pricing policy options: fruit and vegetable (F&V) subsidy (20%), sweetened beverage (SB) tax (20% or 40%), saturated fat (SAFA) tax ($2/100g or $4/100g SAFA), salt tax (0.02/100mg or $0.04/100mg sodium), or sugar tax ($0.40/100g or $0.80/100g sugar). The primary outcome was the percentage of total unit healthy food purchases. Secondary outcomes were food and nutrient purchases.

Results/Findings
In the control condition, 68% of food purchases were classified as "healthy". Intervention price sets increased this significantly by (absolute) 1.8% (95%CI: 1.0 to 2.5) for a SAFA tax, 1.1% (0.3 to 1.9) for a sugar tax, and 1.3% (0.5 to 2.1) for a salt tax. The SB tax and F&V subsidy resulted in non-significant differences of 0.2% (-0.5 to 0.9) and 0.4% (-0.3 to 1.1), respectively. We observed some important substitution effects. Both the SAFA and salt tax resulted in an increase in F&V purchases as a percentage of all food purchases (SAFA tax 4.0% (0.9 to 7.1); salt tax 4.3% (0.0 to 7.7)); but also an increase in sugar as a percentage of total energy (SAFA tax 5.0% (2.1 to 7.9); salt tax 3.2% (0.0 to 6.4)).

Conclusions
The SAFA, sugar and salt taxes increased total healthy food purchases, where we also found that higher tax rates lead to higher effects. However, since important substitution effects were observed, a combination of different tax and subsidy policies might be the most effective way to improve diets and decrease diet-related chronic diseases.
Applications from tobacco control to nutrition and obesity: There are still lessons to be learned

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Policies and environments (SIG)

Objectives: Apply lessons learned and best practices from the decades of work in tobacco control and cessation to and behavioral nutrition and obesity prevention.

Methods: Semi-structured qualitative interviews were conducted with 80 public health experts in the U.S. in the area of tobacco control and cessation representing government, voluntary organizations, state/local/community organizations, universities, and others. Interviews were audio recorded and transcribed verbatim. Inductive coding using QSR NVivo yielded emergent themes.

Results: Key themes included: need for continued efforts in tobacco control among underserved populations; barriers and facilitators for policy advocacy; role of technical assistance; workforce gaps. These themes will be discussed within the context of how to apply best practices and lessons learned from tobacco control to obesity prevention. There have been numerous public health wins in tobacco control over the past few decades, however, prevalence of tobacco use remains high among specific underserved populations (e.g., racial-ethnic minorities, mental health, LGBTQ) indicating that the policy and environmental changes at the population level do not uniformly benefit all subpopulations. Facilitators and barriers can be viewed within the context of industry (i.e., tobacco, food) tactics, and the role of technical assistance from field experts is important. In order to achieve health equity, common understanding and definitions, authentic community engagement, and coordination is needed across partners.

As the tobacco control movement has progressed, many experts transitioned to work in obesity prevention. However, prevalence of tobacco use remains high in subsets of the population. Further, an aging field of tobacco control experts coupled with fewer trainees due to the perception that tobacco has been 'solved' creates a potential gap in workforce. Despite policy wins, the tobacco industry continues to push back at all levels of government. Thus, a highly organized and nimble team of policy advocates are needed to effectively 'hold the line' on public health gains.

Conclusions: As nutrition and physical activity policies targeting obesity are implemented across the world, there is a need to examine unintended consequences, and develop strategies to reach high risk populations. More unified approaches across nutrition, physical activity, and tobacco are needed to continue advancements in population health.
The industry perspectives on the potential impacts of the soft drinks industry levy (SDIL): a qualitative framework analysis and critique using a complex systems approach

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How to impact energy dense food intakes? (Chair: Kathelijne Bessems), South Hall 2A, 12:05 PM - 1:20 PM

Policies and environments (SIG)

Objective
Obesity is a key public health issue in the United Kingdom (UK) due to associated poor health outcomes. Plans were announced for a Soft Drinks Industry Levy (SDIL) in 2016 as part of a strategy to lower childhood obesity prevalence. Obesity is commonly described within a complex systems framework, and this approach is increasingly used to examine public health issues. The objective of this study was to analyse submissions to the SDIL public consultation to identify industry perspectives on its potential impacts from a complex systems perspective.

Methods
This qualitative, cross-sectional study used framework analysis with a complex systems lens to analyse submissions to the 2016 SDIL public consultation. Data were obtained by a Freedom of Information request to Her Majesty's Revenues and Customs for non-confidential submissions from industry organisations. Under the guidance of framework analysis a thematic framework was developed from the data and analysed for manifest content (directly observable references). Subsequently a framework matrix that incorporated a complex system perspective was analysed for latent content (implied references).

Results
Forty-two submissions were obtained (27 businesses, 11 trade associations, and 4 uncategorised). Key themes from the thematic framework analysis were identification of responsibilities, potential for policy abuse, and use of evidence. Framework matrix analysis found unintended consequences to be an overarching theme discussed in all characteristics of complex systems identified in the submissions. Other features included the relationships between agents, adaptation of businesses, redefining system boundaries, and feedback loops. The complexity of implementing the SDIL was recognised from a business perspective, yet contrastingly linear arguments were used to deny effectiveness.

Conclusions
Industry submissions to the SDIL consultation did not consistently acknowledge the complexity of potential effects of the levy. Documented industry tactics present in submissions identified the need for public health professionals to be aware of potential conflicts of interest and its active management. A complex systems approach, alongside robust evidence could pre-empt and mitigate push-back from industry.
A critical review of recent randomised controlled trials for the primary prevention of obesity in infancy

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Nutrition and physical activity research in infants (Chair: Paulina Nowicka), South Hall 2B, 12:05 PM - 1:20 PM

Objective: To critically review on-going randomised controlled trials (RCTs) starting in late pregnancy and early infancy designed for the prevention of obesity in infancy and childhood.

Methods: Two databases (World Health Organization International Clinical Trials Registry Platform, ClinicalTrials.gov) were searched every 3-5 months from August 2016 to October 2018 to identify planned and ongoing trials that met pre-specified criteria. To be included, trial design had to be an RCT with the primary aim of preventing childhood obesity and at least one outcome related to weight. The intervention needed to start in the first two years of childhood or prior, continue for at least 6 months postnatally, and include a component related to lifestyle (i.e. early feeding, parenting, physical activity, sleep). Trials needed to have a follow up time of at least 2 years and we excluded pilot studies and studies that were delivered solely online or via telephone without a face-to-face component.

Results: We identified 21 unique ongoing RCTs implemented since August 2012, with most being undertaken in high income countries (Australia, USA, the Netherlands and Sweden). Two trials have recently begun in low and middle income countries (Guatemala, China). Interventions range from advice on diet, interactive play, sleep, emotion regulation and parenting education through individual home visits, clinic based consultations or group education sessions. Motivational interviewing and cognitive behavioural therapy are techniques used as well as web-based personalised advice combined with face to face counselling. Four trials have published outcome data on weight related outcomes but only one has shown a significant difference in BMI. All four trials have shown significant improvements in practices such as breastfeeding, TV viewing time and physical activity in the intervention groups in comparison to the control groups.

Conclusions: So far there have been few effective interventions to prevent obesity in early life. Changes in weight related behaviours, however, seem to be easier to achieve and this holds potential for reducing obesity in later childhood. Further follow-up of ongoing trials is needed to assess longer-term effects.
Healthy Planet Healthy Youth: a sustainable food systems education and promotion intervention to improve adolescent diet quality and reduce food waste

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Objective: The purpose of this study is to examine the impact of a student-driven sustainable food systems education and promotion intervention on school lunch vegetable consumption and overall plate waste, as well as students' knowledge and attitudes towards the environment.

Methods: Sixth-grade science teachers at two middle schools (n= 268 students) implemented a standards-based curriculum on sustainable food systems, addressing the environmental impacts of food choices and food waste. The culminating curriculum activity required 6th grade students to share their food systems knowledge with 7th and 8th grade peers (n= 426) through a cafeteria promotional campaign discouraging food waste. School-wide, monthly plate waste (n= 694) assessments evaluated changes in vegetable consumption and overall plate waste using a previously validated digital photography method. Pre and post surveys, previously tested for reliability and validity, assessed changes in 6th grade student knowledge and attitudes towards the environment. A qualitative content analysis of the final student projects used a two-pass deductive content analysis method to identify key food system themes that most resonated with students. Key-respondent interviews (n=3) with the science teachers were used for process evaluation and feedback.

Results: On average, 62.7% of 6-8th grade students participated in the monthly plate waste assessments. Hot vegetables were wasted at a lower rate compared to self-serve fruit and vegetable items from the salad bar. About one-third of sixth grade students (n=89) had parent consent and completed both the pre and post survey assessments. While overall relatedness did not change, Hispanic students had significant increases in relatedness (p<0.01), suggesting that Hispanic students felt more connected to their peers regarding environmental issues after participating in the curriculum. The content analysis of student projects suggests that packaging waste reduction strategies and landfill diversion techniques for food and packaging waste are important to students. Science teachers reported high overall satisfaction with the curriculum and that students were engaged in the curriculum content.

Conclusions: Sustainable food systems education and promotional activities were well-received by middle school students and teachers. Engaging students in promotional activities allows materials to reflect current youth culture and students' specific needs and interests.
Choosing Healthy Eating for Infant Health (CHErIsH): the development of an evidence-based intervention to promote the implementation of guideline-based infant feeding behaviours within Irish primary care

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Children and families (SIG)

Infant feeding behaviours including the introduction of solid foods play a crucial role in the development of childhood obesity. World Health Organisation guidelines recommend introducing solid foods from six months; however, 47% of Irish infants are introduced to solid foods by 5 months. Evidence is lacking regarding how best to facilitate implementation of infant feeding guidelines within an Irish healthcare context for parents and healthcare professionals (HCPs). This study aimed to develop a theory-based intervention targeting both parents and HCPs to improve guideline-based infant feeding behaviours within Irish primary care.

Methods

The Behaviour Change Wheel (BCW) informed intervention development. The BCW outlines three phases: Understanding the behaviour, Identifying intervention options and Identifying content and implementation options. We addressed each phase using an iterative process involving evidence syntheses, qualitative research and stakeholder consultation with parents, primary care practitioners and policymakers from the HSE National Healthy Childhood Programme (NHCP) team.

Results

A brief parent-level intervention was developed consisting of the delivery of guideline-based infant feeding verbal messages and supporting materials by HCPs to coincide with routine vaccination visits. A HCP-level implementation intervention was developed consisting of incentivised training and support, supporting materials, electronic delivery prompts and organisational awareness. Messages, materials and HCP training were developed to maximise use of existing NHCP resources.

Conclusion

This study showcases a systematic, theory-based and stakeholder-driven approach towards intervention development for implementing research into practice. Future research aims to evaluate the feasibility of this intervention for all stakeholders and its effects on clinical and implementation outcomes.
INSIGHT Responsive Parenting Intervention for Firstborns Impacts BMI for First and Secondborns

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Nutrition and physical activity research in infants (Chair: Paulina Nowicka), South Hall 2B, 12:05 PM - 1:20 PM

Children and families (SIG)

Purpose: INSIGHT is a randomized clinical trial comparing a responsive parenting (RP) intervention designed to prevent childhood obesity in firstborns (FBs). We aim to test the study group effect on infant body mass index (BMI; kg/m²) of consecutively born siblings from families participating in the INSIGHT trial and the observation-only study of secondborn (SB) siblings, SIBSIGHT.

Methods: Participants included 117 FB and SB infant dyads. FBs randomized to the RP curriculum received guidance on feeding, sleep, interactive play, and emotion regulation. Weight and length were measured in siblings at 3, 16, 28 and 52 weeks to calculate BMI. A three-level quadratic growth model with a random intercept for family was used to evaluate the effect of study group and birth order on BMI. Age and the quadratic age term were included as fixed effects at level 1 (time), birth order was included at level 2 (individual), and study group, maternal age and pre-pregnancy BMI were included at level 3 (family). We also examined if the effect of study group was stronger within the FB than the SB infants, and if rate of BMI change between siblings was correlated.

Results: SBs were born 2.5±0.9 years after FBs. On average, at age 1 year FB and SB infants with parents who received the RP intervention had BMIs that were 0.38 units less than control group infants (SE=0.17, p=.03), and SBs had a 0.43 unit (SE=0.12, p=.0003) greater BMI compared with FBs. The effect of the RP intervention on BMI at one year did not depend on birth order; the interaction between study group and birth order was not significant. When FB and SB cohorts were fit separately, the random linear slopes for BMI change were correlated at r=0.4 and we observed similar magnitudes for the study group effect on BMI at one year by birth order (g=−0.45, SE=0.21 within the FBs and g=−.33, SE=0.20 within the SBs).

Conclusion: The INSIGHT RP intervention was associated with lower BMIs for both FB and SB siblings through the first year. These findings suggest that teaching parents responsive feeding may have continued benefit for subsequent children.
Feasibility, acceptability and potential efficacy of a group-based intervention to promote tummy time among infants (birth to 6 months). A pilot randomized controlled trial.

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Nutrition and physical activity research in infants (Chair: Paulina Nowicka), South Hall 2B, 12:05 PM - 1:20 PM

Purpose: To assess feasibility, acceptability and potential efficacy of group-based intervention to promote tummy time among infants.

Methods: This study was a group randomized controlled trial with follow-up measures scheduled pre- and post-intervention. Mother-infant dyads were recruited from their local early childhood health service in the Illawarra region of NSW, Australia. The control group received usual care, which was to attend mother's group sessions (once per week for 4 weeks) with their child and family health nurse. The intervention group received usual care with the addition of group tummy time classes (30 minutes). Mothers were asked to complete a questionnaire regarding relevance, usefulness and infant outcomes. Mothers were also asked to place a GENEActiv accelerometer on the infant's right hip for 3, 24-hour periods. This measured the amount of tummy time the infant received. Mothers were blinded to the reason for the GENEActiv, being told it measured the infant's physical activity. A blinded outcome assessor measured the infant's motor development using the Alberta Infant Motor Scale, and head shape with cranial calipers to determine cranial vault asymmetry index and cranial diagonal difference.

Statistical analyses were by intention-to-treat and linear mixed models.

Results: 35 healthy infants and their mothers were recruited (n=19 control; n=16 intervention). 43.8% and 55% of infants in the intervention group met tummy time recommendations of 30 minutes per day (pre and post) compared with 62.5% and 33% in the control group. In addition, compared with the control group, infants in the intervention group had a significantly lower mean cranial diagonal difference (p=0.03) and higher sitting ability score (p=0.02). The majority of mothers (96.5%) found the intervention extremely or very relevant and useful. Use of the GENEActiv to measure tummy time was somewhat feasible with 70%, 57% and 26% of infants wearing the device for at least 1, 2 or 3, 24-hour time periods for both pre- and post-group measures respectively.

Conclusion: Group tummy time classes were relevant and useful to mothers to provide tummy time for their infants. Potential efficacy was positive with improved head shape and sitting ability for infants in the intervention group.
Adherence to new Canadian 24-Hour Movement Guidelines among infants

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Objective: Examine cross-sectional and longitudinal adherence to the Canadian 24-Hour Movement Guidelines in a population-based sample of infants.

Methods: Parents and their 2-month old infants were recruited from five large immunization clinics in Edmonton, Canada as part of the ongoing Early Movers longitudinal study. As of November 2018, data were available for 186, 134, and 87 infants at age 2, 4, and 6 months, respectively. Physical activity (tummy time), screen time (watching/looking at the television or cellphone/tablet), sleep duration (night and day), and demographic information were parental-reported at 2, 4, and 6 months of age. Meeting the guidelines was defined as: 1) ≥30 minutes/day of tummy time, 2) no screen time, and 3) 14-17 hours (2 months) or 12-16 hours (4 and 6 months) of sleep per 24-hour period. Descriptive statistics and generalized estimating equations (GEE) adjusted for demographic characteristics were conducted.

Results: At 2 months, 17.2 % met all recommendations (tummy time: 55.9%; screen time: 67.2%; sleep duration: 41.4%). At 4 months, 11.3% met all recommendations (tummy time: 76.1%; screen time: 23.1%; sleep duration: 70.7%). At 6 months, 2.3% met all recommendations (tummy time: 92%; screen time: 4.6%; sleep duration: 82.8%). For every 2 month increase in age, infants were significantly more likely to meet the tummy time (OR=3.01, 95%CI: 2.10-4.31) and sleep duration (OR=3.11, 95%CI: 2.24-4.33) recommendations and significantly less likely to meet the screen time recommendation (OR=0.12, 95%CI: 0.08-0.19) and all recommendations (OR=0.45, 95%CI: 0.28-0.70). No participants met all of the recommendations at all time points but some participants met individual recommendations at all time points (tummy time: 46.4%; screen time: 4.8%; sleep: 32.1%). Infants that met a recommendation at 2 months, compared to those that did not, were significantly more likely to meet that recommendation at subsequent time-points (tummy time: OR=5.33, 95%CI: 2.14-13.3; screen time: OR=12.8, 95%CI: 3.07-53.5; sleep duration: OR=2.78, 95%CI: 1.29-6.00).

Conclusions: Few infants met the 24-Hour Movement Guidelines, and notably screen time adherence decreased over time. Since meeting recommendations tracked across infancy, parents and caregivers should be targeted as early as possible with guideline dissemination and activation efforts to promote healthy infant development.
Novel concept of school physical activity recommendation: Support for health behavior in secondary schools

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School- and family-based interventions promoting physical activity & sedentary behavior in children (Chair: Teatske Altenburg), North Hall, 12:05 PM - 1:30 PM

Children and families (SIG)

Purpose: The aim of the study is to establish the existing and complement the newly proposed SPA recommendation in the general PA recommendation for children and youth in Central European region and globally.

Methods: The research results involved 3860 boys and 5237 girls from 98 schools in the Czech Republic and 3052 boys and 3329 girls from 104 schools in Poland aged 15-19 in the years 2009-2017 at secondary schools. International Physical Activity Questionnaire, long form and ActiTrainer accelerometers were used to indicate the subjective and objective levels of PA.

Results: Research results showed that boys averaged in school 2,846 ± smn; 1,853 steps (474 ± smn; 296 steps/hour) and girls 2,633 ± smn; 1,671 steps (433 ± smn; 246 steps/hour). Our recommendation is to take at least 500 steps/hour (or at least 3000 steps/school time). Average school MVPA time (= 3 METs) in boys was 15.2 ± smn; 14.0 min and they spent 17.8 ± smn; 28.7 min in = 60% HRmax. Girls spent 12.0 ± smn; 11.4 min in MVPA (= 3 METs) and 19.3 ± smn; 28.9 min in = 60% HRmax. We recommend reaching 20 min of MVPA (= 3METs or 60% HRmax) in school time and at least once a day HRsubmax/max during PA. SPA should represent at least 25% of school time. Recommendations are as follows:

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Conclusions: School physical activity (SPA) is an essential part of daily physical activity (PA), the basis of the development of lifelong PA, fitness and the guarantee of the acquisition of physical and health literacy. Adopting SPA recommendations can refine the requirements for changes in PA and lifestyle at secondary schools. The proposed SPA recommendations should be used for positive changes in the educational process and in the school lifestyle.
Better together: Investigating the holistic benefits of father-daughter co-physical activity with mediation analyses

Morgan P, MD Young, DR Lubans, N Eather, ER Pollock, AT Barnes

School-and family-based interventions promoting physical activity & sedentary behavior in children (Chair: Teatske Altenburg), North Hall, June 6, 2019, 12:05 PM - 1:30 PM

Objective: Although fathers may influence their daughters' physical activity, they often: (i) are less involved with their daughters than mothers and (ii) discount their role in fostering their daughters PA. The current study examined data from the 'Dads And Daughters Exercising and Empowered' (DADEE) randomized controlled trial (RCT) to determine whether improvements in father-daughter co-physical activity significantly mediated the intervention's positive effects on girls' physical activity, social-emotional wellbeing, fundamental movement skill (FMS) competence and father-daughter relationship quality.

Methods: In a two-arm RCT, 115 fathers (mean[SD] age: 41.0[4.6] years) and their primary school-aged daughters (n=153, mean[SD] age: 7.7[1.8] years) were randomized to: (i) the DADEE intervention, or (ii) a wait-list control group. The 8-week program included weekly educational and practical sessions plus home tasks. Practical sessions involved FMS, rough-and-tumble play and fitness. Physical activity was measured objectively with one week of pedometry (Yamax SW200). Validated scales assessed co-physical activity (days/week), girl's social-emotional well-being (72 items; father-proxy), and father-daughter relationship quality (14 items), which was collected from both perspectives. Girls' FMS competence was assessed using the Test of Gross Motor Development. Intention-to-treat mediation analyses investigated the indirect effect of co-physical activity at 2 months (post-test; 88% retention) on various outcomes at 9 months (7-mo follow-up, 90% retention).

Results: At post-test, significant intervention effects were detected for physical activity in daughters (p=.02, d=0.4) and fathers (p=.001, d=0.7) and all other outcomes, including co-physical activity (+1.1 days/week; 95% CI 0.7,1.6). In addition, significant mediation effects were detected for co-physical activity on daughters' physical activity (AB=+454 steps/day, 95% CI 16,1296), daughters' social-emotional well-being (AB=+11.7 units; 95% CI 3.7,22.0) and the quality of the father-daughter relationship from both fathers' (AB=+0.12 units; 95% CI 0.04,0.25) and daughters' (AB=+0.12 units, 95% CI 0.04,0.23) perspectives. Improvements in co-physical activity did not significantly mediate the improvements detected for FMS competence.

Conclusions: Co-physical activity was key to improving girls' physical activity. Importantly, this study also provided the first experimental evidence that father-daughter co-physical activity may improve girls' social-emotional wellbeing and father-daughter relationship quality. These outcomes may serve as important motivators to increase the engagement of fathers and optimise physical activity interventions.
Project Spraoi: A strategy to improve nutrition and physical activity in primary schoolchildren

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School-and family-based interventions promoting physical activity & sedentary behavior in children (Chair: Teatske Altenburg), North Hall, June 6, 2019, 3:50 PM - 4:25 PM

Objective: Ireland is predicted to become the fattest of 53 nations by 2030 (1), with associated annual healthcare costs and productivity losses in Ireland estimated at €437 million and €865 million, respectively. Given that Irish children do not meet daily recommended levels of physical activity (PA), have poor cardiorespiratory fitness (CRF) and consume insufficient amounts of fruit and vegetables, interventions that address these poor lifestyle habits are warranted. ‘Project Spraoi’ (pronounced ‘Spree’) was introduced to address this issue in Ireland through the delivery and evaluation of a whole school health promotion intervention that targeted primary schools in Cork. The intervention drew on, and collaborated with, international best practice from ‘Project Energize’, New Zealand.

Methods: Seven schools in Cork city and county participated and major programme components included the provision of an 'Energizer' into schools to structure PA (including fundamental movement skills (FMS)) programmes that were aligned with the curriculum and to seek opportunities to enhance nutritional intake. Evaluation measures were collected amongst 5/6 year old and 10/11 year olds before (2014/15) and after (2015/16) programme completion (24 months). Measures included physical activity and sedentariness (via accelerometry), cardiorespiratory fitness (550metre run), FMS (TGMD-2) blood pressure, height and weight (body mass index), abdominal circumference and nutritional behaviour (knowledge and attitudes survey). For comparative purposes, scores will also be compared to a control group (n=121) who did not participate in the intervention.

Results: Data is currently being analysed.

Conclusion: Preliminary findings indicate that Project Spraoi, a multi-component intervention, is successful at promoting PA (including FMS), CRF, nutritional knowledge and healthier body mass among Irish primary school children.
Mixed-methods evaluation of a family-based physical activity promotion intervention: The Families Reporting Every Step to Health (FRESH) pilot randomised controlled trial

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School-and family-based interventions promoting physical activity & sedentary behavior in children
(Chair: Teatske Altenburg), North Hall, 12:05 PM - 1:30 PM

PURPOSE: Family physical activity (PA) promotion holds promise, but there is little high quality research evaluating its impact. Following successful feasibility assessment and adaption, this pilot study assessed the acceptability of FRESH, a child-led family-based PA intervention delivered online.

METHODS: In a three-armed randomised controlled pilot study, 153 participants from 41 families (with a 7-11-year-old index child) were allocated to a standard care control (CON), 'pedometer' (PED), or 'family' arm (FAM) of the Self-Determination Theory-guided FRESH intervention. All family members in PED and FAM received pedometers and generic walking information; FAM additionally received access to the FRESH website, enabling participants to select step challenges, log steps, and track progress as they virtually globetrot. A mixed-methods process evaluation at 8-week follow-up included questionnaires assessing acceptability of the intervention and accompanying effectiveness evaluation assessing physical (e.g., fitness), psychosocial (e.g., social support), and behavioural (e.g., objectively-measured family PA) measures. Process evaluation questions were dichotomous yes/no responses for children and adults responded on a 1-4 point agreement scale. Also, semi-structured focus groups were conducted and website engagement was explored.

RESULTS/FINDINGS: Of the 41 families approached for follow-up to date, 40 were retained (146 participants; mean±smn;SD family size= ~4.0±smn;1.0 people/family). Compared to CON and PED, a greater percentage of FAM children self-reported doing more family PA (CON: 35%, PED: 45%, FAM: 83%) and found FRESH fun (CON: 93%, PED: 81%, FAM: 94%). Higher mean (±smn;SD) scores were reported by parents in FAM for improved PA awareness (3.6±smn;0.6 vs. 3.2±smn;0.7) and increased family PA (3.0±smn;0.8 vs. 2.5±smn;0.8) compared to PED. Approximately 82% of FAM children wanted to keep using the FRESH website and 93% found it easy to use. Focus groups revealed FAM families enjoyed choosing weekly step challenges and were capable of identifying ways of meeting daily steps goals. Overall, 88% of children enjoyed being measured and adults disagreed that data collection took too long (1.7±smn;0.8) or too many measures were employed (1.5±smn;0.7).

CONCLUSIONS: Preliminary process evaluation findings related to the FRESH intervention and evaluation were promising, particularly amongst FAM participants. Full findings of the process evaluation and preliminary effectiveness of FRESH will be presented.
Secondary school flexible learning spaces reduce sedentary time and facilitate lesson engagement in adolescents

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School-and family-based interventions promoting physical activity & sedentary behavior in children
(Chair: Teatske Altenburg), North Hall, 12:05 PM - 1:30 PM

Objective: Many schools internationally are replacing traditional classrooms with innovative flexible learning spaces to improve academic outcomes. The purpose of this study was to determine whether, via a stealth approach, there may be unintended health benefits, in addition to educational benefits, if students reduced their total and prolonged sitting during a typical lesson.

Methods: A school-based cross-over trial was conducted at nine secondary schools. Students (n=191, M age=13.2±smn;1.0y) wore activPAL accelerometers in both a traditionally furnished and arranged classroom and a flexible learning space containing a variety of furniture and layout options and utilizing student-centred pedagogies, for the duration of one double classroom lesson (M=76min). Momentary time sampling observations were conducted (n=60, M age=13.2±smn;1.0y) in both conditions to categorise in-class academic and social behaviour. The lesson content and teacher were consistent across both conditions. Data were analysed using multilevel mixed-effects linear regression.

Results: In flexible learning spaces, students spent less class time sitting (mean = 18%; 95% CI: -20.8, -15.0), and accumulated more breaks in sitting (2.1; 95% CI: 0.8, 3.5 per 60min), more bouts of intermittent (=9min) sitting (2.2; 95% CI: 0.8, 3.6 per 60min), and fewer bouts of prolonged (=30min) sitting (-0.2; 95% CI: -0.3, -0.1 per 60min), than in traditional classrooms. Students also spent more class time standing (15%; 95% CI: 12.7, 18.0) and stepping (3%; 95% CI: 2.0, 3.1) in flexible learning spaces than traditional classrooms. Students in flexible learning spaces also spent a significantly greater proportion of the lesson working in small groups, collaborating, actively engaging and interacting with peers than in traditional classrooms.

Conclusion: By stealth, the varied, adaptable nature of flexible learning spaces including a range of furniture and resources and greater use of student-centred pedagogies, facilitated improvements in adolescents' sedentary profiles during class time as well as enhanced interaction, collaboration and engagement. This effectively results in a "win-win" situation where schools obtain the educational benefits they are pursuing, and as an unintended consequence, there may potentially be beneficial health impacts if the modifications are sustained over years of schooling, given the benefits of reducing total and breaking up prolonged sitting.
16910

O41, O41.6

Parental support in promoting children’s health behaviours and preventing overweight and obesity – a long-term follow-up of the cluster-randomised Healthy School Start Study II trial

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School- and family-based interventions promoting physical activity & sedentary behavior in children
(Chair: Teatske Altenburg), North Hall, 12:05 PM - 1:30 PM

Children and families (SIG)

Background: Effects of obesity prevention interventions in early childhood are only meaningful if they are sustained over time, but long-term follow-up studies are rare. The school-based cluster-randomised Healthy School Start (HSS) trial aimed at child health promotion and obesity prevention through parental support was carried out in 31 pre-school classes (378 families) in disadvantaged areas in Sweden during 2012, 2013. Post-intervention results showed intervention effects on intake of unhealthy foods and drinks, and lower BMI-sds in children with obesity at baseline. This study aimed to evaluate the long-term effectiveness four years post-intervention.

Methods: Data were collected from 215 children in March-June 2017. Child dietary intake, screen time, and physical activity were measured through parental-proxy questionnaires. Child height and weight were measured by the research group. Group effects were examined using Poisson, linear, logistic, and quantile regression for data on different levels. Analyses were done by intention to treat, per protocol, and sensitivity analyses using multiple imputation.

Results: No between-group effects on dietary intake, screen time, physical activity, or BMI-sds were found for the entire group at the four-year follow-up. In girls, a significant subgroup-effect was found favouring intervention compared to controls with a lower intake of unhealthy foods, but this was not sustained in the sensitivity analysis. In boys, a significant sub-group effect was found where the boys in the intervention group beyond the 95th percentile had significantly higher BMI-sds compared to boys in the control group. This effect was sustained in the sensitivity analysis. Analyses per protocol showed significant intervention effects regarding a lower intake of unhealthy foods and drinks in the children with a high intervention dose compared to controls.

Conclusions: Four years after the intervention, only sub-group effects were found, and it is unlikely that the HSS intervention had clinically meaningful effects on the children. These results suggest that school-based prevention programmes need to be extended for greater long-term effectiveness by e.g. integration into school routine practice. In addition, results showed that children with a high intervention dose had better long-term outcomes compared to controls, which emphasises the need for further work to increase family engagement in interventions.
Psychosocial and behavioral outcomes of Intervention INC: An interactive web-based comic tool to decrease obesity risk in low-income minority preadolescents

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Digital and online tools for nutrition assessment and promotion (Chair: Camille E Short), Terrace 2A, 12:05 PM - 1:20 PM

E- & mHealth (SIG)

Purpose: Childhood obesity is a serious global public health issue. In the US, the greatest risk is among low-income, minority populations. Web-based/mHealth interventions may be an engaging approach to promote positive dietary behaviors in at-risk children. Our innovative intervention (Intervention INC) was a web-based tool, comprising a 6-chapter interactive nutrition comic (with tailored messaging, related trivia questions, and a goal-setting component), with the goal of reducing childhood obesity risk in Black/African-American (AA) and Latino preadolescents. We aimed to explore potential impact of our tool on child dietary-related psychosocial variables and behaviors.

Methods: 89 Black/AA and Latino children (mean age=10.4±smn;1.0 years, 61% female, 62% Black, 42% Latino, 51% overweight or obese, and 33% annual household income <$20,000) from New York City participated in a pilot two-group randomized study, comprising a 6-week intervention. Participants were randomly assigned to either the experimental (E) (n=45) group, who received the web-based tool, or the comparison (C) (n=44) group, who received online nutrition newsletters. Surveys measuring knowledge, outcome expectations (OE), self-efficacy (SE), behavioral intention (BI), attitudes, and behaviors related to fruit, vegetable, water, sugar and junk food intake were completed at baseline (T1), intervention mid-point (T2), and intervention end (T3). Data were analyzed using mixed models with repeated assessments (T1-T3), condition (E-C), and time by condition interaction.

Results/Findings: While the interactions were not statistically significant, the E group showed greater improvements from T1 to T3 (p<.05) in SE for fruit (d=.36 vs. d=.16), vegetable (d=.55 vs. d=.05) and water (d=.36 vs. d=.15), OE for water (d=.32 vs. d=.17), and attitudes towards vegetable (d=.31 vs. d=-.07) and junk food (d=.35 vs. d=.01). Both E and C groups showed significant improvements in knowledge (d=.98 vs. d=.94). In addition, the E group demonstrated greater improvements from T1-T3 (p<0.05) in vegetable (d=.54 vs. d=-.15), water (d=.55 vs. d=.05), and sugar (d=-.37 vs. d=.07) intake.

Conclusions: Study results appear promising. An interactive nutrition comic may be a useful and engaging format to promote healthy dietary behaviors in children at risk for childhood obesity. However, further research is warranted to determine efficacy of this innovative web-based health promotion tool.
A cluster randomised controlled trial of a consumer behaviour intervention to improve the nutritional quality of food purchases from online canteens

**Objective**: School canteens represent an ideal setting in which to deliver public health nutrition strategies given their wide reach, and frequent use by children. Online canteens, where students select and pay for their lunch online, provide an opportunity to improve the purchase of healthier foods through the application of strategies that impact on purchasing decisions. The aim of this study was to assess the impact of an intervention implemented in an online canteen on improving the 'nutrition quality' of student online lunch purchases, including the i) mean percent of energy from saturated fat and sugar and; ii) mean proportion of items purchased that were 'healthy' and 'less healthy'.

**Methods**: Ten NSW primary schools (2,714 students) currently using an online canteen were recruited to a cluster RCT conducted over a 2-month period. Intervention schools received a consumer behaviour intervention integrated into their online menu (targeting menu labelling, healthy food availability, item placement and prompting). Control schools received no change to their online menu. Data were assessed using separate linear mixed models under an intention to treat framework with multiple imputation.

**Results**: Students online lunch orders in the intervention group contained a significantly lower percent of energy from saturated fat (-1.77%; P<0.001) but significantly higher percent of energy from sugar (19.82%; P<0.001). Student purchases in the intervention group contained a significantly higher proportion of items that were 'healthy' (21.47%; P<0.001) and significantly lower proportion of items that were 'less healthy' (-7.52%; P<0.001) at follow up.

**Conclusions**: The study provides evidence supporting the efficacy of a consumer behaviour intervention utilising online canteen infrastructure to improve the nutritional quality of student purchases from primary school canteens and may represent an appealing policy option as part of a broader government strategy to improve child public health nutrition.
Targeting young adult university students through a brief online nutrition intervention: Results of the EATS pilot RCT

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Digital and online tools for nutrition assessment and promotion (Chair: Camille E Short), Terrace 2A, 12:05 PM - 1:20 PM

E- & mHealth (SIG)

Purpose: Young adults have a high prevalence of unhealthy eating behaviours and high risk of weight gain, and are therefore a priority population for nutrition intervention. University-based interventions may overcome the challenges of reaching young adults, while a brief intervention may overcome the challenges of engagement. This study aimed to assess the feasibility and preliminary efficacy of the EATS (Eating Advice To Students) brief online nutrition intervention for young adult university students.

Methods: A 3-month pilot RCT with 124 students aged 17-35 years from the University of Newcastle, Australia, was conducted in February-July 2018. Participants were randomised to EATS (n=62) or attention control (n=62). EATS aimed to improve four target eating behaviours (consumption of vegetables, fruit, discretionary foods, breakfast), and incorporated 26 behaviour change techniques. EATS was delivered using a website with four components 1) brief screening quiz providing personalised feedback on eating behaviours and barriers to healthy eating, 2) provision of information, tips and strategies for target behaviours, and two guided exercises to facilitate behaviour change; 3) goal-setting and 4) creating strategies. Primary outcomes were feasibility (recruitment and retention, usage, program acceptability), and secondary outcomes were preliminary efficacy (dietary intake, alcohol intake, well-being, quality of life, self-efficacy). Numbers recruited and retained were recorded, program acceptability was assessed via a process evaluation survey and usage was objectively tracked in real-time. Linear mixed models were used to estimate the treatment effect.

Results: Recruitment targets were reached within 5 weeks. Retention rates were 73% (90/124) at 3-months. Intervention participants used EATS 1.5±smn:1.0 times. The quiz had the highest usage (90%). Process evaluation was completed by 84% (58/62), with overall satisfaction with EATS rated at 4.04±smn:0.74 (maximum 5), while scores for intervention components on usefulness, relevance and motivation to change behaviour ranged from 3.2-4.4. A significant difference in favour of the intervention group was observed for percentage energy/day from discretionary foods (-4.8%, 95%CI -8.6, -1.1, p=0.012, d=-0.34).

Conclusion: The EATS intervention demonstrated high feasibility, particularly for reach and acceptability, demonstrating that the university setting and a brief intervention show promise in terms of reaching and engaging young adults to improve their eating behaviours.
17360

O42, O42.4

Nutrition pregnancy apps are of low quality and do not contain adequate techniques for behaviour change

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Digital and online tools for nutrition assessment and promotion (Chair: Camille E Short), Terrace 2A,
12:05 PM - 1:20 PM

E- & mHealth (SIG)

Objective: Smartphone apps have emerged as a mode to provide information to women during pregnancy, with more apps available for this condition than for any other medical topic. Despite their popularity, no reviews have been conducted on the quality of pregnancy apps. Therefore, the aim of this review was to assess the quality of Android pregnancy apps, their inclusion of behaviour change techniques and pregnancy-specific nutrition information.

Methods: A keyword search was conducted in the Google Play store followed by screening of app title, app store description, and the downloaded app to determine eligibility. To be included, the apps needed to be free, in English, aimed at pregnant women and contain nutrition information. App quality was assessed using the Mobile Application Rating Scale (MARS), absence or presence of behaviour change techniques (BCTs) was assessed using the CALO-RE taxonomy and presence of nutrition guidelines was also reported.

Results: Eighty android apps met the inclusion criteria and were included in the analysis. The mean overall MARS quality score was 3.51 out of 5 (SD: 0.56) (‘1’ = inadequate and ‘5’ = excellent). The functionality sub-scale scored the highest (mean= 4.05) and information scored the lowest (mean= 3.22), followed by engagement (mean= 3.27) and aesthetics (mean 3.49). Twelve BCTs out of a possible 40 were present across the apps, with a median of one BCT per app (range: 0-9). The most common BCTs used were 'providing information on consequences of behaviour in general' (n=36, 45% of apps) and 'goal setting' (behaviour) (n=17, 21%). The median number of pregnancy-specific nutrition topics per app was five (range: 0-8). The most common nutrition guidelines were related to caffeine consumption (n=56, 70% of apps) and fish consumption (n=54, 67.5%), although the quality and quantity of nutrition information varied greatly between apps.

Conclusions: Although there are a large number of pregnancy apps available, few are of high quality and most contain only a small number of BCTs and/or pregnancy-focused nutrition guidelines. It is important to be aware of the limitations of these apps in providing high quality dietary advice during this key life stage.
The feasibility of using a voice assistance tool (Amazon’s Alexa) for dietary self-monitoring

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Digital and online tools for nutrition assessment and promotion (Chair: Camille E Short), Terrace 2A, 12:05 PM - 1:20 PM

Objective: Advancements in digital technologies have the potential to improve rates of dietary self-monitoring. Becoming increasingly popular are voice-assisted digital tools such as Amazon’s Echo (Alexa). The objective of the current study was to test the feasibility of using Alexa to self-monitor diet.

Methods: Using a mixed-methods prospective cohort design, we conducted a feasibility study testing perceptions of using a voice-assisted device to self-monitor diet and engagement with voice self-monitoring within a brief dietary change intervention. Participants were given an Amazon Echo Dot device to self-monitor diet daily. After 2 weeks, we conducted individual qualitative interviews eliciting barriers and facilitators of using Alexa to self-monitor diet. Two separate analysts examined interview data for themes. Using survey questions with a 1-10 scale, we assessed perceptions about Alexa's accuracy and self-efficacy to self-monitor diet daily using Alexa. Participants then received an 8-week dietary intervention to determine engagement over time, operationalized as the average proportion of days tracked over expected.

Results: Participants (N=24) had a mean age of 33.8y and were primarily women (57%), White (71%), and college-educated (83%). 58% reported no experience with an in-home voice assistant device and 0% reported using it for health purposes. After 2 weeks, 75% reported a rating =7/10 about Alexa's accuracy and 92% rated >7/10 describing self-efficacy to self-monitor diet using Alexa. Major themes that emerged from the interviews: voice tracking is easier and less time consuming than diet tracking apps, but there are concerns about Alexa understanding certain foods and portion sizes, with limited ability to edit entries. Participants tracked on average 77% of days in the first 2 weeks and 67% of days over the 8-week intervention.

Conclusions: Results from this mixed-methods exploratory study demonstrate that voice-assistance tools are a feasible way to self-monitor diet. Engagement with diet tracking was high over 8 weeks and many perceived the voice-assistance tools to be easier to use than other digital diet tracking apps. However, efforts are needed to improve the accuracy of voice entries. More research is needed to determine the long-term sustainability of voice assistance tracking and its comparative effectiveness to other dietary self-monitoring technologies.
O42, O42.6

Boosting vegetable consumption by meal colour variety in a just-in-time Ecological Momentary Intervention

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Digital and online tools for nutrition assessment and promotion (Chair: Camille E Short), Terrace 2A, 12:05 PM - 1:20 PM

E- & mHealth (SIG)

Objective: Dietary guidelines typically specify rather complex goals and indicators for healthy food choices, such as nutrient and energy content patterns. However, translating these complex goals into practice in real life is often a major obstacle for many people. The present study proposes an intervention strategy for boosting healthy food choices by prompting consumers in a meaningful moment with a simple visual behavioural trigger, that is to eat a colourful lunch, and tests its feasibility in a smartphone-based intervention.

Methods: For a period of three weeks, 80 participants recorded a total of 1,210 lunch meals via mobile visual food recording, indicated the perceived meal colour variety and added a short meal description using a smartphone. In the second week, participants additionally received a daily smartphone prompt to eat a colourful meal that was tailored to their individual lunch times. All visual food records and descriptions were coded by a trained expert according to seven main foods groups (fruit, vegetables, grains and starches, protein sources, dairy, fried foods, sugary extras). After the study, participants were asked to evaluate the prompt. Data was analysed using multilevel modelling.

Results: Increased perceived meal colour variety was generally related to increased vegetable intake (b = 0.003, t(72.79) = 7.728, p < .001, quasi-R²2; = .11) and decreased sugary extras, fruit, and grains and starches intakes (bs = -.001, ts(dfs = 65.54) = -2.05, ps = .044, quasi-R²2; = .01). During the intervention, more vegetables and less dairy were consumed compared to baseline (bs = |0.04|, ts(dfs = 766.80) = |2.20|, ps = .028, quasi-R²2; = .02). Moreover, participants evaluated the prompt to eat colourfully as enjoyable and easy to follow.

Conclusions: Prompting consumers "just in time" to eat colourful meals is a simple yet effective and feasible intervention strategy for boosting healthy food choices in daily life.
Identifying opportunities to develop the science of implementation for community-based non-communicable disease prevention: a review of implementation trials.

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Implementation of physical activity & sedentary behavior interventions in adults (Chair: Femke van Nassau), Terrace 2B, 12:05 PM - 1:20 PM

Implementation and scalability (SIG)

Objective:
Implementation of interventions in community organisations such as schools, childcare centres, and sporting clubs are recommended to target a range of modifiable risks of non-communicable diseases. Poor implementation, however, is common and has contributed to the failure of non-communicable disease interventions globally. The aim of this study was to characterise experimental research regarding strategies to improve implementation of chronic disease prevention programs in community settings.

Methods:
The review used data collected in three comprehensive systematic reviews undertaken between August 2015 and July 2017. Randomised controlled trials (RCTs), including those with a cluster design, and non-randomised trials with a parallel control group were included. The data were extracted to describe trial characteristics, implementation strategies employed, implementation outcomes and study quality.

Results:
Of the 40 implementation trials included in the study, unhealthy diet was the most common risk factor targeted (n=20). Most trials were conducted in schools (n=27, 68%), used randomized/cluster RCT designs (n=29, 73%) and conducted follow-up more than twelve months post baseline (n=23, 57%). The most commonly reported implementation strategies were educational meetings (n=38, 95%), educational materials (n=36, 90%) and educational outreach visits (n=29, 73%). Few trials were conducted at-scale (> 50 community organisations) (n=8, 20%) or reported adverse effects (n=5, 13%). Further, the reporting of other implementation related outcomes including intervention adoption (n=13, 33%), appropriateness (n=11, 28%), acceptability (n=8, 20%), feasibility (n=8, 20%), cost (3, 8%) and sustainability (n=2, 5%) was limited. For the majority of trials, risk of bias was high for blinding of study personnel/participants and for the blinding of outcome assessors.

Conclusions:
Population health improvements are contingent upon evidence-based interventions being implemented 'at-scale' across entire populations. An evidence-base regarding how to best do so needs to be urgently developed. The findings of this study identify a range of opportunities to improve the implementation evidence base for community NCD prevention.
What is important during the implementation process of a multicomponent intervention to reduce sitting time among office workers? – results from Take a Stand!

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Implementation and scalability (SIG)

Purpose
Multicomponent workplace-based sitting interventions targeting office workers are becoming increasingly popular, however, the implementation process is often not evaluated. Take a Stand! was a multicomponent workplace-based sitting intervention targeting office workers that resulted in reduced sitting time by 71 minutes after one month. Participants in the intervention group came from offices with different characteristics and the implementation process varied between offices. Thus, the aim is to assess which factors, e.g. in the context or initiation, affected the implementation process and how these factors are related to the effect size in Take a Stand!

Methods
In the present study the intervention offices from Take a Stand!, a cluster-randomized controlled trial, were included, resulting in 173 participants from 10 offices (office size ranged from 10 to 33 with a mean of 17 (SD=8)). Descriptive statistics were used to analyze questionnaire data and activity data from participants clustered at office level. Directed content analysis was used for the qualitative analysis of interviews with participants, ambassadors and leaders. Categories for analysis were taken from the Framework for Evaluating Organizational-level Interventions.

Results/findings
Changes in sitting time compared to baseline varied between offices from -4 to -133 minutes at 1 month and 4 to -72 minutes at 3 months. Preliminary results from the qualitative analyses showed that participants found management support very important, especially because they felt they needed approval to participate in intervention activities. Additionally, it seemed that involving employees and ensuring positive attitude at the very beginning of the project was crucial, as well as the timing of the project in relation to other changes at the workplace.

Conclusions
This study systematically describes factors that are important for successful implementation of a multicomponent sitting intervention at the workplace. This is relevant for future workplace interventions, mainly related to sitting, but results could also be relevant for other health interventions at the workplace, e.g. on physical activity or nutrition.
Barriers to implementation of physical activity in Danish public schools

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Implementation of physical activity & sedentary behavior interventions in adults (Chair: Femke van Nassau), Terrace 2B, 12:05 PM - 1:20 PM

Implementation and scalability (SIG)

Purpose: It is well-known that regular engagement in physical activity (PA) contributes to a multitude of health benefits. Like in many other countries, a large number of Danish school children do not reach the global PA recommendations. In 2014, the Danish Government initiated a new public-school reform. A distinctive feature of the reform was incorporation of 45 minutes PA in the regular school day. The purpose of the present study was to investigate the teachers’ and pedagogues' perceived barriers to implement the 45 minutes of daily school PA. The socio-ecological model was used as a theoretical framework for the study.

Methods: A mixed methods approach using questionnaire and semi-structured interviews was conducted to get a broader understanding of teachers' and pedagogues' perceived barriers to implement PA into regular classes. A total of 213 teachers and pedagogues from 31 schools completed the questionnaire and 11 key informants from 11 different schools were selected for participation in semi-structured interviews. Descriptive statistics were used for the quantitative data whereas a pen profile analysis was used for the qualitative data.

Results: Based on the questionnaire 15 different barriers were identified: four individual barriers, four social or cultural barriers, two physical barriers, four organizational barriers and one natural barrier. Especially six barriers were mostly mentioned: time for preparation, lack of time during teaching, access to facilities and materials, school arrangement, resources for education and lack of inspiration. These six barriers were also prominent in the interviews. The results showed that the older students they teach, the more barriers do teachers and pedagogues perceive.

Conclusion: The effectiveness of a nationwide school-based initiative on PA depends on the implementation, wherefore it is important to understand the challenges that teachers and pedagogues face in integrating PA. This study theoretically identified the barriers impacting the implementation of daily PA as a demand of a public-school reform. These findings provide guidance to researchers, policy makers and practitioners in designing future studies to support implementation of similar school policies to promote PA.
Commuter Choices: using social cognitive theory to identify strategies for increasing uptake and use of active commuting among office workers

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Implementation of physical activity & sedentary behavior interventions in adults (Chair: Femke van Nassau), Terrace 2B, 12:05 PM - 1:20 PM

Implementation and scalability (SIG)

Objective:
Active commuting (AC) is a promising strategy towards achieving 'healthy people, healthy planet'. While infrastructure, information and incentives may increase AC, interventions to increase AC are rare, with few being theory-based. This research used social cognitive theory (SCT) to evaluate strategies for increasing AC among office workers in Brisbane, Australia.

Methods:
Five Brisbane central business district workplaces were enrolled. A convenience sample of 51 office workers from three of these workplaces participated in focus groups exploring factors shaping commuting mode choice. Seventy-four workers completed an online survey (assessing main commuting mode, recent modes and predictors of AC) and a 7-day diary of commuting/physical activity. Of these, 44 completed a separate online Needs Assessment in which they ranked obstacles, options they would consider and strategies to increase AC.

Results:
Analysis of focus group discussions identified several possible strategies: personalised journey plans, online information, commuting buddy system, and sharing among employees of AC tips. These findings informed the following stages. Findings from the online survey revealed that the theoretical constructs of habit strength, outcome expectations and self-efficacy for AC were high, and self-regulation and social support were low. In the Needs Assessment, workers identified multiple obstacles, but were willing to consider trying AC. Most (80%) wanted a personalised journey plan, and preferred online to printed information (30%/13%). Interest in a buddy system (20%) and in goal setting (10%) was low. Geographical and other factors impacting on commuting meant that a buddy system involving commuting together would be impractical. Most respondents lived too far from work to manage walking or cycling the whole distance.

Conclusions:
This research indicates that online delivery of personalised journey plans may contribute to increasing AC. Although the Needs Assessment revealed limited interest in goal setting, the low levels of self-regulation suggest this may be a crucial intervention element. Focus groups and Needs Assessment returned contradictory findings about social support using a buddy system. While workers commuting together was impractical, a buddy system with workers encouraging and praising each other's AC efforts could be beneficial. These findings can inform the development of workplace-based interventions to increase AC.
Move on bikes program. A community-based physical activity strategy in Mexico City

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Implementation of physical activity & sedentary behavior interventions in adults (Chair: Femke van Nassau), Terrace 2B, 12:05 PM - 1:20 PM

Implementation and scalability (SIG)

Community-based interventions have become popular to increase physical activity levels. Ciclovia programs close temporally streets allowing access to walkers, runners, rollerbladers, and cyclists. However, until now there is scarce evidence on the evaluation of these programs worldwide and in Mexico. Objective. The purposes of this study are to estimate the participation, physical activity levels among the Muévete en Bici (MEB) program, and the association on the frequency of participation with sociodemographic, physical and program characteristics in Mexico City. Methods. From October 2017 to July 2018, six hundred seventy-nine participants were surveyed using a questionnaire that contains sociodemographic, physical, and program characteristics. A wide-angle video camera was used to estimate the average speed per event per participant. Based on survey interviews we corrected the official estimate of the number of participants per event. Results. On an average MEB program day, 21,801 people attended the event. The MEB program contributes to an average of 221 minutes of moderate to vigorous physical activity (MVPA) per event. In total, 88.4% of the users accumulated at least 150 minutes of physical activity at the event. On average, 29.6% of participants attend the program every Sunday. Men, those aged 41 to 64 years old, participants classified as very and sufficiently active regularly and at the program, those that use active transportation to come into the program, and participants that come alone were more likely to assist more frequently. Conclusions. This program contributes with 71 more minutes of MVPA recommended per week. Regular attendees are more likely to be physically active. MEB authorities should be found a way to include people with overweight and those from low-income areas that have demonstrated to be more vulnerable to obesity and diabetes and to be more physically inactive during leisure time.
The effectiveness of an annual nationally-delivered workplace Step Count Challenge on step-counts across two years of delivery.

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Implementation of physical activity & sedentary behavior interventions in adults (Chair: Femke van Nassau), Terrace 2B, 12:05 PM - 1:20 PM

Objective
Walking has multiple physical, mental and social health benefits, and the workplace is an environment in which walking can be promoted to adults. Paths for All's workplace Step Count Challenge (SCC) is a flagship programme of Scotland's National Walking Strategy. The 8-week online challenge incorporates several behaviour change techniques including goal setting, self-monitoring through activity monitors, and social support. The objective of this study was to examine changes in step-counts throughout the duration of the SCC across two years of delivery.

Method
Participants in the 2015 (n=2629) and 2016 (n=4153) SCCs registered to take part in the SCC and reported demographic data at registration. Participants self-reported their daily step count for each day of the SCC on an on-line database. Mean daily steps for each week were calculated. Linear mixed models were used to assess changes in steps over time (Model 1). The final model controlled for age and gender (Model 2).

Results
Participants were predominantly female (2015 78%; 2016 76%) with a mix of participants aged ≤45 (2015 57%; 2016 55%) and >45 years. The analysed sample only included those who provided both sex and age data plus at least one week (minimum 4 days/week) of steps data (2015 n=2142 82%; 2016 n=3659 88%). Model 1 showed an increase in steps over time for both years (p < .001: 2015 mean difference +1073 (791.8, 1353.3) steps; 2016 mean difference +1182 (966.3, 1397.3) steps). The addition of age and sex (Model 2) improved the fit of the models. There were time (+1186.5 (847.4, 1525.6) steps) and gender effects (males +1219.8 (831.5, 1608.1) steps) in 2015. In 2016 there was evidence of a time by gender interaction, with females (+1291 steps) increasing more than males (+853 steps). There was no age effect in either year.

Conclusion
The SCC results in an increase for both men and women in daily steps across the 8 weeks of the challenge, with some indication that the effect may be greater for women and is not influenced by age. The sustainability of these changes should be investigated.
O44, O44.1
Tackling men’s health through Rugby League: Findings from the Active Breed men’s health pilot study

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Preventing cancer and disease through physical activity (Chair: Falk Mueller-Riemenschneider), Club A, 12:05 PM - 1:20 PM

Disease prevention and management (SIG)

Objective:
In Australia, around 70% of men are overweight or obese and less than half are sufficiently active. Despite this, men are less likely than women to engage with health services and health promotion initiatives. The purpose of this pilot study is to examine the feasibility and preliminary efficacy of Active Breed, a gender-tailored weight loss program for Australian men delivered at a first-grade Rugby League club.

Methods:
Participants were 47 overweight men (mean (s.d.) age 44.14 (7.07); BMI 33.47 (4.44)kg/m2), recruited through the Canterbury-Bankstown Bulldogs National Rugby League Club and randomised to an intervention (n=24) or wait-list control (n=23) group. The intervention comprised 12 weekly 90-minute education and physical activity (PA) sessions delivered at the Bulldogs’ home stadium in South-Western Sydney. Education sessions focused on weight loss, PA, dietary intake, mental health, and violence prevention. PA sessions, delivered by exercise physiologists, included gym-based workouts and touch football games. The program was integrated within the club, and included training in first grade gyms and visits from current and past players. Participants were assessed at baseline and 12-week follow-up for outcomes including weight, waist circumference, blood pressure, PA and sedentary behaviour (IPAQ and accelerometry), psychological distress (Kessler 10), and perceptions of masculinity (Male Role Norms Scale). Data were analysed using general linear models in SPSS.

Results:
Participants were recruited within 2 weeks, with a retention rate of 83% at end of intervention (12-weeks). Fifteen of 24 intervention participants (62.5%) attended =10 out of 12 sessions. After 12 weeks, mean (s.d.) weight loss was 2.85 (3.13) kg for intervention participants and 0.34 (2.30) kg for wait-list control participants. A significant treatment effect was observed for weight (p=0.014), waist circumference (p=0.004), fruit consumption (p=0.014), and sugar-sweetened beverage consumption (p=0.004). Program evaluation scores on importance of topics, level of support, appropriateness of venue/facilities, quality of facilitators and overall satisfaction ranged from 3.7 to 4.8 out of 5.

Conclusions:
Preliminary results from the Active Breed pilot study are promising and suggest a 12-week gender-tailored program can improve health outcomes. These findings, combined with participant feedback will guide the development of a fully-powered randomised controlled trial.
Efficacy of a computer-tailored physical activity intervention for prostate and colorectal cancer patients and survivors

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Preventing cancer and disease through physical activity (Chair: Falk Mueller-Riemenschneider), Club A, 12:05 PM - 1:20 PM

Cancer prevention and management (SIG)

Objective: Physical activity (PA) is especially beneficial for cancer patients and survivors as it can improve negative physical and psychological effects of cancer and cancer treatment. Nevertheless, adherence to PA guidelines is low. Computer-tailored interventions have the potential to reach large populations and match with patients' preference for home-based, unsupervised PA programs. They can thus be a cost-effective option to increase PA in the growing population of cancer survivors. Consequently, we developed OncoActive: a computer-tailored PA intervention for prostate and colorectal cancer patients and survivors and evaluated its long-term efficacy.

Methods: Prostate and colorectal cancer survivors were randomized to the OncoActive group (N=249), or a usual-care waiting-list control group (N=229). Intervention participants received a pedometer and computer-tailored PA advice, both Web-based via an interactive website and with printed materials. PA was assessed objectively (Actigraph) at baseline, 6 and 12 months. Questionnaires were used to assess self-reported PA, fatigue, distress and quality of life at baseline, 6 and 12 months. Intervention effects were examined using multilevel regression analyses.

Results: Six months after baseline, days and minutes of PA increased significantly in the intervention group both for self-reported and ActiGraph data. At 12 month follow-up OncoActive participants self-reported significantly higher PA, but no significant differences were found for ActiGraph data. OncoActive participants reported improved physical functioning (p=.03), decreased fatigue (p=.006), and decreased depression (p=.004) at 6 month follow-up. At 12 month follow-up the decrease in fatigue was still significantly larger in the intervention group (p=.032). Intervention effects were moderated by type of cancer, education level and gender.

Conclusions: The OncoActive intervention was effective in increasing PA and physical functioning and in decreasing fatigue and depression in prostate and colorectal cancer patients and survivors six months after baseline. Although PA was not significantly higher at 12 month follow-up, fatigue levels were still lower in the intervention group. Due to natural improvement of the control group, effects regarding physical functioning and depression diminished. OncoActive, thus gives patients a head start to recovery, but additional efforts should be taken to increase long term maintenance of PA. Possibilities for implementation will be explored.
Breast, prostate and colorectal cancer specialist nurses’ perspectives of physical activity promotion and the potential role of smartphone-based physical activity interventions in cancer care: a qualitative study

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Objective: Cancer Clinical Nurse Specialists (CNSs) play a key role in PA promotion in cancer care in the United Kingdom and patients value PA support from their assigned CNS. Smartphone applications (apps) can be an effective way to increase PA but little is known about CNSs' opinions about the use of apps to promote PA among people affected by cancer. This study aimed to assess CNSs' opinions on the CNS role in PA promotion and the potential of smartphone-based PA interventions in cancer care.

Methods: Breast, prostate and colorectal cancer CNSs were recruited via advertisements distributed by professional organisations. In-depth semi-structured telephone interviews were conducted and analysed using thematic analysis.

Results: 19 participants took part; 9 (47%) were colorectal cancer CNSs, 6 (32%) were prostate cancer CNSs and 4 (21%) were breast cancer CNSs. CNSs acknowledge their role in discussing and supporting PA among their patients but recognise that they sit within a wider system necessary for effective PA promotion among people affected by cancer. They highlighted the influence that the national/policy-level changes in survivorship care in the UK has had on their ability to bring PA into consultations and that this has helped to raise awareness about the benefits of PA after cancer (e.g. on fatigue, quality of life, risk of cancer recurrence). However, CNSs felt they lack specific knowledge and confidence about what exactly to recommend or how to encourage patients who might require greater levels of support to increase PA (e.g. patients with advanced disease, several comorbid conditions or low levels of motivation/interest to increase PA). CNSs recognise the benefits that app-based PA interventions offer and feel that this could be an effective way to support patients who want to engage with PA support in this way but that it may not be of interest or suitable for all of their patients. CNSs discussed factors that could influence effective implementation of app-based PA support in routine care.

Conclusions: The results of this study can inform the development of an app-based PA intervention for people affected by cancer that could be implemented into routine cancer care.
NEW, O44.4

Longer-term effects of exercise dose and type during breast cancer chemotherapy on quality of life, cancer-related symptoms, and psychosocial outcomes

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Preventing cancer and disease through physical activity (Chair: Falk Mueller-Riemenschneider), Club A, 12:05 PM - 1:20 PM

Cancer prevention and management (SIG)

OBJECTIVE: To compare the longer-term effects of different doses and types of exercise during breast cancer chemotherapy on patient-reported outcomes and exercise behavior at 6-, 12-, and 24-month follow-up; and to investigate the association between self-reported exercise behavior during follow-up and patient-reported outcomes.

METHODS: The Combined Aerobic and Resistance Exercise (CARE) Trial randomized 301 breast cancer patients initiating chemotherapy to thrice weekly, supervised exercise consisting of either a standard dose of 25-30 minutes of aerobic exercise (STAN; n=96), a higher dose of 50-60 minutes of aerobic exercise (HIGH; n=101), or a combined dose of 50-60 minutes of aerobic and resistance exercise (COMB; n=104). Self-reported quality of life, cancer-related symptoms, psychosocial outcomes, and exercise behavior were assessed at 6-, 12-, and 24-month post-intervention. Repeated measures analyses of covariance were used to compare the mean differences for outcomes among groups during the follow-up period and univariate analyses of covariance were used to investigate the association between self-reported exercise behavior during follow-up and patient-reported outcomes.

RESULTS: We obtained complete data for all 3 follow-up time points on 257 (85.4%) patients. There were no statistically significant main effects for randomized exercise group on any patient-reported outcomes during the follow-up period. However, there were statistically significant group-by-time interactions for happiness (p = 0.025) and anxiety (p = 0.022); and borderline significant interactions for fatigue (p = 0.06), stress (p = 0.07), and sleep quality (p = 0.05). In the general pattern of the interaction effects, COMB was superior at 6-month, inferior at 12-month, and minimal group differences at 24-months. At 6-months follow-up, COMB was significantly superior to STAN for sleep quality (mean group difference = 1.2; 95% CI = 0.1 to 2.3; p = 0.027). Moreover, self-reported meeting of the combined exercise guidelines during each follow-up time point was significantly associated with better patient-reported outcomes at that time point.

CONCLUSIONS: There were no consistent effects of different doses and types of exercise during breast chemotherapy during the 24-month follow-up period. However, self-reported combined exercise during follow-up was significantly associated with better longer-term quality of life, cancer-related symptoms, and psychosocial outcomes.
The Effects of Increasing Physical Activity on Cognitive Performance in Prostate Cancer Survivors: A Pilot, Randomized Controlled Trial

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Objectives: Cognitive impairment is reported as a primary quality of life complaint in cancer survivors. Cancer-related cognitive impairment (CRCI) significantly extends disease-related disability, contributing to deleterious side effects. Despite its prevalence and significance, there are no proven treatments beyond symptom management. Physical activity (PA) may be a promising treatment for CRCI. No PA studies have targeted objectively-assessed CRCI in prostate cancer survivors (PCS). The purpose of this study was to evaluate the effects of supervised PA program plus standard exercise counseling (SPA+EC) versus a supervised physical activity program plus motivationally-enhanced behavioral counseling (SPA+BC) on objective and self-reported cognitive function in PCS.

Methods: Twenty-six PCS were randomized to a 12-week SPA + EC group (n=13) or SPA+BC group (n=13) based on the Multi-Process Action Control Framework. The goal of both groups was to increase PA to meet public health guidelines with supervised PA that tapered to a home-based program after 6 weeks. PA was assessed using accelerometers and objective cognition using the National Institutes of Health Cognitive Toolbox, and self-reported cognition using the FACT-Cog. Analyses of covariance were used to compare objective and self-reported cognition between the two groups from baseline to 12-weeks (post-intervention).

Results: PCS had a Mage of 65.6 ±smn; 6.8, 92.3% had localized disease, MBMI of 30.2 ±smn; 5.8 kg/m2, and mean months since diagnosis of 93.5 ±smn; 65.6. Adherence rates were 70% and 90% of PCS in the SPA + EC and SPA + BC group, respectively. The SPA + BC had greater improvements in episodic memory scores by +2.9 points (95% CI: 0.8-5.0, p=.010, Partial ?;2=.28) and fluid cognition composite scores by +3.5 points (95% CI: 0.2 to 6.8, p=.040, Partial ?;2=.19) compared to the SPA+EC group. No significant effects were found with self-reported cognition.

Conclusions: This study provides preliminary evidence that adding behavioral counseling to supervised PA resulted in greater improvements with memory and fluid abilities, as well as adherence to home-based exercise. Given the effect sizes, the cognition effects appear quite robust. These findings will inform a larger RCT, and if replicated, will identify selective cognitive functions that are amenable to change with PA.
O44, O44.6

Associations of grip strength and body mass index with cancer mortality in 413,338 adults: The UK Biobank study.

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Preventing cancer and disease through physical activity (Chair: Falk Mueller-Riemenschneider), Club A, 12:05 PM - 1:20 PM

Cancer prevention and management (SIG)

Background: There is compelling evidence that, independent of adiposity, higher aerobic fitness is associated with lower risks of cancer. However, little is known about whether cancer risk is lower with higher muscle strength, independent of adiposity.

Objective: The aim of this study was to investigate the associations between grip strength (GS), body mass index (BMI), and total and 11 site-specific cancer mortality outcomes.

Methods: The UK Biobank data is an ongoing prospective cohort containing >500,000 adults aged 40-69 years at baseline (2006-2010). The average GS value of both hands was divided by fat-free mass to account for differences in body size. Age- and sex-specific cut-points were used to generate three categories of GS. BMI was used as an indicator of adiposity. Cox regression models using age as the underlying time scale were performed to estimate associations between GS, BMI and each cancer mortality type. Models were adjusted for potential confounders.

Results: Data from 413,338 participants were used in the present analyses. Over a median 7.0-year follow-up period, a total of 5,052 cancer deaths were accrued. Compared with the lowest GS group, the highest GS group showed a 12% lower hazard of total cancer mortality (Hazard Ratio [HR]: 0.88; 95% CI: 0.82-0.95) after adjusting for BMI as well as confounders. In obese individuals (BMI>30 kg/m2), the middle category of GS was associated with a 14% lower hazard of total cancer mortality (HR: 0.86; 95% CI: 0.76-0.97) compared with the lowest. The highest GS group showed reduced risks of liver (HR 0.57; 95% CI 0.38-0.85), and bladder cancers (HR 0.39; 95% CI 0.22-0.68), compared with the lowest. While higher GS was associated with lower risks of liver, ovary, blood and bladder cancers in normal weight (only for ovary and blood cancers) or overweight individuals, none of the associations between GS and 11 site-specific cancers were statistically significant in obese individuals (p-values >0.05 for interaction for all 11 site-specific cancers).

Conclusions: Individuals with higher GS may have lower risks of total, liver and bladder cancer mortality, independent of BMI. In obese individuals, higher GS may be protective against only total cancer mortality.
O45, O45.1

Have rates of active commuting to and from school changed during the last decade in young Spanish people? The PACO Study


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Purpose: This study aimed to analyze the changes in mode of commuting to and from school in Spanish children and adolescents between 2006 and 2017.

Methods: Cross-sectional data from 34 original studies conducted in Spain between 2006 and 2017 were included. Data about mode of commuting to and from school, age, gender, survey year, and time of commuting between home and school (categorized as "<15 min" if they commuted less than 15 minutes and as "³15 min" if they commuted 15 minutes or more) were included in the analyses. A total of 19,346 children (6-11 years old) and 21,524 adolescents (12-17 years old) reported valid data. The Chi-square test was used to analyse the differences between mode of commuting to and from school, age, and gender with survey year. A multilevel logistic regression model was used to associate mode of commuting to and from school with survey year (i.e., 2006-2008, 2009-2011, 2012-2014 and 2015-2017) separately by children and adolescents; age, gender, and time of commuting between home and school were included as covariates. Additionally, analyses were performed separately by gender, using the same statistical model, but excluding the gender.

Results: The preliminary results using Chi-square test showed significant differences in children between survey years with active commuting to school (ACS), age, and time of commuting (all p<0.01). In adolescents, there were significant differences between survey years with age and time of commuting (all p<0.01). In the multilevel regression analysis, children were more likely to choose ACS in the period 2015-2017 than in 2009-2011 (p<0.001), and adolescents were more likely to choose ACS in 2015-2017 than in 2006-2008 (p<0.001). When the results were analysed separately by gender, the associations remained constant, except for female children.

Conclusions: In the last decade, the rates of ACS have changed in children and adolescents, who are currently more active than in previous years. This novel increased trend might be an answer to the recent concern related to healthy and environmental issues in our society, and as a consequence, the families are changing into more healthy and sustainable behaviors. Policy interventions should promote the initiatives developed to maintain and increased the observed changes.
16872

O45, O45.2

Trends of adolescent’s physical activity, sedentary behavior and active transportation and their association with perceived social support of parent and peer in Indonesia: The Global School-based Health Survey 2007 and 2015

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Trends in behavioral nutrition physical activity (Chair: Greet Cardon), Club B, 12:05 PM - 1:20 PM

Other

Purposes: To provide the trend in prevalence of physical activity habit (PAH), sedentary behaviour (SB) and active transportation (AT) habit, as well as to identify the association of those three behaviours with perceived parent and peer support among adolescents.

Methods: Data were obtained from a cross-sectional survey of the Indonesia Global School-based Student Health Survey (GSHS) in 2007 and 2015. The survey recruited 5,587 adolescents aged 13-15 years. The self-administrated questionnaire asked about PAH (=5 days/week of moderate to vigorous activities more than 60 minutes), SB (>2 hours/day spent on TV, computer games or other sitting activities) and AT (=5 days walking or biking to/from school). Adolescents reported perceived parental bonding, connectedness and supervision. Perceived peer support was self-reported ("how often most of the students in your school were kind and helpful"). Logistic regression estimated the odds ratios of PAH, SB and AT associated with perceived parent and peer support.

Results: Between 2007 and 2015, the prevalence of PAH declined from 24.19% to 16.80% among boys and from 22.49% to 14.91% among girls. Prevalence of AT declined from 41.45% to 28.46% among boys and 43.66% to 27.41% among girls. However, SB showed a steady decreased from 30.93% to 27.2% among boys and 32.79% to 27.02% among girls. Perceived parental supervision was inversely associated with SB in 2007 (AOR=0.62; 95% CI [0.45-0.85]) and in 2015 (AOR=0.61; 95% CI [0.53-0.70]). In 2015, perceived parental bonding was associated with PAH (AOR=1.6; 95% CI [1.31-2.17]) and SB (AOR=1.39; 95% CI [1.31-1.69]), perceived parental supervision was associated with AT (AOR=1.17; 95% CI [1.04-1.36]), and perceived peer support was associated with SB in 2015 (AOR=1.22; 95% CI [1.04-1.44]), but these association were not significant in 2007.

Conclusions: Indonesian adolescents' PAH and AT both decreased from 2007 and 2015. Adolescent's PAH was associated with perceived parental bonding. AT was associated with perceived parental supervision. SB was positively associated with perceived parental bonding and perceived peer support, but inversely associated with perceived parental supervision. There is a need to improve adolescent's physical activity and active transportation in Indonesia. The intervention targeted at parent and school will be needed.
Changes in youth health behaviours during the transition to secondary school

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Trends in behavioral nutrition physical activity (Chair: Greet Cardon), Club B, 12:05 PM - 1:20 PM

Objective: The transition from elementary to secondary school is a critical time when adverse obesogenic behaviours (physical activity (PA), dietary behaviours and screen time) appear but our understanding of how the school environment influences youths' health behaviours is poorly understood. This study aimed to understand the factors within the school environment that influence obesogenic health behaviours, as youth transition to secondary school.

Methods: 28 semi-structured interviews were conducted among a sample of ethnically diverse child/parent dyads within the public school system in Surrey, British Columbia, Canada (50% boys, 68% mothers, 25% White). Questions during the interview probed for environmental and behavioural factors in the school context that were perceived to have influenced the youth's health behaviours. Thematic data analyses were conducted using NVivo11.

Results: Youths' participation in PA as they transition into grade eight were influenced by: pressure to focus on grades; preferences as youth have the autonomy to be active or inactive in their free time at school; skills as it dictates opportunities and ability to qualify for team sports; disappearance of play as it is replaced by PA or graded physical education; and peer groups and norms as it influences participation and shapes preferences. Dietary habits were influenced by: youth's ability to self-regulate their schedule (finding time to eat lunch and managing school pressures); increased autonomy to choose what they eat; increases in accessibility and availability within and outside of the school; socializing habits as sharing treats becomes a way to form new relationships; and nutrition knowledge shape choice and decision process. Finally, screen time becomes influenced by: access (owning a smartphone device); using technology as a teaching tool; and the addictive nature of social networks.

Conclusions: Our findings highlight opportunities to support youths during the often socially and emotionally complex transition into secondary school. To support adoption or maintenance of healthy behaviours in Grade eight, schools may: 1) ensure the PA curriculum meets the needs of those with low PA skills/literacy; 2) actively support youth to make healthy food choices; and 3) provide strategies to curtail screen times and use of social media.
Study protocol and baseline characteristics of a longitudinal study on body weight, body composition and energy balance related behaviour during the transition to parenthood: TRANSPARENTS study

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Trends in behavioral nutrition physical activity (Chair: Greet Cardon), Club B, 12:05 PM - 1:20 PM

Other

Purpose: The transition to parenthood is a critical period for weight gain. Although research has shown evidence on first pregnancy-related weight and fat gain and retention in women, the effect of having a first child on men's body weight and body composition is lacking. Moreover, there is no full understanding about which specific energy balance related behaviours (EBRB) contribute to unfavourable weight gain and retention. Therefore, the objectives of this study are to investigate both maternal and paternal changes in body weight, body composition and EBRB during the transition to parenthood and to investigate socio-demographic and behavioural predictors of these changes.

Methods: TRANSPARENTS is a multi-centre observational follow-up study that focuses on body weight, body composition and EBRB during the transition to parenthood in both women and men. Data are collected at four occasions (week 12 of gestation, 6 weeks, 6 months and 12 months postpartum). Couples (women and men) are recruited during the first trimester of their first pregnancy. Anthropometrics are assessed, including body weight, height, body composition (using bio-electrical impedance and measurement of four skinfold thicknesses (biceps, triceps, subscapular, supraspinal)) and waist and hip circumference. Socio-demographics, breastfeeding, dietary intake, physical activity and sedentary behaviour, lifestyle, mental health and social support are assessed using a questionnaire. Accelerometers are used to objectively assess participants' physical activity and sedentary behaviour. Multilevel modelling will be used to evaluate maternal and paternal changes in body weight, body composition and EBRB during and after pregnancy. All analyses will be adjusted for possible confounders. Multiple linear regression analyses will be performed to identify predictors of changes in body weight, body composition and EBRB.

Results: Baseline characteristics of the study sample and baseline associations across EBRB will be presented for the first time.

Conclusions: This study is unique in its field, as to date, there are no studies investigating pregnancy-related weight gain from a holistic energy balance perspective, i.e. considering eating, physical activity and sedentary behaviour, as well as both women and men simultaneously. Provided insights will facilitate the development of tailored intervention strategies to counter excessive weight gain among couples transitioning to parenthood.
O45, O45.5

Five-year weight loss and physical activity trajectories following bariatric surgery

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Trends in behavioral nutrition physical activity (Chair: Greet Cardon), Club B, 12:05 PM - 1:20 PM

Objective: Weight loss trajectories after bariatric surgery are variable among patients with severe obesity. Strikingly, little research takes this individual variability into account. Further, physical activity (PA) has been linked to weight loss. However, few studies have studied this link longitudinally. To gain insight into individual variability in weight loss, and PA over time, we aimed to identify and describe latent classes of weight loss, and PA, up to 5 years after bariatric surgery. In addition, we aimed to investigate if these trajectories are interrelated.

Methods: Data collected during standard treatment at the Dutch Obesity Clinic were used. Weight was measured before and 3, 6, 9, 12, 15, 24, 36, 48, and 60 months after surgery. PA was assessed at 0, 9, 15, 24, 36, 48, and 60 months. Percentage total weight loss (%TWL) was calculated. Latent class growth analysis (LCGA) was used to identify latent classes of weight loss, and PA. Multinomial logistic regression was used to investigate whether weight loss and PA trajectories were interrelated.

Results: A total of 3009 patients were included. Analyses revealed 5 distinct weight loss trajectories, with most patients in an average and fairly stable weight loss trajectory (43.5%), an above average weight loss, partial regain trajectory (35.4%), poor weight loss result trajectory (10.4%), rapid weight loss and long-term weight regain trajectory (7.4%), or continued weight loss trajectory (3.3%). For PA, 3 trajectories were identified wherein most patients showed a trajectory in which they increased their PA on the short term and slightly decreased over the longer term (96.9%), some patients showed a drop in PA at the beginning, followed by recovery in the long-term (2.6%) and a few showed great increase and relapse (0.5%). Patients who followed a 'poor weight loss result' trajectory were never in the PA trajectory that showed great increase and relapse in PA.

Conclusions: Five weight loss trajectories were identified after bariatric surgery. Patients with initial greater change in physical activity were less likely to follow an unfavorable weight loss trajectory, indicating the importance of promoting behavioral factors after bariatric surgery.
Identifying household substitutes for soft drinks: an analysis of longitudinal purchasing data in Montréal, Canada

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Trends in behavioral nutrition physical activity (Chair: Greet Cardon), Club B, 12:05 PM - 1:20 PM

Background

Soft drink consumption contributes to the increasing global incidence of obesity, cardiovascular diseases, and type II diabetes. Previous studies addressing purchasing patterns of soft drink consumption have emphasized the importance of both complementary products and product substitution; however, few have actually analyzed dynamic patterns of purchasing in longitudinal, household-level data. The objective of this study is to identify the purchasing trends of complementary food groups (junk foods, sweet snacks) and alternative beverages (e.g. water and juice) purchased by households who also purchase soft drinks.

Methods

We used longitudinal, individual-level loyalty card transaction data from a grocery retailer in Montréal, Canada between February 2015 and September 2017. Using standard marketing criteria, frequent shoppers were selected based on the frequency and volume of their store transactions (n = 2,745). After correcting price for inflation over the two year period, consumers were categorized into five groups of temporal expenditure patterns on soft drinks using k-means clustering. Purchase patterns of soft drinks and their complementary and competing beverages and foods were characterized by descriptive statistics.

Results

Households that purchased fewer soft drinks had a decreased likelihood of buying junk foods. Over time, a cluster of 181 households that decreased their expenditure on soft drinks by showed a 24.3% decrease in purchasing of sweet snacks and a median 51.0% increase bottled water with no changes in milk and fruit juice. No correlation was found between expenditure on soft drinks and socio-economic status.

Conclusions

Using routinely recorded grocery transaction data, we identified the beverages that households tended to substitute for soda in addition to purchasing patterns of unhealthy foods. Furthermore, we found that purchasing of unhealthy foods was related within households. This has implications for public health practitioners seeking to better understand shoppers' longitudinal purchasing patterns and evaluate interventions on unhealthy food purchases.
17211

O46, O46.1

Does genetic risk of obesity modify associations between characteristics of the neighbourhood built environment and BMI?

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Food environments, socio-economic differences and lifestyle (Chair: Jenny Veitch), Club C, 12:05 PM - 1:20 PM

Policies and environments (SIG)

Purpose: There is growing recognition that recent global increases in obesity are the product of a complex interplay between individual genetic and environmental factors. However, in gene-environment (GxE) studies of obesity, 'environment' usually refers to individual behavioural factors that influence energy balance, while more upstream environmental factors are overlooked. We sought to address this gap by investigating GxE interactions between genetic risk of obesity and neighbourhood characteristics likely to be associated with overweight and obesity (proximity to fast food and availability of physical activity facilities), to examine whether genetic risk of obesity modifies associations between neighbourhood environments and body mass index (BMI).

Methods: We analysed a cross-sectional sample of 332,174 mid-life adults in the UK Biobank cohort with linked environmental and genetic data. In mixed effects regression models we examined interactions between genetic risk of obesity and two neighbourhood characteristics, proximity of home address to a fast-food outlet, and availability of physical activity facilities within 1km of home, in relation to objectively measured BMI. We operationalised genetic risk using individual SNPs strongly linked to BMI, as well as polygenic risk scores for obesity. The environmental variables are part of the UK Biobank Urban Morphometric Platform, a collection of objective measures of study participants' residential environments derived from various UK-wide spatial databases.

Results/findings: Although effect estimates were small, we found that the association between proximity to fast-food and BMI is stronger among those at increased genetic risk of obesity, with evidence of an interaction with polygenic risk scores (P=0.017) and in particular with a SNP linked to MC4R (P=0.009), a gene known to regulate food intake. We found little evidence of any gene-environment interaction for availability of physical activity facilities.

Conclusions: Our findings suggest that individuals at an increased genetic risk of obesity may be more sensitive to exposure to the local fast-food environment. This is novel evidence for a potentially important GxE interaction. Ensuring that neighbourhood residential environments are designed to promote a healthy weight may be particularly important for those with increased genetic susceptibility to obesity.
17146
O46, O46.2
The food environment transition

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Food environments, socio-economic differences and lifestyle (Chair: Jenny Veitch), Club C, 12:05 PM - 1:20 PM

Policies and environments (SIG)

Objective: Low- and middle-income countries (LMIC) around the world are undergoing a nutrition transition where their traditional diets are being replaced by a westernized diet high in unhealthy fats, sugar and salt. Although the nutrition transition has been examined in many countries, there is a striking research gap on how the food environment influences the availability, affordability, convenience, and desirability of food in LMIC contexts. The objective of this paper is to develop a conceptual framework for understanding the 'food environment transition' with the view to informing the design, implementation and evaluation of policies and programs aimed at improving food choices.

Methods: We identified food environment typologies associated with the patterns of the nutrition transition and how they influence the availability, affordability, convenience, and desirability of food based on existing literature and food environment case studies conducted in Myanmar, Kenya, India, Senegal and China. We then identified methods for measuring food environments as they transition over time.

Results/findings: Food environments can be categorized as natural (wild and cultivated) or market (informal or formal) environments. As populations move through the different stages of the food environment transition their food environments shift from consisting mainly of natural food environments to those that are more reliant on market environments. In many cases consumers interface with several different food environments within a given pattern of the food environment transition. The different food environment typologies that consumers interface with have implications for how food environments are measured. Wild and cultivated food environments can be measured using indicators from the ecological literature (e.g., production diversity) whereas market environments can be measured using GIS mapping and objective measures of food prices, the availability of healthier as compared to less health foods, etc. However, given the dynamic nature of informal market environments novel approaches to measuring the availability, affordability, convenience and desirability in these contexts are needed.

Conclusions: The food environment transition is driving shifts in diets around the world. A better understanding of this transition is needed in order to identify context-specific policies and programs aimed at ensuring that they support healthy diets.
16828

O46, O46.3

Changes in the Dutch foodscape over the past decade: differences by
neighbourhood socioeconomic status and urbanisation

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Food environments, socio-economic differences and lifestyle (Chair: Jenny Veitch), Club C,
12:05 PM - 1:20 PM

Policies and environments (SIG)

Objective: Changing food environments may play an important role in the obesity epidemic. However, little is known about changes in the amount and type of food retailers in the Netherlands. Methods: Geographic coordinates of all Dutch food retailers from 2004 to 2017 were obtained from a commercial retailer database (Locatus). Neighbourhood characteristics were obtained from Statistics Netherlands (CBS). For each neighbourhood with at least 100 inhabitants, we calculated the density per 10,000 inhabitants of supermarkets, local food shops (green grocers, bakeries, butchers, poultry and fish shops), fast food restaurants (FFR) and all food retailers combined. We used descriptive statistics to examine changes in food retailers over time and stratified neighbourhoods according to their urbanisation level and socio-economic status (SES). Results: The density of all food retailers per 10,000 inhabitants remained relatively constant from 2004 (35.7) to 2017 (35.8). Notable differences were found for specific food retailers, and changes differed per neighbourhood type. In general, the density of FFR increased by 14.6%; density of local food shops decreased by 26.3%; and density of supermarkets remained constant. The density of supermarkets increased by 26.1% in highly urbanised areas (>2500 inhabitants per km²) and decreased by 24.2% in non-urban areas (<500 inhabitants per km²). For neighbourhoods in the top quintile of average house prices (indicator for high neighbourhood SES), we observed a 22% increase in the density of total food retailers, while it remained constant in neighbourhoods with the lowest quintile of average house prices (indicator for low neighbourhood SES). Despite a stronger increase (45% vs 18.6%) in the density of FFR in high-SES neighbourhoods as compared to low-SES neighbourhoods, density of FFR was higher in low-SES neighbourhoods across all time points (e.g. 8.3 for low-SES vs 5.1 for high-SES in 2017). Local food shops generally decreased over the study period with a greater decrease observed in the low-SES neighbourhoods (-28.8%) as compared to high-SES neighbourhoods (-18.2%). Conclusions: Considerable differences were observed in the Dutch foodscape, specially across different types of stores and neighbourhood characteristics. These findings may benefit future research focusing on trends and inequalities in food behaviours and health outcomes overtime.
Evaluation of the first U.S. staple foods ordinance: Impact on nutritional quality of small and non-traditional food store offerings, customer purchases and home food environments.

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Food environments, socio-economic differences and lifestyle (Chair: Jenny Veitch), Club C, 12:05 PM - 1:20 PM

Policies and environments (SIG)

Purpose. Many lower-income and racially diverse communities in the U.S. have limited access to healthy foods, with few supermarkets and many small convenience stores, which tend to stock very limited quantities and varieties of healthy foods. To address food access, in 2015 the Minneapolis Staple Foods Ordinance became the first policy in the U.S. requiring food stores to stock minimum quantities and varieties of healthy foods/beverages, including fruits, vegetables and whole grains, through business licensing. This study examined whether: (a) stores complied, (b) overall healthfulness of store environments improved, (c) healthy customer purchases increased, and (d) healthfulness of home food environments improved among frequent small store shoppers.

Methods. Data for this natural (quasi) experiment were collected at four times: pre-policy (2014), implementation only (no enforcement, 2015), enforcement initiation (2016) and continued monitoring (2017). Store assessments were conducted in randomly sampled small and non-traditional food stores in Minneapolis and compared to those in a nearby control city, St. Paul, Minnesota (n=155 stores total). Stores were excluded that were: supermarkets, authorized through WIC (Special Supplemental Nutrition Program for Women, Infants, and Children), and specialty stores (e.g., spice shops). Customer intercept interviews were conducted with 3,039 customers exiting stores. Home visits, including administration of home food inventories, were longitudinally conducted with a sub-sample of frequent shoppers (n=88).

Results. Overall, findings indicated significant improvements in healthy food offerings by retailers over time in both Minneapolis and St. Paul, with no significant differences in change between the two cities. Compliance was low; in 2017 only 10% of Minneapolis retailers in the sample were fully compliant, and 51% of participating Minneapolis retailers met at least 8 of the 10 required standards. Few changes were observed in the healthfulness of customer purchases or the healthfulness of home food environments among frequent shoppers, and changes were not different between cities.

Conclusions. This study is the first evaluation a local staple foods ordinance in the U.S. and reflects the challenges and time required for implementing such policies.
Policy action to create healthier environments – using policy frameworks and databases to promote healthy diets, physical activity & reduce overweight and obesity

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Food environments, socio-economic differences and lifestyle (Chair: Jenny Veitch), Club C, 12:05 PM - 1:20 PM

Policies and environments (SIG)

Purpose: To establish a physical activity policy framework, equivalent to the NOURISHING policy framework that promotes healthy diets, for reporting, categorising and monitoring policy actions around the world. To establish a method for compiling a database of government implemented policy actions that promote physical activity.

Methods: Literature reviews were undertaken on the evidence of various policy interventions and policy actions recommended by global peer reviewed literature, grey literature and World Health Organization were distilled into distinct policy categories. Academics and policy experts were consulted to provide feedback throughout the framework development. A bespoke methodology was designed for an in-depth European level scan to identify government implemented policy actions that promote healthy diets and physical activity.

Results: The 'MOVING' policy framework formalises a comprehensive package of policies to promote physical activity and complements the existing NOURISHING policy framework. 'MOVING' identifies six distinct policy areas where governments need to take policy action. Using the established methods document, policy actions that promote healthy diets and/or physical activity across Europe were identified and verified with an in-country source before being included in NOURISHING and MOVING policy databases. The NOURISHING and MOVING frameworks and databases are logical and practical tools that allow the end user to identify a series of policy actions that can be taken as part of a comprehensive approach. Similar actions are grouped into distinct policy areas which assists the end user in searching and accessing relevant implemented policy actions.

Conclusions: Policy frameworks and databases are innovative, helpful tools to help governments implement more evidence-informed policies. More government action is needed to promote healthy diets and physical activity and reduce overweight, obesity and non-communicable diseases. The NOURISHING and MOVING frameworks and databases can be used by 1) policymakers to identify where action is needed, tailor options suitable for their populations and assess whether their approach is sufficiently comprehensive; 2) researchers to identify the evidence available for different policies, identify research gaps and monitor and evaluate policies; and 3) civil society organisations to monitor what governments are doing, benchmark progress and hold governments to account.
Beyond the local food environment: Exploring the digital food space in three high-income countries and its socioeconomic (SES) differences

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OBJECTIVE: Online meal delivery platforms are gaining prominence in the food market yet this is often ignored in current research into food environments. By not accounting for the digital food environment, research is likely to be underestimating an individual's food environment exposure. This study aimed to explore online food access to takeaway foods in two cities of high-income countries (Amsterdam, Netherlands and Melbourne, Australia).

METHODS: Uber Eats was selected as online delivery platform. In Amsterdam and Melbourne, addresses in three high- and three low-income neighborhoods were randomly selected. For each address, food delivery options were extracted for Thursday evenings (6.30pm). Each outlet provided one or more predefined keywords to summarize food options and these were used to explore online food access: (1) healthy keywords: 'salad' and 'healthy' (2) sustainable keywords: 'vegan' and 'vegetarian' (3) fast food keywords: 'pizza', 'burgers', 'fast food'. Number of outlets, frequencies of keywords, and SES differences were assessed in both cities.

RESULTS: In both Amsterdam (high=222, low=115) and Melbourne (high=197, low=126) more delivery options were available in high compared to low SES neighborhoods. In the Netherlands, 34.9% of the keywords were fast food related whereas 17.4% were health and 20.4% were sustainable related. In Melbourne, 34.9% of the keywords were fast food related however sustainable (6.19%) or healthy (7.17%) keywords were less prominent. All keywords themes were less often used in high compared to low SEP neighborhoods in Amsterdam. However, fast food keywords (-8.9%) were more frequently absent in high SES neighborhoods than healthy (-1.3%) or sustainable keywords (-1.2%). In Melbourne, fast food (+0.22%), health (+1.24%) and sustainable (+4.49%) keywords were more prominent in high SES neighborhoods.

CONCLUSIONS: These preliminary outcomes indicate that there is a large food supply via the digital food environment and demonstrate its international differences. Moreover, the number of outlets accessible via the digital food environment is larger than those present in the built environment near home addresses. Further work is needed to better understand the true exposure related to digital food environments and the potential impact on an individual's health and the environmental impact of increased use of packaged foods.
Prevention of overweight and obesity in adolescents: an overview of systematic reviews

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Determinants of physical activity and sedentary behavior (Chair: Glenn Weaver), South Hall 2A, 2:20 PM - 2:55 PM

Policies and environments (SIG)

Purpose: The aim of this overview of systematic reviews is to summarize the evidence from up-to-date systematic reviews of the effectiveness of interventions aimed at preventing overweight and obesity in adolescents aged 10 to 19 years.

Methods: We will consider systematic reviews published during the last 10 years of any primary prevention interventions aimed at preventing obesity among adolescents through influencing their energy-balance related behaviour. The interventions include structural/environmental, organizational/community and interpersonal/individual interventions. We will only include reviews of high to moderate quality, as assessed by the AMSTAR tool and include systematic reviews of randomised controlled trials (RCTs), cluster randomised trials (cRCT), non-randomised controlled trials (NRCTs), as well as reviews that include observational study designs. The review will be finalized in May 2019.

The primary outcomes we consider are: BMI z-score, physical activity level, eating behaviour (e.g. consumption of fruit/vegetables and sugar-sweetened beverages, breakfast habits)/ healthy eating indexes and energy balance. The secondary outcomes included are: screen time (time in front of the TV, computer, or other electronic devices), transport (for example to and from school or to other activities), health outcomes (e.g. diabetes, hypertension, mental health), quality of life, satisfaction, equity outcomes, attitudes, and intention to change, change in consumer behavior and cost data.

Results: Findings will be presented in a format aligned with the policy domains and policy areas as defined by WCRFT's policy databases NOURISHING (existing) and a newly developed policy database physical activity related policies (MOVING). The rating of the overall confidence in the result will be rated in four AMSTAR levels (high, moderate, low and critically low). The certainty of evidence will be assessed by four GRADE levels (high, moderate, low and very low certainty).

Conclusion: This presentation will provide overview of systematic reviews will provide updated and current evidence on effective interventions aimed at preventing overweight and obesity in adolescents aged 10 to 19 years, as well as identifying policy domains and areas where there are knowledge gaps.
Fostering healthier and sustainable food and physical activity environments for all: Global applications of community-engaged citizen science

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Determinants of physical activity and sedentary behavior (Chair: Glenn Weaver), South Hall 2A, 2:20 PM - 2:55 PM

Policies and environments (SIG)

Purpose: Among the most underutilized "renewable resources" for catalyzing health-enhancing change in local communities is the power of residents themselves. The Our Voice Global Initiative combines cutting-edge mobile technologies with innovative citizen science methods to drive realistic environmental and policy changes that advance health equity. Relevant physical activity and food access projects have been mounted in diverse populations across six continents.

Methods: Our Voice methodology includes a novel mobile app (translated into multiple languages) that is used by residents from diverse socioeconomic and cultural backgrounds to capture local barriers to and enablers of healthy food access and physical activity. Data sources include qualitative (geocoded route, photo, and audio files) and quantitative data (e.g., environmental and psychosocial rating scales; biometric sensing of stress-related response; air quality sensing). Residents are trained in data-centered consensus building, issue prioritization, and facilitated communications with relevant decision-makers to enact practical environmental and policy changes that support healthy living.

Results: Successful behavioral, environmental, and policy outcomes from diverse Our Voice research projects include increased walking/biking to school in elementary school children; local park improvements for increasing physical activity and park utilization; creation of a senior-friendly community garden; identification of strategies for healthier food access in urban and rural communities; creation of age-friendly walking routes; repair of community streetscapes and sidewalks; resident partnerships with waste management authorities to remove items illegally dumped on neighborhood paths and sidewalks; and changes in parking designations to increase pedestrian safety. Several projects also have demonstrated significant increases in ratings of personal and collective self-efficacy for enacting local change; rated social cohesion; and sustained resident activation around environmental and policy changes across extended periods (e.g., three years after the initial project was completed).

Conclusions: Current results underscore that residents, ages 9 to 90, from low-resourced, underserved communities can learn how to gather, analyze and apply their own data to activate local environmental and policy changes in support of healthy lifestyles. This relatively low-cost and scalable citizen science approach, which incorporates mobile technology, web-based data management, an implementation toolkit, and remote technical assistance, is currently being implemented and evaluated in 14 countries worldwide.
SO12, SO12.3

Understanding and influencing occupational sedentary behaviour - A mixed-method approach in a multi-ethnic Asian population

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Determinants of physical activity and sedentary behavior (Chair: Glenn Weaver), South Hall 2A, 2:20 PM - 2:55 PM

Policies and environments (SIG)

Purpose

Working adults can spend much of their time on the job sitting, but few studies have used a comprehensive approach to understand sedentary behaviours (SB) in this context and in non-Western populations. This study aimed to assess sitting patterns and explore barriers and strategies towards reducing SB in a large multi-ethnic sample of Asian working adults, combining quantitative (questionnaire, environmental audits) and qualitative methods (Focus Group Discussions (FGD)).

Methods

Utilizing a mixed-method approach grounded in the socio-ecological framework, employees of a tertiary hospital in Singapore were recruited. All employees with email were invited to complete an online questionnaire that captured socio-demographics and self-reported SB levels. Environmental influences on SB at the workplace were assessed using an adapted version of the Checklist for Health Promotion Environments at the Worksite (CHEW). FGDs addressed perceptions, barriers, and strategies towards reducing workplace SB. Analyses were performed separately and integrated using inductive comparative approach.

Results

Of 3600 eligible employees, 938 completed the online questionnaire, met the inclusion criteria and provided data on SB. A high proportion of participants were Chinese (n = 641, 68.5%), female (n = 785, 83.8%), and of nursing professions (n = 266, 28.4%). Median sitting time at work was 300 minutes/day, and highest among administrative staff (administrative: 421 minutes/day, allied health: 300 minutes/day, ancillary: 300 minutes/day, nursing 120 minutes/day, medical/dental/others: 240 minutes/day, p-value: <0.001). The CHEW assessment identified poor physical (0/30) and information (0/15) environment contributing to workplace SB. FGDs confirmed an unsupportive environment and elicited barriers at other levels of influence: low SB awareness, nature of work, workplace norms, and organizational approach towards an active lifestyle. Besides environmental approaches, participants suggested face-to-face communication and social modelling to promote more breaks from sitting and more standing.

Conclusions

This mixed-method study among diverse professional groups of a tertiary hospital indicated large amounts of occupational SB, particularly amongst administrative staff. Raising awareness of the health risks of SB and building a supportive informational and physical environment plus organizational culture emerged as significant factors in reducing occupational SB. These findings highlighted the need for multi-component interventions that address the interrelated levels of influence.
City center or outskirts? Where are the Czech adolescent active


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Determinants of physical activity and sedentary behavior (Chair: Glenn Weaver), South Hall 2A, 2:20 PM - 2:55 PM

Policies and environments (SIG)

Objective: Improvement and support of increase in overall physical activity and consequently physical fitness seem to be related to building supportive environments. Changes in the neighborhood environment in the last decades however promote significantly less active lifestyle and more passive forms, leading to a sedentary behavior. Therefore the aim of this study was to evaluate the associations of physical activity and built environment in Czech adolescents aged 11,19 years.

Methods: The research was conducted from 2013 to 2016 and includes a total of 1,745 participants (850 girls). Physical activity was obtained from self-reported IPEN Adolescent questionnaire and objectively by the Yamax SW-700 pedometer for seven consecutive days, in selected adolescents also by the ActiGraph GT1M or GT3X accelerometer. The neighborhood environment was assessed subjectively by the IPEN Adolescent questionnaire and in selected cities also objectively using geographic information systems. Current results include sample of 217 respondents who met the including criteria (objective measures of both PA and environment).

Results: We confirm that adolescents who live in more walkable environments do not reach a significantly higher level of physical activity or physical fitness compared to adolescents who live in a less walkable neighborhoods. The core city locality (city center and surroundings) was a significant factor for meeting 60 min of MVPA guideline (OR = 1.58; p = 0.550; 95% CI [0.99; 2.53]), in other parts of the cities (outskirts and block of flats) PA did not vary in both sexes. However, the research suggests no specific associations between the built environment and physical activity or physical fitness in Czech adolescents.

Conclusions: The findings identify the specific role of the built environment in Czech adolescents in relation to physical activity. The policy and school intervention programs should reflect these indicators in creation more active friendly environments to influence the level of physical activity in adolescents.
Do objectively-assessed physical activity and sedentary behaviour mediate the associations between environmental attributes and Japanese older adults’ body mass index?

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Determinants of physical activity and sedentary behavior (Chair: Glenn Weaver), South Hall 2A, 2:20 PM - 2:55 PM

Objective. Several studies have shown associations of walkable urban design attributes with older adults' weight status. However, these have been conducted mainly in Western countries. In addition, the mediation effects of both objectively-accessed physical activity and sedentary behaviour in this relationship have not yet been explored. The purposes of this study were to examine associations between objectively-measured walkable urban design attributes with Japanese older adults' body mass index, and to test whether objectively-assessed physical activity and sedentary behaviour mediated such associations.

Methods. Data collected in 2013 from 297 older residents (aged 65-84 years) living in Japan were used. Walkable urban design attributes, including population density, availability of physical activity facilities, intersection density, and access to public transportation stations, were objectively calculated using geographic information systems within both 800m and 1600m network-based buffers around participants' geocoded residential addresses. Physical activity, sedentary behaviour, and body mass index were objectively measured. The relationships of walkable urban design attributes, Walk Score®, and body mass index were examined by multiple linear regression with adjustment for covariates in all models. Mediation effects of the physical activity and sedentary behaviour variables in these relationships were tested using a product-of-coefficients test.

Results. Higher population density and Walk Score®, a free composite measure of walkability, was associated with lower body mass index. Light and moderate-to-vigorous physical activities were partially mediated the relationships between these walkable environmental attributes and body mass index.

Conclusions. This study adds evidence about the role of walkable built environments on older adults' weight status in Asian contexts and on the mediation effects of objectively-assessed physical activity and sedentary behaviours in this relationship. The findings of this study suggest that light and moderate-to-vigorous physical activities were significant mediators of the association. The significant associations of built environment variables with body mass index in older adults in Japan supports the cross-cultural generalizability of prior results from Western countries identifying built environments as an important public health problem. Developing active-friendly environmental policies to (re)design neighbourhoods may not only promote active transport behaviours but help in improving residents' health status in non-Western contexts.
SO13, SO13.1

Family resource drivers of unhealthy food intake in Australian toddlers

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Parents as key influencer on preschoolers' diet? (Chair: Wendy Van Lippevelde), South Hall 2B, 2:20 PM - 2:55 PM

Children and families (SIG)

Objective: Intake of energy dense-nutrient poor food contributes one third of 2-3 year olds daily energy intake. Understanding the relationship between family resources and unhealthy food intake in young children will allow better targeting of behavioural support strategies. This study aimed to explore sociodemographic characteristics as resource-related drivers of unhealthy food intake in toddlers.

Methods: This study utilised maternal-child data from the 'NOURISH' (ACTRN 1260800056392) and 'SAIDI' studies in Australia. Maternal age, highest level of education, working hours, household income, and number of children was collected via questionnaire at recruitment and child age 2 years. Child dietary intake data, collected via 1x24-hour recall and 2x24-hour records, were linked to 8-digit codes from the AUSNUT 2007 database and a discretionary food categorisation flag from the Australian Bureau of Statistics. Multiple regression was used to explore the relationship between sociodemographic characteristics and child intake of unhealthy food (% total energy intake) across the day and at meals/snacks (% energy at meal/snacks).

Results: A sample of 544 toddlers aged 2.0±smn;0.1 years, with 2-3 days of dietary intake data were included for analysis. Sixty-one percent of mothers were university educated and 59% were working (22±smn;10 hours/week), while 54% of children were the only child. Unhealthy food accounted for a median of 20(IQR 13-28)% of total energy intake. The regression model explained 4.6% variance in the proportion of energy from unhealthy food consumed across the day (p<0.001). Number of children in the household (βa;=0.138, p=0.004), household income (βa;=-0.115, p=0.013) and maternal working hours (βa;=0.094, p=0.042) contributed significantly to the model, while maternal age and education did not. Sub-analyses showed trends for different resource-related drivers of unhealthy food intake at dinner (p=0.068) compared with snacks (p=0.075).

Conclusions: Time, income and other resource-related constraints in differing family structures may act as barriers to healthy family food provision, providing an opportunity for targeted behavioural support. The conceptualisation of sociodemographic characteristics as indicators of family resources, in addition to measures of advantage/disadvantage, may be of benefit to intervention design, however requires further investigation. Future research could extend our models by incorporating feeding practices, eating behaviours and other family factors.
SO13, SO13.2

The association of parenting practices with preschoolers’ dietary intake and BMI, and the moderating role of general parenting and child characteristics

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Parents as key influencer on preschoolers' diet? (Chair: Wendy Van Lippevelde), South Hall 2B, 2:20 PM - 2:55 PM

Purpose: The purpose of this study was to examine the influence of parenting practices on preschoolers' dietary intake and weight status. In addition, moderation effects of general parenting style and child characteristics on the association between parenting practices and outcomes will be examined, in line with the contextual model of parenting style (Darling and Steinberg, 1993).

Methods: Parents of preschoolers (1-3 years old) were recruited through child-care centers and preschools in the Netherlands. Data regarding 388 children were available. Parenting practices were assessed using the Child Feeding Practices Questionnaire. Dietary intake was assessed using parental questionnaires and BMI z-scores were measured by trained research assistants. Linear regression analyses were used to explore the association of parenting practices and child outcomes, adjusted for child and parent background characteristics. Interaction terms between parenting practices, parenting style and child characteristics will be used to examine moderation effects.

Results: Emotional feeding was significantly and positively associated with child's BMI z-score and intake of cookies, cake and savory snacks. Healthy parental role modeling was associated with decreased savory snack intake and increased water intake; having a healthy food environment at home was associated with increased fruit, vegetable and water intake, and decreased cookie, sweets and sweet drink intake. Notably, child control over intake was associated with increased savory snack and sweet drink intake, and findings regarding teaching about nutrition and encouraging balance and variety were inconsistent. Moderation effects of child characteristics and parenting style on the association between practices and outcomes will be presented.

Conclusions: Various parenting practices were significantly associated with children's dietary intake and weight status, showing the importance of targeting parenting practices to prevent childhood obesity. In contrast to previous research, child control was associated with unhealthy intake. This might indicate that the control over intake granted to a child has to be age-appropriate.
SO13, SO13.3

Associations between parenting styles, feeding practices and child diet quality.

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Parents as key influencer on preschoolers' diet? (Chair: Wendy Van Lippevelde), South Hall 2B, 2:20 PM - 2:55 PM

Children and families (SIG)

Objective: In Australia, almost 25% of pre-school children are overweight or obese; poor diet quality is a key contributor. Parents play influential roles in the food intake of children. Previous studies found the authoritative parenting style is associated with healthier dietary intakes in children, however little is known about the mechanisms that mediate these relationships. This study examined associations between parenting styles, feeding practices and child diet quality. Furthermore, whether feeding practices mediate the associations between parenting styles and child diet quality will be examined.

Methods: A cross-sectional online survey of 915 Australian mothers of children aged 2-5 years was conducted. Maternal parenting styles were classified as authoritative, authoritarian, permissive, or disengaged using two parenting dimensions (warmth and control). Feeding practices were assessed using the Feeding Practices and Structure Questionnaire and the Comprehensive Feeding Practices Questionnaire. Diet quality was assessed using a 14 item diet quality index validated for the Australian population. Multiple linear regression examined the associations between parenting styles, feeding practices and diet quality, controlling for seven potential confounders.

Results: The parenting styles associated with higher diet quality (when compared to the disengaged parenting style) were authoritative (3.59; 95% CI [2.34, 4.84]), and authoritarian (2.62; 95% CI [1.22, 4.02]). The feeding practices associated with higher diet quality were; structured meal timing, monitoring, covert restriction, modelling healthy eating and structured meal setting (coefficients ranged from 0.64 to 2.68). The feeding practices associated with lower diet quality were; overt restriction, persuasive feeding, reward for eating and reward for behaviour (coefficients: -0.91 to -1.84). The authoritative parenting style was positively associated with the majority of feeding practices that were associated with higher diet quality and vice versa. (Full mediation results will be presented at the conference.)

Conclusions: Authoritative and authoritarian parenting styles, and several feeding practices, were positively associated with child diet quality. These findings can be applied to develop tailored nutrition promotion programs for parents with different parenting styles and feeding practices.
Consistency between parent-reported feeding practices and behavioral observation during a dinner meal

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Parents as key influencer on preschoolers' diet? (Chair: Wendy Van Lippevelde), South Hall 2B, 2:20 PM - 2:55 PM

Purpose: To understand whether feeding questionnaire responses reflect actual mealtime behavior, the current study compared parents' reported feeding practices to those observed during a meal.

Methods: Seventy-five parents of toddlers (mean 24.7 mo) in the US completed feeding behavior questionnaires and video-recorded their child's dinner meal, which was coded for feeding behavior. Parents' questionnaire responses of "never" or "rarely" were considered consistent if the behavior was not observed in the video; responses of "most of the time" or "always" if there was at least one observation. A cutoff of 70% agreement was used for behaviors to be considered consistent. To better understand how parents use "sometimes" responses, the percentage of participants using this response that were observed doing each behavior was compared to the other response groups.

Results: Parents reported the following behaviors with at least 70% consistency: allowing child to eat as much as he wants, helping child eat, prompts to eat, television/screens on during meal, offering non-food rewards, or hurrying child to eat faster. The following behaviors fell below the 70% threshold: arranging foods attractively, reasoning with child to eat, allowing child to choose among foods, allowing child to determine portion, asking child to clean plate, offering food rewards, praising child, and eating together.

For many behaviors, all reported frequency groups (never, sometimes, always) had similar rates of participants demonstrating the behavior at least once. For only five behaviors (restriction, television, food rewards, non-food rewards, and choosing food) did the observed rates fall in the expected direction (always>sometimes>never). For some behaviors, the "sometimes" group had a higher (e.g., clean plate) or lower (e.g., praise) frequency than either of the other two groups.

Conclusions: For many behaviors, questionnaire responses predicted whether the behavior was observed during the meal, but others did not. This may be due to situational factors, lack of awareness, or differences in item interpretation. Parents' use of "sometimes" remains difficult to interpret and its use may vary based on the behavior probed. We suggest that parents may use "sometimes" to mitigate socially undesirable responses, therefore necessitating further exploration of response scales used on behavioral questionnaires.
The Effect of Parent Beliefs and Practices on Young Children’s Response to a Preschool Healthy Eating Intervention: A Qualitative Study

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Parents as key influencer on preschoolers’ diet? (Chair: Wendy Van Lippevelde), South Hall 2B, 2:20 PM - 2:55 PM

Purpose: Early childhood is a critical period for establishing food preferences. Prevention programming designed to expand child consumption of a variety of healthful foods has had varied results. In order to understand how contextual, family and individual factors influence intervention effects, this study compared food/nutrition practices and beliefs among the parents of children who substantially increased or decreased consumption of a less liked healthful food when a child centered nutrition phrase (CCNP) was paired with repeated exposure (RE).

Methods: This mixed methods study used a sequential explanatory design. An intensity sample of parents (n = 10) from the CCNP study were purposively selected based on their child's responsiveness to the CCNP+RE condition in comparison with the RE condition (high or negative). Participants completed the Child Feeding Styles Questionnaire (CFSQ) and a semi-structured interview that examined family food/nutrition communication, food parenting, parent health, and feeding motivation. A demographic profile was created for each parent/child dyad. Interviews were transcribed verbatim and MAXQDA 11 was used to complete initial inductive coding and thematic analyses. A matched comparison analysis of coded segments was conducted in order to understand what factors explained children's high or negative response to the CCNP.

Findings: The intensity sample consisted of parents from the high CCNP responsiveness group (n = 7) and negative CCNP responsive group (n = 3). According to the CFSQ, parents in the high responsiveness group were more likely to use an authoritative feeding style (n = 5, 71%) compared with parents in the negative response group who used uninvolved (n = 2, 66%) or indulgent (n = 1) feeding style. The matched comparison analysis found that parents in the two groups differed in: frequency and content of parent initiated food communication, messaging related to the food/body connection; food parenting practices related to structure, autonomy support and coercion; and consideration of child factors.

Conclusions: The family environment may influence children's response to early education prevention programming with children whose parents use fewer effective evidence-based practices being less liable to change. Results suggest that the family is an important context for early childhood obesity prevention efforts.
Predictors of lapse and relapse in physical activity and dietary behavior: a literature review on prospective studies

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Behavior change Interventions (Chair: Jorge Encantado), North Hall, 2:20 PM - 2:55 PM

Objective: To uphold the health benefits of changes in physical activity and dietary behavior, it is crucial that people do not relapse into unhealthy habits. To prevent relapse, insights into predictors of relapse are needed. Hence, our aim is to synthesize the literature on the predictors of lapse and relapse in patterns of physical activity and dietary behavior, by applying systematic review techniques and a narrative synthesis approach.

Methods: Following the cognitive behavioral model of Marlatt (Marlatt & George 1984) we defined lapse and relapse in its broadest sense, wherein individuals need to have recently adopted a healthy behavior, followed by a return to previous more unhealthy behavior. If this return is temporary (i.e. a slip), it is defined as a lapse; if it concerns a full return to previous behavior, it is defined as a relapse. Prospective studies in adults aged = 18 years were identified from searches in PsycINFO, Pubmed and Cinahl. Methodological quality of included studies was assessed and data were synthesized narratively.

Results: In total 35 articles were included. The overall quality of the included studies was low, with only forty percent of the studies scoring high on quality assessment. For several predictors an indication for an association was found with self-efficacy as the only consistent predictor across the different outcomes, predicting both lapse and relapse in patterns of physical activity, and relapse in patterns of dietary behavior. However, for most variables the evidence for prospective relationships with lapse and relapse was insufficient.

Conclusions: This review gave a first insight into predictors of lapse and relapse in patterns of physical activity and dietary behavior and identified self-efficacy as a consistent predictor. Our review partly confirmed knowledge from theoretical models such as the Cognitive Behavioral Model of Marlatt (Marlatt & George 1984); however, for the majority of predictors the evidence was still insufficient. To be able to provide more substantiated conclusions there is a need for more high quality research in the field of lapse and relapse in patterns of physical activity and dietary behavior.
SO14, SO14.2

Findings from The SMART (Support, Motivation and Physical Activity Research for Teachers’) Health randomized controlled trial

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Behavior change Interventions (Chair: Jorge Encantado), North Hall, 2:20 PM - 2:55 PM

Disease prevention and management (SIG)

Objective: Over 30% of the Australian Teachers Health Fund payouts are for diabetes-related care. The aim of the study was to determine the efficacy and confirm the feasibility of referral to exercise physiologists, psychologists, and provision of a technology-based behaviour change support package to promote aerobic physical activity (PA) and resistance-training in school teachers at risk of or diagnosed with type 2 diabetes mellitus (T2D).

Methods: School teachers at risk of or diagnosed with T2D were recruited for an RCT. 104 participants were randomly allocated to one of the three groups: 'wait-list' control group (Group 1), 5 face-to-face visits with a psychologist and exercise specialist (Group 2), or 5 face-to-face visits with a psychologist and exercise specialist, plus a technology-based behaviour change support package for an additional 6 months (Group 3). Aerobic PA (primary outcome) was measured with pedometers and logs. Systolic and diastolic blood pressure, waist circumference, BMI, fasting blood sugar, glycosylated haemoglobin, plasma lipids, self-reported resistance-training, anxiety and depression were also assessed at 3, 9 (primary time-point) and 18-month post-baseline. Linear-mixed models (intention-to-treat) were used to perform the analyses. Process data were also collected to confirm the program's feasibility (satisfaction, adherence, retention).

Results: There were no significant changes in aerobic PA, however resistance-training activities significantly increased at 3- and 9-months post-baseline (p<0.01, p<0.001, respectively). At 3-months post-baseline, both intervention groups increased their monthly RT by 136 minutes (Group 2) and by 149 minutes (Group 3), compared to controls. At 9-months, both intervention groups increased their monthly resistance-training by 145 minutes (Group 2) and 82 minutes (Group 3), compared to the control group. Anxiety scores significantly improved (decreased) in Group 2 (vs controls) at 3-months (p<0.05; Cohen's d=-0.23). There were no other significant secondary outcomes. In terms of adherence, 74% of Groups 2 & 3 attended all 5 of the face-to-face sessions. Overall satisfaction of the program was high (4.7/5.0).

Conclusions: SMART Health is multicomponent, feasible intervention. Although there was no significant change in the primary outcome, some secondary measures however were significant. The findings will be used to guide future PA interventions for this population.

Trials Registry: ACTRN12616001309471
A cluster randomised controlled trial of a sugar-sweetened beverage intervention in secondary schools (the switchURsip program)

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Behavior change Interventions (Chair: Jorge Encantado), North Hall, 2:20 PM - 2:55 PM

Motivation and behavior change (SIG)

Objective: Due to the rising prevalence of overweight and obesity in children and adolescents, reducing childhood overweight and obesity is a public-health priority. A significant source of excess sugar and energy in children's diets comes from sugar-sweetened beverages (SSB), with adolescents having the highest intake of all age groups. However, existing interventions targeting SSB intake in adolescents have multiple limitations including the lack of randomised controlled trials, comprehensive dietary assessments, framework-based interventions or validated measures of SSB. This study aimed to assess the effectiveness of a school-based SSB intervention in reducing daily SSB consumption and daily percentage energy from SSB of secondary-school students.

Methods: A six-month pilot study (the switchURsip program) was designed based on the Health Promoting Schools framework and addressed factors associated with SSB intake in adolescents. A convenience sample of schools in New South Wales, Australia was used to recruit six schools (three intervention; three control). Strategies were mapped to the Behaviour Change Wheel and include: lesson plans on SSB; communication with students and parents; school challenge to build peer support; and school nutrition environment modifications. Support strategies to facilitate implementation included executive leadership and school committees, auditing and feedback, providing resources, staff professional learning and communication and marketing. Data was collected via online surveys, school observations and anthropometric measurements at baseline, midpoint and 6-month follow-up. Linear mixed models were used to compare between-group differences, using an intention-to treat approach with multiple imputation.

Results: Follow-up data collection is being conducted and will be completed by the end of the current school term. Current baseline measures show homogeneity between groups. Results will be analysed once all data is collected by the end of 2018.

Conclusions: This pilot study attempts to address identified evidence gaps by piloting the first intervention in Australia of its kind to reduce SSB intake in adolescents. Should the intervention prove efficacious and cost-effective, this would provide secondary schools with a suitable avenue to improve student health and nutrition.
The impact of a beginners running programme on markers of adiposity, blood pressure and fitness

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Purpose: Recreational running is an effective way of developing health-related fitness. Beginner running schemes, such as the 9-week Couch to 5k programme, aim to help people progress from walking to sustained bouts of running. Despite increasing popularity, no evidence exists on the health benefits of these programmes. This study examined the effects of a beginners running programme on markers of adiposity, blood pressure and fitness.

Methods: A convenience sample of 34 novice runners (85% female, mean±sd; age: 44±sd; years, BMI: 29.0±sd;5.9 kg/m2) were recruited from two community-based running clubs upon enrolment into a beginner’s course. At the start of the programme, researchers measured participants' height, mass and body composition (via bio-impedance analysis). Three consecutive measures of blood pressure were taken after a five-minute rest using an automated monitor. Participants' fitness was measured using the multi-stage 20-meter shuttle run test. The beginner running courses each had a duration of 10-weeks and were constructed around the Couch to 5k programme. They involved participation in one club-based session per week led by a qualified run lead, and two prescribed 'homework' sessions. Upon programme completion, baseline measurements were repeated. Pre and post measures were compared using paired-samples t-tests and effect sizes (ES) calculated. Independent t-tests compared baseline measures between those completing the follow-up measures and those not attending follow-up assessments.

Results: Twenty participants (59%) returned for follow-up measurements after 10-weeks. Sex distribution and all variables assessed at baseline did not differ significantly between those completing the study and those not returning (p>0.05). Body mass, BMI and percent body fat reduced significantly at follow-up (mean±sd change: mass -1.3±sd;2.2kg ES=0.29, BMI -0.5±sd;0.7kg/m2 ES=0.37, percent body fat -1.5±sd;1.6% ES=0.48, all p<0.01). No significant changes were observed in blood pressure. Seventeen participants completed the fitness test at follow-up (3 did not complete due to injury). Significant increases in fitness were observed as measured by comparing the distances covered on the test at baseline and follow-up (397.6±sd;200.4 vs 587.1±sd;317.9m, p<0.001, ES=0.69).

Conclusion: Completion of a 10-week beginner running programme led to favourable changes in adiposity and fitness. These findings should be confirmed in a larger-scale trial with longer-term follow-up.
SO14, SO14.5
Activity for Wellbeing: impact of a need-supportive program on motivation and physical activity behaviour in aged-care workers

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Behavior change Interventions (Chair: Jorge Encantado), North Hall, 2:20 PM - 2:55 PM

Motivation and behavior change (SiG)

Purpose: Occupational factors may predispose frontline aged care workers to decreased physical and psychological health. Growing evidence indicates that perceived autonomy in physical activity (PA) may promote more self-determined motivations, which, in turn, may influence the maintenance of PA behaviour over time. This study assessed the impact of a novel three-month program that emphasised the use of exercise-related affect, perceived exertion and self-pacing of activity intensity, within a multi-component, need-supportive approach (Self-Determination Theory). It was hypothesised that the program would impact motivational processes, physical activity behaviour and psychological wellbeing within a cohort of aged care workers.

Methods: The program was implemented as a single cohort study with measures at baseline, three-(immediately post-intervention), and nine-months. Primary outcomes were PA behaviour (7-day continuous accelerometry), and psychological wellbeing (Assessment of Quality of Life [AQOL-8D] and Kessler 10-item Psychological Distress Scale [K-10]) questionnaires). Process measures included the Perceived Need Support in Exercise questionnaire (PNSE) and the Behavioural Regulations in Exercise Questionnaire (BREQ-3). Data were subjected to repeated-measures analyses.

Results: The sample (n = 25) had a mean age 54.49 years (±s; 11.59) and was 88% female. Average minutes of total moderate to vigorous physical activity (MVPA) at baseline were 8.93 min/day (±s; 7.58). Scores for the K-10 and AQoL-8D were placed within normal range at baseline. A significant increase in the PNSE subscale 'Perceived Autonomy Support' (p = 0.019) was seen immediately post-intervention; however no other significant changes were demonstrated. Preliminary analysis of the nine-month data show maintenance of changes to perceived autonomy observed at three-months.

Conclusions: The results of the current study show that the use of affect, perceived exertion and self-pacing of activity intensity within a need-supportive program may provide a means of targeting perceived autonomy in exercise, as a Self-Determination theory-based mediator of PA behaviour change. Detailed assessment of program impact will be assessed nine-months post-baseline using a mixed-methods approach.
Implementation evaluation of a wearable technology intervention to increase adolescent physical activity: Translatability in practice

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Purpose: Wearable activity tracker interventions in combination with digital behaviour change resources provide opportunities to increase adolescents' physical activity. However, few process data concerning the implementation of such studies in real-world settings have been reported. The aim of this study was to examine adolescents' perceptions of the acceptability, feasibility, impact of, and engagement in and adherence to, a wearable activity tracker intervention. Teacher perceptions of acceptability and feasibility were also examined.

Methods: A mixed methods process evaluation was conducted as part of the Raising Awareness of Physical Activity (RAW-PA) Study. RAW-PA was a 12-week multi-component study that combined a Fitbit Flex with supporting online digital behaviour change resources and weekly challenges delivered via Facebook. A total of 275 adolescents (142 females, 133 males) from 18 schools participated in the study. After baseline data collection, schools were randomised to either an intervention (n=9) or wait-list control (n=9) group. Facebook engagement and Fitbit use data were collected during the 12-week intervention. Survey and focus groups with adolescents and interviews with teachers were conducted immediately post-intervention in intervention schools. Qualitative data were analysed thematically. Descriptive analyses were conducted on survey data.

Results: RAW-PA was rated as moderately acceptable by adolescents and highly acceptable by teachers. Adolescents agreed that the Fitbit was easy to use (93%), increased their physical activity awareness (78%) and motivation (71%), and that the information delivered was easy to understand (83%). Facebook engagement was low and declined over time. Only 48% of adolescents liked the weekly challenges, and 19% of participants reported still wearing the Fitbit at the end of the intervention. Teachers reported the online delivery facilitated implementation, and wanted access during the program to more information about adolescents' involvement and engagement in the intervention.

Conclusions: RAW-PA had moderate acceptability among adolescents, and increased motivation for physical activity in the short-term, however adherence declined over time. The use of a Fitbit to raise awareness of physical activity levels was feasible. The feasibility of implementation was enhanced by low levels of teacher burden for delivery. Future studies should explore how to engage young people in wearable technology interventions over time.
SO15, SO15.2

Qualitative Evaluation of the e-coachER Randomised Controlled Trial: Participants’ views of the web-based support package for facilitating uptake of Exercise Referral Schemes and maintenance of longer-term physical activity

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Digital health promotion tools for behavioral nutrition and physical activity (Chair: Siew Sun Wong),
Terrace 2A, 2:20 PM - 2:55 PM

E- & mHealth (SIG)

Objective: Exercise referral schemes (ERS) aim to increase physical activity (PA) of patients with chronic conditions such as obesity, diabetes, hypertension, osteoarthritis and low mood. However, patient uptake and adherence to ERS limited. The e-coachER RCT aimed to determine whether augmenting usual ERS with a bespoke web-based behavioural support (informed by self-determination theory (SDT)), and pedometer, increased long-term PA for patients with chronic conditions. The present study aimed to qualitatively explore how participants experienced and engaged with the e-coachER intervention.

Methods: Semi-structured telephone interviews were conducted with participants who had logged on to e-coachER at least once (n=26). The topic guide focussed on all aspects of the intervention including the welcome pack, pedometer and web-based support. Interviews were recorded, transcribed and imported into NVivo Version 11. Two researchers analysed the transcripts thematically, focussing on 'top level' themes reflected in the e-coachER logic model.

Results: Thirty-eight interviews were carried out in total with seven participant's having more than one interview. Each interview lasted between 16 and 80 minutes. Participants expressed barriers such as time, ill-health, unexpected life events and IT related difficulties. Most participants found that e-coachER was easy to understand, flexible and supportive and served as a reminder to increase their PA. For many, e-coachER fostered a sense of competence through self-monitoring and goal setting and inviting them to reflect on how they felt after engaging in PA. Many people also felt that e-coachER increased their sense of control, by suggesting other ways they could achieve their PA (e.g. by walking instead of taking the bus) and some felt that e-coachER facilitated connectedness by encouraging them to develop and expand their social networks. Finally, others experienced barriers to engagement which may have undermined these needs and subsequent PA.

Conclusions: The e-coachER intervention was acceptable and positively experienced for many, but not all, of the participants interviewed. Many felt that their basic needs of competence, autonomy and relatedness were somewhat facilitated by e-coachER. This study provides valuable insights into how ERS augmented with web-based support is received by patients with a range of complex personal circumstances and co-morbidities.
Can Instagram be used to deliver an evidence-based physical activity intervention for young women? - an exploratory study

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Digital health promotion tools for behavioral nutrition and physical activity (Chair: Siew Sun Wong), Terrace 2A, 2:20 PM - 2:55 PM

E- & mHealth (SIG)

Purpose
Half of young Australian women do not meet physical activity guidelines. Novel intervention approaches should be developed in consultation with young women to ensure they are appealing and motivate sustained engagement. Instagram is a leading social networking platform used by over 80% of young Australian adults, however, few studies have attempted to use Instagram to deliver a physical activity program. This study aimed to determine the needs and preferences of young women regarding a potential Instagram-delivered physical activity program.

Methods
Young inactive women aged 19 to 30 years (M=25, SD=3) attended a 60-minute focus group to discuss their Instagram use, appeal of a potential Instagram-delivered physical activity program, and preferences for exercises and online content. Data collection occurred on a rolling basis and ceased once data saturation was reached (n=13). Discussion was facilitated using structured questions and a group ranking task, whereby participants rated four series of images related to exercise, environment, model and content, from most to least appealing. A scribe recorded notes and responses were analysed using inductive thematic analysis.

Results
Participants used Instagram for 2.5 hours per day (SD=1). They followed fitness models but were not aware of any available Instagram-based physical activity programs. Instagram was considered an appealing platform for a physical activity program because it is easy to access, integrates engaging features (videos and tagging friends), and could provide daily reminders to exercise through their Instagram feed. Participants preferred running and bodyweight exercises, rather than weight training, boxing or swimming. They also preferred to exercise at home or outdoors, rather than at the gym. Participants preferred Instagram posts to feature models similar to themselves, rather than older adults or fitness models, and simple infographic and inspirational posts, rather than information-rich posts.

Conclusion
Instagram appears to be a suitable and appealing platform for a physical activity program. Young women showed clear needs and preferences for the exercise structure and content delivery. It is therefore vital to develop physical activity programs in consultation with young women to ensure they are appropriate for this population. Findings will be used to develop a 12-week Instagram-delivered physical activity program.
Evaluation of a Physical Activity Program Designed for Adults with Developmental Disabilities and their Staff

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Digital health promotion tools for behavioral nutrition and physical activity (Chair: Siew Sun Wong), Terrace 2A, 2:20 PM - 2:55 PM

E- & mHealth (SIG)

Objective: Engaging in regular physical activity has many proven health benefits, however the majority of people are not meeting the recommended guidelines. This is especially true for individuals with disabilities. Many adults with developmental disabilities spend their days working at programs where they are supervised by staff. These programs present a great opportunity to involve this population in daily physical activity. However, staff often feel unprepared to organize physical activity opportunities. Therefore, the purpose of this study was to evaluate a program designed to teach staff how to incorporate daily physical activity at a program for adults with developmental disabilities.

Methods: Participants included 26 staff. The program consisted of staff receiving three text-messages each day that specified physical activities they could implement. Additionally, staff were given a binder, highlighting the importance of physical activity and descriptions and pictures of how to perform each activity. Participants completed surveys about their physical activity participation and their perceptions on the usefulness of program. Qualitative data analysis was directed by the grounded theory approach.

Results: Twenty-six staff members signed up to participate in the program. However, only 10 participated at least 70% of the time. Participation was defined as responding to the three text-messages sent each day and completing a pre and post survey. Results indicated that all staff who completed the program found the program helpful and effective for themselves and the adults with developmental disabilities. Specific themes that emerged included the helpfulness of the ease of access to the material and the adaptability of the exercises. Data from staff who did not participate at least 70% of the time indicated that most of them implemented the physical activities throughout the day, but they did not respond to the text messages. Lack of responses to the text-messages was considered a limitation of this study. Implications for future implementation of this design will be discussed.

Conclusions: If implemented properly, this text- based program has the potential to increase physical activity levels of adults with developmental disabilities who are enrolled in various types of programs and their staff.
Digital health promotion tools supporting healthy eating in families: A mixed method review

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Objective: Children consume one-third of their food intake at school, therefore improving school day intake can support improvements in diet quality. Parents are the main providers of school food in many countries, however, reaching and engaging parents is challenging. With growth in internet and smartphone use, digital platforms provide potential to disseminate information rapidly to many people. The purpose of this work was to understand (1) what digital tools are available for parents to support provision of healthy lunches, (2) what parents want from digital health promotion tools, and (3) effectiveness of digital health promotion tools used with parents to support children's nutrition.

Methods: A systematic search of websites (Google) and Apps (App Store) providing lunch-provision information to parents was conducted. Two systematic reviews were also undertaken to identify studies conducting user-testing of digital tools with parents and evaluating their effectiveness for improving nutrition. Searches were conducted in five databases for publications from 2008 (review 2) or 2013 (review 3). For all reviews, results were included if they were targeted at parents and excluded if targeted only at children. Results were double screened, and data extracted into standardised spreadsheets. Quality was assessed using the MARS (websites/apps) and quality assessment tool (systematic reviews).

Results: Websites (n=15) were developed primarily by credible sources and included information-based content consistent with dietary guidelines and limited interactive features. Apps (n=6), developed mostly by commercial organisations, were more interactive but provided less credible information. User-testing studies (n=31) identified that digital platforms should include both informative content and interactive features, and information should be from credible, trusted sources and evidence-based. Studies evaluating digital interventions for improving nutrition in the family setting (n=21) demonstrated effectiveness which was equal to or slightly better than face-to-face or online comparison groups.

Conclusions: This unique, multi-component review demonstrated that digital health promotion tools are acceptable modes of health promotion delivery for parents and can be effective for improving nutrition-related outcomes in the family setting. The findings highlight potential to develop digital health promotion tools targeting parents to improve children's lunches, which meet the desired combination of credentialed information and interactivity.
PRACTIS for COmEBAcK: use of PRACTIS to guide process evaluation and scalability planning within a trial evaluating two physical activity interventions in people with self-reported walking difficulty

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Implementation and scalability (SIG)

Purpose: To describe the application of the scalability assessment guide PRACTIS to the evaluation of two physical activity interventions within a randomised controlled trial.

Methods: COmEBAcK (COaching and Exercise for Better wALKing) is a three-arm pragmatic randomised controlled trial (n=600) to evaluate the effectiveness of two interventions to enhance physical activity in people with self-reported walking difficulties against a wait-list control group. The trial has been co-designed with key stakeholders to optimise suitability for implementation and scalability. Intervention 1 involves a face-to-face physiotherapy assessment conducted by a local physiotherapist, fortnightly telephone health coaching delivered centrally, physical activity plan, and access to technologies (e.g. fitbit) and online resources. Intervention 2 incorporates a single telephone health coaching session delivered centrally, fortnightly tailored text messages, physical activity plan and access to online resources. The process evaluation for the trial was developed utilising the four steps of the PRACTIS guide.

Results: A mixed methods process evaluation was developed. Semi-structured qualitative interviews with 20-30 participants receiving coaching and 15-20 stakeholders will be conducted and analysed thematically. Interview topics will cover expectations of the intervention, motivations, self-efficacy, behaviour change and facilitators and barriers to participation in each component of the intervention. Quantitative data will be collected from multiple sources and will be analysed and reported descriptively. Recruitment pathways will be monitored to inform future recruitment strategies. Intervention fidelity (e.g. health coaching session frequency and content) and participant engagement with different components of interventions (e.g. online resource usage, text message delivery) will be measured to identify essential ingredients for future intervention implementation. Evaluation of the local physiotherapy assessment, access to appropriate local physical activity opportunities and communication between health coaches and other health professionals will inform how well the interventions can be integrated into the current health and community context.

Conclusions: The PRACTIS tool provided a useful framework for designing the process evaluation for a randomised controlled trial to ensure that implementation feasibility and scalability are integrated into evaluation.
A Longitudinal Study of Disseminating, Translating, Implementing and Scaling-Up Research Recommendations to Increase Physical Activity in Rural Communities

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Upscaling nutrition and physical activity interventions (Chair: Chris Lonsdale), Terrace 2B, 2:20 PM - 2:55 PM

Implementation and scalability (SIG)

Objectives: What adaptations are needed to successfully translate, implement and scale-up research-generated recommendations for promoting physical activity in under-resourced, rural, American Indian, Hispanic, and non-Hispanic communities with high rates of health disparities? What technical assistance do they require? How was a model (VIVA I) systematically developed and scaled-up in New Mexico (VIVA II) and the Navajo Nation (Healthy Places--Healthy People) to fit the unique context of these communities while maintaining fidelity to original research conducted in mostly urban/suburban locations?

Methods: We used mixed methods to study the process of adaptation using: pedestrian counts, surveys, participant observation of academic-community partnership meetings, content analysis of minutes, field notes and documents, and in-depth interviews. All qualitative data were entered into an NVIVO database, while technical assistance data were entered into a Red Cap database. Qualitative data were analyzed using a constructivist grounded theory approach. We identified factors important for successful implementation of the model as well successful strategies at a beta site (VIVA I). The model was scaled-up to 30 additional communities throughout the state (VIVA II), and a plan is underway for scaling-up the model to the Navajo Nation (Healthy Places--Healthy People).

Results: Outcomes include new and enhanced trails, sidewalks, social support of activity, policy changes, and park improvements. Important themes for successful adaptation and implementation include an active community-academic partnership; local leadership; multiple partners across sectors (e.g. land management, parks and recreation, public health agency, regional planning); and culturally relevant approaches that fit local context and place characteristics.

Conclusions: This study demonstrates how research findings can be translated and developed into a practical blueprint for an under-resourced rural setting (beta site) dissimilar from that of the original studies. It furthermore demonstrates how this model can be scaled-up to many other communities with similar characteristics. It is important to identify key factors that promote fit of the model into local context while maintaining fidelity to the original research, thus bridging the gap between research and practice. Developing a beta site model and then scaling-up to similar populations shows promise as a universal strategy for dissemination and implementation of research findings.
Scaling up an intervention to promote physical activity in childcare centers

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 Upscaling nutrition and physical activity interventions (Chair: Chris Lonsdale), Terrace 2B, 2:20 PM - 2:55 PM

Objective
Childcare centers are settings with a huge impact on children's health and health behavior. QueB is an intervention to create activity-friendly childcare centers through organizational development and to increase the children's and staff's capabilities for an active lifestyle. QueB was developed and tested in a participatory process with 12 childcare centers in two model regions in Germany as part of the research consortium Capital4Health (2015-2018). The aim of the second project phase QueB 2 (2018-2021) is to develop and implement strategies to scale up the intervention in one region, to ensure sustainability and to gain access to hard-to-reach childcare centers.

Methods
Intervention: A regional peer-to-peer-network is initialized with childcare centers from the first project phase and new ones to learn from each other and exchange ideas about physical activity promotion. In addition, a web-based qualification and a mobile application for multipliers are developed to help them assess the needs of childcare centers concerning physical activity and offer adequate support.
Evaluation: The different parts of the intervention are evaluated with accelerometers in a pre-post-design (changes in children's and childcare staff's activity patterns) and interviews with stakeholders (acceptability, feasibility, barriers and facilitators).

Results
QueB 2 will result in regional structures that support the physical activity promotion of childcare centers: A peer-to-peer-network with regular meetings, qualified multipliers who bring physical activity promotion on the childcare centers' agenda and an online toolbox with diverse supporting material for multipliers and childcare centers.

Conclusions
The described low-threshold measures will facilitate the access to hard-to-reach childcare centers and contribute to the promotion of the childcare staff's and children's capabilities for an active lifestyle. The involvement of multipliers is important for the sustainable implementation of the intervention.
Pursuing effective strategies to increase reach for family-based pediatric obesity treatment interventions

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Upscaling nutrition and physical activity interventions (Chair: Chris Lonsdale), Terrace 2B, 2:20 PM - 2:55 PM

Implementation and scalability (SIG)

Objective: To determine the differential reach of active versus passive recruitment strategies for a family-based obesity treatment intervention via a school or clinical setting.

Methods: Eligible participants (n=458) were identified by pediatricians through clinical record review and through BMI screenings at a local public-school district. Potential participants were then randomized to active or passive recruitment strategies (clinic: n=150 active and n=75 passive; school district: n=150 active and n=83 passive). Eligible participants received an initial active or passive recruitment letter from either the clinic or school district. Active recruitment follow-up consisted of four contact attempts using phone, email, and or text message by the research team. The passive letter requested the family contact the research team if interested. Descriptive analyses were calculated for reach by recruitment partner and strategy. Reach was defined as the number, proportion, and representativeness of eligible participants recruited.

Results: Five children were deemed ineligible during the recruitment and 2 families contacted the research team outside of the planned recruitment strategies and participated in the intervention. The overall reach was 4.0% (18/455). Active recruitment achieved a reach of 3.4% (10/295), compared to 3.8% (6/165) by planned passive recruitment. Planned passive recruitment led to 3 participants for both the clinic and school district. School-based active recruitment led to 8 participants compared to 2 through the clinic. All Hispanic participants (8.3%) were recruited through the school district.

Conclusions: These results have important implications for micropolitan rural communities where there is a challenge to recruit enough participants to populate behavioral interventions. The local public-school district was a viable partner for additional recruitment, including ethnic representation of the eligible population. Multiple pragmatic recruitment strategies with existing community organizations may be necessary for scalability of effective evidence-based interventions.
A thematic analysis on the implementation of nutrition policies at food pantries in the United States using the RE-AIM framework

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Upscaling nutrition and physical activity interventions (Chair: Chris Lonsdale), Terrace 2B, 2:20 PM - 2:55 PM

Objective: Food pantries may be concerned about the nutritional quality of the food they are distributing, but we found only one in five pantries have adopted a formal nutrition policy. Adopted policies tended to contain weak language and a narrow breadth. Barriers to implementation of the policies have not been fully explored at food pantries. The purpose of this study was to use a qualitative approach to explore the implementation of adopted formal nutrition policies among food pantries. Additionally, it sought to explore barriers to implementation in pantries that had not adopted a nutrition policy.

Methods: A survey distributed across the United States in 2017 found 282 pantries had a formal nutrition policy. Of those, 40 policies were submitted to our team and 13 of those were determined to have a nutritional focus. The 13 pantries were then matched with 27 pantries without a nutrition policy by type of pantry, geographic region and operation method. We used a modified motivational interviewing approach used to explore barriers to implementation of nutrition policies at food pantries. Interviews were conducted by a trained interviewer, recorded, transcribed, and took place during April and May 2018. A thematic analysis approach guided the coding and was focused on the RE-AIM dimension of implementation.

Results: Ten food pantry directors were interviewed (25%). The implementation themes that arose from those with formal policies were barriers, enforcement, fidelity, unexpected consequences, and delivery of the policy. For informal policies, themes included barriers, enforcement, and fidelity. Barriers to implementation among policy adopting pantries were volunteer pushback limiting enforcement and client buy-in. Key barriers to implementation among non-policy adopting pantries were lack of time and knowledge to create a policy.

Conclusions: Pantries in the current study have experienced pushback from volunteers and clients regarding formal policies. These barriers limit the degree to which the policy can be fully implemented and enforced. Including volunteers and clients in development of the policy may help increase buy-in and improve implementation. By supporting food pantries in the development, adoption, and implementation of nutrition policies, researchers can play an important role in improving the quality of food in the emergency food network.
SO17, SO17.1

Physical activity and dietary intake among patients with newly diagnosed colorectal cancer

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Cancer and Disease prevention and management (Chair: Linda Trinh), Club A, 2:20 PM - 2:55 PM

Cancer prevention and management (SIG)

Purpose: Our purpose was to describe physical activity and dietary intake in colorectal cancer (CRC) patients.

Methods: In newly diagnosed CRC patients, activity energy expenditure (AEE) was evaluated as total energy expenditure (doubly labeled water) minus resting energy expenditure (indirect calorimetry). Accelerometers (ActiCal) were worn during the two-week doubly labeled water assessment period to obtain percent time in sedentary, light, moderate, and vigorous activities, with categories defined by manufacturer defaults of activity counts/1-minute epoch. Caloric intake (kcal/kg body weight/day) and protein intake (g/kg body weight/day, % total caloric intake) were ascertained by 24-hour dietary recall on the first weekday of data collection. Pearson or Spearman's rank correlation and independent t-tests were used to assess relationships among demographic variables, AEE, physical activity, and dietary characteristics.

Results: Twenty-one patients were included (n=20 with stage II or III cancer; 14:7 male:female; BMI: 28.3±smn;4.9kg/m2; age: 57±smn;12 years). One patient had stage IV disease and was not an outlier in terms of physical activity or diet and results were similar when this individual's data was removed in a sensitivity analysis. Average AEE was 709±smn;400 kcal/day and was highly variable (range: 62, 1787 kcal/day). AEE was not correlated to step count or percent time in sedentary, light, moderate, or vigorous activities. The majority (80.1±smn;9.4%) of time was spent in sedentary activity, ranging from 63.6, 94.5%. Only six patients engaged in vigorous activity. Age was negatively correlated to step count (r=−0.532, p=0.016) and percent time in moderate activity (r=−0.467, p=0.038). Step count (4487±smn;2459 vs. 5351±smn;2673, p=0.002) and percent time in moderate activity (7.4±smn;4.8% vs. 8.5±smn;5.4%, p=0.038) were lower on weekends than weekdays, respectively. Reported energy intake was 27.2 kcal/kg body weight (2233±smn;666 kcal/day), with five patients (23.4%) reporting intake within the recommended 25, 30 kcal/kg/day. Protein intake was 1.1±smn;0.4 g/kg/day and nine patients (42.9%) consumed less than recommended for cancer patients (i.e. <1.0 g/kg/day). AEE was positively correlated to energy intake (r=0.609, p=0.003), but negatively correlated to percent calories from protein (r=-0.596, p=0.004).

Conclusion: Further understanding of the determinants of physical activity and dietary intake is needed to facilitate interventions for improved prognosis and survivorship in cancer patients.
Integrating Nutrition into Oncology Care – the NutriCare program

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Cancer and Disease prevention and management (Chair: Linda Trinh), Club A, 2:20 PM - 2:55 PM

Purpose: Cancer patients can experience side effects of treatment that can impact nutritional intake as well as unwanted weight loss during cancer, due to cachexia. In addition, survivors have been shown to experience unwanted weight gain and to have poorer dietary quality than the general population. Nutrition therefore should form an integral part of their management and treatment plan, however this is not always the case.

Methods: A multidisciplinary team of researchers met weekly to identify the best approach for integrating nutrition into standard oncology practice and to identify the core components and behavioural change aspects for the program. It was decided that the underlying components of this should be grounded in social cognitive and self-determination theories with the aim of increasing knowledge, developing goal-setting skills, increasing self-efficacy and providing positive reinforcement. The 5-A model which has previously been used in smoking cessation and more recently in weight management was adapted as it fit well with the core principles already identified. Using this model we developed the NutriCare programme which consisted of a healthcare professional toolkit, a nutrition assessment screening tool for use with patients and survivors, a prescription pad based intervention and a patient toolkit. This programme was piloted at Tufts Medical Centre between July and August 2018 and 20 breast cancer survivors were enrolled in the study. A personalised intervention utilising the NutriCare model was delivered by the research dietitian and supported by the local healthcare team. Dietary history, quality of life and medical history were assessed in all participants at baseline and 6 weeks post intervention. Participants were also invited to evaluate the program by survey upon completion.

Results: This pilot will provide evidence for the effectiveness of this model to integrate nutrition within the oncology care setting and for this advice to be delivered by the oncology team. It will also provide valuable feedback to further develop this intervention.

Conclusions: By better understanding how to integrate nutrition into oncology care, interventions can be optimised. The findings therefore will have implications for the further development of work in this area.
SO17, SO17.3

Feasibility and acceptability of tailored eHealth activity change advice among breast cancer survivors

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Cancer and Disease prevention and management (Chair: Linda Trinh), Club A, 2:20 PM - 2:55 PM

Cancer prevention and management (SIG)

Purpose: Despite the benefits, physical activity levels are low among women with breast cancer; about 70% not engaging in the recommended levels for health benefits. In addition, they spend approximately 66% of their waking time sedentary. Research shows various forms of web-based technology (eHealth/mHealth) to be effective in facilitating activity behaviour change various populations. The main purpose is to determine feasibility and acceptability of a tailored web-based exercise and behavioural support program among women who have been diagnosed with breast cancer.

Methods: Breast cancer survivors were recruited via community based methods or in oncology clinic. Women were consented and provided with a FitBit Alta HR for the study duration (3 weeks). The first week was to establish a baseline amount of activity after which access to the site ExerciseGuide.ca was granted. The site contains modules designed to deliver tailored advice to women based on their activity levels and survey answers. Resistance and cardiovascular exercise advice was also prescribed. Participants visited the site and synced their FitBit to get personalized progress reports at the end of week 1 and week 2. After 3 weeks, participants completed post-study evaluation surveys.

Results: Recruitment of 30 women with a breast cancer diagnosis concluded on 29 November 2018. Of the 30 women, 18 were recruited from breast cancer support groups and 12 from the Nova Scotia Cancer Centre in Halifax, Canada. 14 women were currently on hormone therapy and 2 on radiotherapy with the remainder post-treatment. Reports of technical difficulties are being tracked. To date, these have included FitBit sync problems, registration or login difficulties, and survey issues; due mostly to user error but easily resolved. Evaluations have been positive and some interesting qualitative comments have been collected that offer praise and constructive feedback for how to improve.

Conclusions: Preliminary evidence suggests it is feasible and acceptable to deliver tailored activity advice to women with a breast cancer diagnosis. The information and site have so far been well received with few technical difficulties. The study intervention will be concluded December 21, 2018.
Perceptions on Integrating Nutrition into Oncology Care by Oncology Providers and Adult Cancer Survivors

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Cancer and Disease prevention and management (Chair: Linda Trinh), Club A, 2:20 PM - 2:55 PM

Purpose: Cancer patients experience many treatment side-effects that impact on nutritional intake. Cancer survivors have been shown to have poor dietary quality and often battle with unintentional weight loss or weight gain. Nutrition care plays a critical role in improving the long-term health of cancer patients and survivors; and yet it has not been incorporated as a standard component of the current delivery model of outpatient oncology care. The aim of this study was to assess perceptions on strategies to integrating nutrition into oncology care from both oncology care providers and cancer survivors.

Methods: A total of 6 focus groups were conducted in July 2018 with 12 oncology providers and 12 cancer survivors in the United States. Participants were asked about their perceptions on the role of nutrition in survivors' health, the appropriate components of nutrition care for cancer patients, and strategies to integrate nutrition care into the current delivery model of outpatient oncology care. The focus groups were recorded and transcribed verbatim. Based on the research aims and the questions asked during the focus groups a coding framework was developed. This was inductively refined based on the focus groups and the transcripts were coded. The coded data was then assessed to identify themes.

Results: Four main themes emerged: 1) nutrition is an important component of oncology care. Patients consider nutrition as an important tool to empower themselves with choices to improve their quality of life and long-term health 2) the most appropriate time for providers to talk to patients about nutrition not immediately post diagnosis but rather at the time of development of the treatment plan; 3) Providers reinforcement of the key nutrition messages is critical to improve patients' adherence to nutrition recommendations; 4) both patients and providers desire access to evidence-based nutrition recommendations. Major barriers to integrate nutrition into oncology are the lack of time for providers due to busy practice, and the lack of motivation from providers due to lack of reimbursement.

Conclusions: Both providers and survivors were interested in and supportive of nutrition being integrated into outpatient oncology care, with appropriate timing and major barriers noted.
SO17, SO17.5

Context-specific sitting time and abnormal glucose metabolism in Australian men and women

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Purpose: High volumes of time spent sitting are associated with an increased risk of developing type 2 diabetes. Evidence to date has been primarily based on studies using television (TV) viewing or overall sitting time as the exposure; much less is known about the specific effects of sitting in other settings. We examined the associations of self-reported time spent sitting in four contexts (occupational, transport, TV viewing, and leisure computer use) with abnormal glucose metabolism (AGM) in Australian men and women.

Methods: Participants (1470 men; 1950 women; mean±smn;SD age 58±smn;10 years) were those without previously diagnosed diabetes or CVD from the 2011-2012 assessment wave of the AusDiab study. Logistic regression models examined associations of context-specific sitting times with presence of AGM based on a standard 2h oral glucose tolerance test. Gender-specific tertiles of sitting time were calculated. Analyses were adjusted for age, education, ethnicity, occupation, marital status, alcohol, smoking, energy intake, physical activity and BMI.

Results/findings: Compared to the lowest tertile of TV viewing time (=1 hour), the odds ratios for AGM were 1.27 (0.92, 1.76) in the mid tertile (>1 to =2 hours) and 1.42 (1.03, 1.96; P=0.04) in the highest tertile (>2 to 10 hours) in women. For men, the odds ratios were 0.70 (0.49, 1.00; P=0.05) in the mid tertile (>1.15 and =2.14 hours), and 1.00 (0.74, 1.35) in the highest tertile (>2.15 to 8.29 hours) relative to the lowest tertile (=1.14 hours). In working men, compared to the lowest tertile of occupational sitting (=1.6 hours), the odds ratios were 0.94 (0.63, 1.40) in the mid tertile (>1.6 and =4.3 hours) and 1.46 (0.95, 2.26; P=0.08) in the highest tertile (>4.3 hours and <14.6 hours). No significant associations were observed for occupational sitting in working women. Sitting time during transport and leisure computer use were not associated with AGM in men nor women.

Conclusions: Excessive sitting in specific contexts may be more detrimental to glycaemic health than others, and may vary by gender. Future prospective studies examining contexts of sitting linked to device-based measures are needed to confirm and extend these findings.
A systematic review and meta-analysis of interventions to reduce time spent sedentary or break up prolonged sedentary events in adults

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Objective: Research shows the adverse effects of sedentary behaviour on physical and mental health. This systematic review and meta-analysis examined the effectiveness of interventions which measured sedentary behaviour in adults from both clinical and non-clinical populations, and identifies Behaviour Change Techniques (BCTs) and components that were effective in reducing sedentary behaviour in adults.

Methods: Nine electronic databases, websites of relevant organisations, and previous reviews focused on sedentary behaviour in adults were searched (October 2017). No language or date restrictions were applied. Inclusion criteria: Randomised controlled trials (RCTs) including cluster-RCTs, and randomised cross-over trials in adults (clinical and non-clinical). Any study including a measure of sedentary behaviour was included even if reducing sedentary behaviour was not the primary outcome. Exclusion criteria: Interventions delivered in schools, colleges, or workplaces; studies that aimed to investigate the acute (immediate) effects of breaking up sitting time as part of a supervised (usually laboratory-based) intervention. Two review authors conducted data extraction, including intervention BCTs, and quality assessment (GRADE approach). Meta-analyses included data from the first available follow-up post-intervention, and the last available follow-up.

Results: Searches identified 24,184 records, of which 82 studies met the inclusion criteria and were included in a narrative synthesis; 68 studies were included in meta-analyses. At post-intervention, total time spent engaging in sedentary behaviour was reduced in interventions which incorporated the provision of information, education, or formal support (advice or recommendations), in conjunction with either motivational counselling (-38 min/day; 95% CI: -64 to -12; n= 262) or included a form of physical activity (-15 min/day; 95% CI: -23 to -0.07; n= 2421). However, this positive effect was not maintained at follow up. No intervention effect was evident in the meta-analyses of interventions to break up prolonged sedentary events. A review of individual RCTs indicated frequently occurring BCTs within effective interventions were action planning, goal-setting, social support, and problem-solving.

Conclusions: This systematic review and meta-analysis shows that interventions may be effective in reducing time spent sedentary immediately post-intervention, and highlights potentially effective intervention components and BCTs. Future interventions would benefit from focusing on breaking prolonged sedentary events.
SO18, SO18.2

Health benefits of electrically-assisted cycling: a systematic review

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Purpose: Active commuting is associated with a lower risk of cardiovascular disease and mortality. However, rates of engagement in active travel are low. Electrically assisted bicycles (e-bikes) have been highlighted as an alternative method of active travel that could overcome some of the commonly reported barriers to cycle commuting. The objective of this systematic review was to assess the health benefits associated with e-cycling.

Methods: A systematic literature review of studies examining physical activity intensity, cardiorespiratory, metabolic and psychological outcomes associated with e-cycling was conducted. Where possible these outcomes were compared to those from conventional cycling and walking. Seven electronic databases, clinical trial registers, grey literature and reference lists were searched up to November 2017 using e-bike related terms. Hand searching occurred until June 2018. Experimental or observational studies examining the impact of e-cycling on physical activity intensity and/or health outcomes of interest were included. The e-bikes used must have pedals and require pedalling for electric assistance to be provided. The quality of included studies was assessed.

Results: Seventeen studies (11 acute experiments, 6 longitudinal interventions) were identified involving a total of 300 participants. There was moderate evidence that e-cycling provided physical activity of at least a moderate intensity, which was lower than the intensity elicited during conventional cycling, but higher than that during walking. There was also moderate evidence that e-cycling can improve cardiorespiratory fitness in physically inactive individuals. Evidence of the impact of e-cycling on metabolic and psychological health outcomes was inconclusive. Longitudinal evidence was compromised by weak study design and quality.

Conclusions: E-cycling can contribute to meeting physical activity recommendations and increasing physical fitness. As such, e-bikes offer a potential alternative to conventional cycling. Future research should examine the long-term health impacts of e-cycling using rigorous research designs.
SO18, SO18.3

Associations of Device-Measured Sitting, Standing, and Stepping Time with Informal Face-to-Face Interactions at Work

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Physical activity and sedentary behavior studies (Chair: Ferdinand Salonna), Club B, 2:20 PM - 2:55 PM

Objective: Sharing knowledge through face-to-face (FTF) interactions between workers is recognized as valuable element in contemporary knowledge-based workplaces in the context of changes in communication technology and increasing job specialization. Co-location or coworking is a typical strategy to increase informal FTF interactions between colleagues at the workplace. However, sitting and movement patterns at work, along with the availability of space for interaction, may be also relevant. This cross-sectional study examined associations of workplace movement (sitting, standing, and stepping) and availability of discussion space with FTF interactions.

Methods: Desk-based workers (n=221, 68% women, age range: 24, 65, 80% fulltime) were recruited from 14 geographically separate offices from a single government department in Victoria, Australia. Their workplace movement (time spent sitting, standing, and stepping) was measured via the activPAL3 activity monitor. Participants self-reported their weekly frequency of informal FTF interactions with colleagues and availability of informal discussion space. Negative binomial regression models examined associations of workplace movement and space availability with the frequency of FTF interactions.

Results: Participants spent on average 79% (SD: 13%), 14% (SD: 8%), and 7% (SD: 3%) of work hours/day in sitting, standing, and stepping, respectively. Informal FTF interactions occurred 0 to 35 times/week (median: 5 times/week). Adjusted for potential confounders, each one SD increment in time spent sitting, standing, and stepping was associated with 20% lower (95%CI: 0.69, 0.93, p=0.004), 19% higher (1.06, 1.34, p=0.003), 6% higher (0.98, 1.15, p=0.16), and 11% higher (0.92, 1.35, p=0.26) frequency of informal FTF interactions, respectively. Only results for sitting and standing reached statistical significance (p<0.05).

Conclusions: Those who sat less and stood more at work had more frequent FTF interactions than their counterparts. Results did not support a role of stepping or office space availability in workers’ interactions. While lower workplace sitting time is often linked to reduced risk of chronic diseases, our findings suggest that less sitting and more standing at work may have additional benefits of increasing informal interactions between office workers (or vice versa). Examining the impact of workplace sitting reduction interventions on FTF interactions may yield further insights.
Using a latent change score approach to understand longitudinal relations between psychological distress and moderate-to-vigorous physical activity

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Purpose: The effect of physical inactivity on mental health risk is well established; however, less is known about how psychological distress might deter participation in physical activity. Guided by advancements in the treatment of longitudinal data, the aim of this study was to examine patterns and predictors of change in moderate-to-vigorous physical activity (MVPA) and psychological distress (e.g., feeling nervous, worthless). Methods: Australian adults (4944 females, Mage = 34.63 years ± smn; 5.34; 4322 males, Mage = 37.51 years + 6.14) provided baseline data as part of the Longitudinal Study of Australian Children (LSAC) and were followed up biennially over a 10-year period (i.e., yielding 5 total measurements). A single item was used to measure MVPA. Psychological distress was assessed using the Kessler Psychological Distress Scale, which comprises six indicators (e.g., nervous, hopeless, restless/fidgety, worthless). Latent change scores were computed within a structural equation modeling framework to examine the temporal dynamics between MVPA and psychological distress. Results: The slope means indicated that MVPA decreased over time, whereas psychological distress increased throughout the 10-year period. With regard to the correlations between the slope and intercepts factors, the results revealed that psychological distress changed more rapidly in people who started with higher levels of psychological distress. For the correlated intercepts factors, people with higher levels of psychological distress reported lower levels of physical activity at the start of the collection period. Findings also indicated that there was a positive linear change component for psychological distress, such that higher levels of psychological distress and MVPA at the previous measurement wave were associated with lower increases in distress at subsequent waves. Conclusion: This investigation is the first to document that changes in MVPA and psychological distress are coupled temporally. Notably, we observed that individuals’ distress levels at a given time point predicted subsequent change in both MVPA and distress; a finding which provides novel and important insight into how adults’ activity levels and psychological distress fluctuate relative to one another.
SO18, SO18.5

Habitual physical activity patterns of vocational education students are not associated with executive functioning: The PHIT2LEARN study

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Physical activity and sedentary behavior studies, Club B, 2:20 PM - 2:55 PM

Other

Purpose: Besides the health-related effects, increasing physical activity (PA) and reducing sedentary behavior (SB) may also benefit executive functioning (EF) and consequently academic performance (AP). Research in vocational education and training (VET), lower tertiary education, is lacking however. The current study focused on the relation between objectively measured PA and SB on the one hand, and EF of VET students on the other. In accordance with the literature, we hypothesize that students with higher levels of PA and/or lower levels of SB show better EF.

Methods: In a cross-sectional design, 230 (average age = 19.3 [3.1]) of 374 VET invited students participated and 93 students had complete and valid data for the analysis. Objective computerized cognitive tests were conducted to measure executive functions. The letter-memory test and color-shape test were used to investigate updating, shifting, and inhibition. A 24/7 thigh-worn waterproofed ActivPAL accelerometer was used to measure sitting, standing, and stepping over the course of one week. Three different study sectors were distinguished: economy; sports and safety; healthcare and well-being. Hierarchy in the data was not present, supporting the use of linear regression analysis to analyze the data.

Results: Clear differences in PA patterns and SB were apparent between different study sectors. Sports and safety students were significantly less sedentary with 103.8 and 71.3 min per day on average compared with economy and healthcare and well-being students, respectively (p < .001). Economy students were standing (85.9 and 84.0 min per day on average) and stepping (35.8 and 24.6 min per day on average) significantly less compared with sports and safety, and healthcare and well-being students, respectively (p < .001). None of the PA measures were associated with cognitive performance on any of the measures.

Conclusions: The results did not show any association between PA and SB on the one hand, and EF on the other hand. Looking at the PA patterns, sports and safety students show the lowest sedentary behavior. Further, both sports and safety, and healthcare and well-being students show higher standing and stepping behavior than the economy students.
SO19, SO19.1

Understanding the longitudinal association between adherence to the DASH dietary pattern and blood pressure reduction

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Disease prevention and management (Chair: Jeroen Lakerveld), Club C, 2:20 PM - 2:55 PM

Objective: The Dietary Approaches to Stop Hypertension (DASH) dietary pattern is a proven strategy to lower blood pressure (BP). Yet, full adherence to DASH is challenging. Limited research has examined the effectiveness of partial DASH adherence. The objective of this secondary analysis of a behavioral intervention trial was to determine the association between changes in DASH adherence and changes in systolic BP.

Methods: Adults (N=810) with elevated BP were randomly assigned to a 6-month behavioral intervention promoting established lifestyle recommendations for lowering BP (reduced sodium intake, weight loss if overweight, and increased physical activity), the same intervention plus DASH, or an advice-only control group. Dietary intake was collected by duplicate 24-hour recalls at baseline and 6 months. DASH adherence was assessed using an 0-8 point scoring index. Using linear regression, we regressed 6-month change in DASH score on 6-month change in SBP, adjusting for treatment group, age, sex, race, baseline SBP and BMI. Separate models also adjusted for changes in physical activity (PA), sodium intake, and weight. Nonlinear associations were tested using quadratic and cubic terms, and splines.

Results: Participants had a mean (SD) age of 50 (8.9) years and a mean (SD) BMI of 33 (5.8) kg/m2; 62% were women and 35% African American. The mean (SD) DASH score at baseline was 2.0 (1.6) and the 6-month change in DASH score was 1.3 (2.1). Change in DASH was significantly associated with change in SBP [-0.45 (-0.79, -0.12)]. When adjusting for changes in PA, sodium, and weight, the only significant variable was change in weight [0.03 (-0.30, 0.35) for DASH and 0.35 (0.29, 0.41) for weight].

Conclusion: Results demonstrate that the association between change in DASH and change in BP is linear, suggesting that partial DASH adherence can reduce BP. It is unclear whether weight loss mediates the association between DASH and SBP or whether weight loss and DASH are independent mediators of BP change. More research is needed to understand interactive effects and to evaluate the degree of DASH adherence needed to reduce the population burden of hypertension.
17222

SO19, SO19.2

Effects of a 22-week strength and endurance training intervention in sedentary, obese people with increased cardiovascular disease risk: Lessons learned from a complex feasibility study

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Disease prevention and management (Chair: Jeroen Lakerveld), Club C, 2:20 PM - 2:55 PM

Disease prevention and management (SIG)

Objective: People with obesity and a sedentary lifestyle can obtain significant health benefits from physical activity; however, physical activity levels in the population remains low. The aim of this study was to examine the effects of a 22-week supervised endurance and strength training intervention on aerobic capacity, muscle strength and physical activity levels in sedentary, obese people with elevated cardiovascular disease (CVD) risk. This study expands current knowledge on long-term maintenance of lifestyle changes, by evaluating novel tools in a complex intervention

Methods: The design was a 12-month feasibility study, with participants recruited from the seventh population-based Tromso; Study. Inclusion criteria were age between 55 and 74 years, body mass index (BMI) =30kg/m^2, sedentary physical activity level, increased CVD risk (elevated NORRISK 2), and no prior myocardial infarction. Participants attended a 22-week supervised exercise intervention that included one-hour endurance and resistance training session and one-hour high-intensity training session per week, in addition to a leg press exercise twice weekly. Exercise intensity, duration, and weight load were gradually increased. Outcomes were changes in maximal oxygen uptake and maximum load on strength exercises, hours per day of moderate-vigorous physical activity (MVPA), and steps per day. MVPA and steps were measured by the Polar M430 activity tracker during and six months after the intervention period.

Results: Ten men and four women with a mean age of 66.1 ±smn;5.8 years and mean BMI of 35.6 ±smn;5.3 were included and attended on average 71% of the 42 workouts. Both aerobic capacity and muscle strength increased significantly; mean maximal oxygen uptake increased by 8.8% (p=0.04), whereas maximum leg press load increased by a mean of 160% (p<0.001), pull down load by 7% (p<0.001), and chest press load by 7% (p=0.65). Daily MVPA increased slightly, whereas step-count did not change.

Conclusions: During this 22-week training intervention study, aerobic capacity and muscle strength increased considerably, whereas MVPA increased slightly during and after the intervention. The participants adhered to and tolerated a gradually intensified strength and endurance training program. This feasibility study will form the basis for a larger randomized, controlled trial aimed at long-term lifestyle changes.
Digital health cardiovascular disease prevention: Systematic review and meta-analysis of randomised controlled trials

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Disease prevention and management (Chair: Jeroen Lakerveld), Club C, 2:20 PM - 2:55 PM

Purpose: Cardiovascular disease (CVD) is a leading cause of mortality and disease burden. Preventative interventions to augment the adoption of healthier lifestyles at population level is a priority, particularly among those at highest risk. Participation in face-to-face preventative interventions affords individualisation and is effective, but at the same time costly and resource intensive. Electronic and mobile health approaches aimed at risk factor modification may be an effective and scalable approach to reach many individuals while preserving individualisation. This systematic review and meta-analysis aimed to 1) determine the effectiveness of digital health interventions to reduce cardiovascular risk among free living individuals; 2) describe other health effects (e.g. quality of life, measures of mental health) and adverse events of the interventions, and 3) summarise any evidence on the cost-effectiveness of these interventions.

Methods: MEDLINE, CINAHL, Embase, PsycINFO, Web of Science, Cochrane Public Health Group Specialised Register, and CENTRAL electronic databases will be searched from inception through January 2019. Eligibility criteria are: 1) Population: free-living / community-dwelling adults; 2) Intervention / Comparison: Randomised controlled trials comparing electronic or mobile health CVD risk preventative interventions with face-to-face based CVD risk preventative interventions or usual care; 3) Outcomes: modifiable cardiovascular risk factors (e.g. blood pressure, cholesterol, body composition, markers of insulin resistance, inflammatory markers, physical activity level, sedentary behaviour, exercise capacity, diet). References of included studies will be hand searched. Authors and research groups will be contacted for information about unpublished or ongoing studies. Two authors will independently screen titles and abstracts using Covidence, after which full-text reports will be screened for inclusion. A data extraction form will be developed and piloted. Retrieved reports will be downloaded onto Endnote reference management software. Two authors will independently undertake data extraction using Covidence and export the data directly to Review Manager. Risk of bias will be assessed using the Cochrane Risk of Bias tool. Assuming natural heterogeneity between studies, meta-analysis will be performed.

Results: This is a protocol for a meta-analysis. Results will be available for presentation at the conference.

Conclusions: This systematic review will provide quantitative and qualitative syntheses of current digital health CVD preventative interventions.
Arterial stiffness, body composition and self-reported physical activity to assess fitness versus fatness

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Disease prevention and management (Chair: Jeroen Lakerveld), Club C, 2:20 PM - 2:55 PM

Arterial stiffness is associated with both obesity and poor physical fitness. However, recent findings indicate that obese/overweight individuals who are physically fit have similar mortality risks to normal weight individuals. Objective: To determine the associations between body composition, self-reported physical activity and arterial health. Methods: Forty-one participants (18 males, age: 46.6 ±smn; 14.9 years, weight: 74.9 ±smn; 14.8 kg, height: 1.72 ±smn; 0.8 m) underwent body composition (fat and muscle mass), pulse wave velocity (PWV), augmentation index (AIx75), and resting heart rate measurements. Data were grouped according to body composition: normal weight (n=24) vs overweight (n=17), and their self-reported physical activity: Inactive (n=9); active (n=32). Data were further assessed according to: normal weight inactive (n=3), normal weight active (n=21), overweight inactive (n=6) and overweight active (n=11). An unpaired t-test was used to determine the between group differences, and then presented as: mean change, ±smn;90% confidence interval, qualitative interpretation

Results: Normal weight participants had less arterial stiffness (PWV: -1, ±smn;0.74m/s-2, very likely slower PWV; AIx75: -13, ±smn;6.2, most likely lower AIx75) and resting heart rates (-4.1, ±smn;5.7bpm, possibly lower) compared to overweight participants. Active participants had more muscle mass (5.1, ±smn;4.9kg, likely more), fat mass (-7.1, ±smn;4.7kg, very likely lower), resting heart rate (-12, ±smn;6.2bpm, most likely lower), and AIx (-12, ±smn;7.9, very likely lower) compared to inactive participants. Active participants had possibly higher PWV (0.3, ±smn;0.93m/s-2) vs inactive participants. Active participants who were overweight had poorer arterial health (PWV: 1.2, ±smn;0.88m/s-2, very likely faster; AIx75: 11, ±smn;7.2, very likely higher) than those who were active and normal weight. However, being overweight and active was associated with improved fat mass (-5.4, ±smn;4.4kg, likely lower) and better AIx75 (-9.6, ±smn;9.8, likely lower) than being overweight and inactive. Conclusions: Normal weight and physically active participants had the most advantageous arterial stiffness and resting heart rate measures. However, while still elevated compared to their normal weight counterparts, active overweight participants had lower fat mass, resting heart rate and arterial stiffness measures than those who were overweight and inactive. These findings highlight the importance of regular physical activity on health outcomes, particularly in overweight populations.
Are foods and beverages with lower free sugars levels more expensive?

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Socio-economic inequalities in nutrition (Chair: Sara Rosenkranz), Club D, 2:20 PM - 2:55 PM

**Socio-economic inequalities (SIG)**

Canadians are increasingly considering price as the most important determinant influencing their food selection but foods "low in sugar" is reported by 70% of Canadians to have a positive influence on food selection and reducing sugars intakes is the number one change to eating habits reported in 2015. Research has yet to examine how well price and sugars contents, as determinants of food choice, align with one another in the context of the Canadian food supply.

**Objective:** To compare the price of foods and beverages with excess free sugars levels to those without excess free sugars levels.

**Methods:** Using the University of Toronto's Food Label Information Program database 2013 (n=13,389 after exclusions), the adjusted mean price ($ per 100g/100mL) of products with and without excess free sugars levels (≥10% and <10% of calories from free sugars, respectively) was determined using ANCOVA. Analyses were stratified by food and beverage subcategory and adjusted for container size, brand (national vs. private label), and store.

**Results:** For 13 of 83 (16%) food subcategories (baked breakfast, fruit drinks, soft drinks, breakfast cereals, soft cheese, custards and puddings, dessert toppings, beans, sauces, popcorn, bouillon and broth, confectionery, and canned vegetables), mean price was significantly higher for products with lower free sugars by an average of $1.69 per 100g/mL. Conversely, mean price for a different 13 subcategories was higher for products with higher free sugars levels by an average of $0.34. No significant difference in price was found in the remaining subcategories (n=7365, 55%).

**Conclusion:** Findings from this study highlight areas of concern in the food supply, namely, food categories in which products with lower free sugars levels are more expensive than their higher free sugars counterparts. Many of these categories are also major contributors to sugars intakes in Canada. Thus, consumers with limited purchasing power may be at a disadvantage when trying to limit intakes of sugars from these sources. Results suggest there may be a need to consider economic interventions to ensure that products lower in free sugars are also lower in price.
Improving cardiometabolic health through nudging dietary behaviours and physical activity in adults with low socioeconomic position: the SUPREME NUDGE project

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Objective: Unhealthy dietary patterns and lack of physical activity tend to cluster in adults with low socioeconomic position (SEP), putting them at higher risk of cardiometabolic diseases. Socio-ecological models highlight the importance of the context in which behaviours take place. Nudging and price strategies to support healthier food purchases, and context-specific, smartphone based, tailored activity support may be promising intervention strategies in low SEP populations. We describe the background and design of the SUPREME NUDGE project, aiming to improve lifestyle behaviours and cardiometabolic health in low SEP adults.

Methods: A cluster-randomised controlled trial will be conducted in 8, 12 collaborating supermarkets in the Netherlands. Target participants (n=1,100) are aged 45, 75 years with low SEP, in possession of a smartphone and regular customer of the selected supermarkets. Intervention components are environmental nudges (combining position, presentation, and information) and pricing interventions in the supermarket, together with a tailored mobile health (mHealth) physical activity intervention providing time- and context-specific feedback. Supermarkets will be randomised to: 1) no intervention (control); 2) nudges; 3) nudges and mHealth intervention; 4) nudges, mHealth intervention and pricing strategies. Primary outcomes at 6 and 12 months are systolic blood pressure, low-density lipoprotein and HbA1c. Secondary outcomes at 3, 6 and 12 months are diastolic blood pressure, high-density lipoprotein, total cholesterol, daily step count and adherence to the dietary guidelines. Tertiary outcomes are changes in intentions, habit formation and acceptance of nudges.

Results: Preliminary results from our qualitative interviews with the participating supermarket chain (no study funder) show that promotional product messaging, 'spotlight' positioning, and promoting within product-groups substitutions are promising intervention targets. Interviews with the target group revealed that price, ease of preparation, taste, habit and family preferences are important determinants of food choice. These results will guide the intervention development.

Conclusions: This project benefits from the partnership with a committed supermarket chain, which allows for testing the intervention components in a real-life setting, as well as the objective measurement of the primary outcomes. Challenges are the recruitment and continued participation of a hard-to-reach low SEP population, and generating relevant changes despite continued other supermarket product promotion.
To what extent do dietary costs explain socioeconomic inequalities in diet quality?

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**Socio-economic inequalities in nutrition (Chair: Sara Rosenkranz), Club D, 2:20 PM - 2:55 PM**

**Objective:** We aimed to investigate the mediating role of dietary costs in the association between individual and household educational level and dietary quality indicators in a Dutch study population.

**Methods:** This cross-sectional study used data from the European Prospective Investigation into Cancer and Nutrition cohort in the Netherlands (EPIC-NL). Between 1993-1997, over 40,000 adults provided information about their own and their partners' educational level. In 2015, a subsample (n=13,421) filled in a food frequency questionnaire, the FFQ-NL 1.0. We calculated adherence to the Dutch Healthy Diet index 2015 (DHD15-index, ranging from 0 to 120) and the Dietary Approaches to Stop Hypertension diet (DASH, ranging from 8-35). Individual dietary cost estimates, reflecting the monetary value of individuals' diets, were collected from supermarkets and local shops, and linked to the FFQ items. The mediating role of dietary costs in the association between individual and household educational level (low, middle and high) and adherence to DHD15-index and DASH diet was assessed using the macro PROCESS, adjusting for relevant confounders.

**Results:** Mean age was 69 years and 77% were women. Mean (SD) DHD15-index and DASH scores were 70 (16) and 21 (4). Higher individual and household educational level were associated with higher DHD15-index and DASH scores. For example, highest individual educational level was associated with a 7.75 (95%CI 7.05; 8.45) point higher DHD15-index compared to the lowest individual education level. Higher individual and household educational levels were also associated with higher dietary costs. Higher dietary cost was in turn associated with higher DHD15-index and DASH scores. Mediation analyses showed that dietary cost significantly mediated the association between individual and household educational level and dietary quality measures. Depending on the dietary indicator and the education level indicator, dietary costs explained between 4% and 12% of the association between educational level and diet quality. Furthermore, the educational level, dietary cost, diet quality pathway was found to be moderated by sex and age, such that associations were strongest among women and adults older than 65 years.

**Conclusion:** Dietary cost explains between 4% and 12% of the socioeconomic inequalities in dietary quality, particularly among women and older adults.
SO20, SO20.5

Access to healthy food: a Solomon Islands case study

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Socio-economic inequalities in nutrition (Chair: Sara Rosenkranz), Club D, 2:20 PM - 2:55 PM

Socio-economic inequalities (SIG)

Objective
For the past half-century, populations in Pacific Island Countries have been transitioning away from diets high in locally-grown and caught foods, towards diets high in energy-dense, processed, and often imported foods. These diets are a major contributing factor to the burden of non-communicable diseases, which cause three-quarters of adult deaths in the region. Solomon Islands is in the midst of this nutrition transition. Our analysis involved a methodologically novel approach to examine the most important determinants of access to a healthy diet in Solomon Islands.

Methods
Our research used a country case study approach with two main arms. We performed a qualitative study involving 40 individual in-depth interviews with parents of primary school children in urban Honiara. Interviews included semi-structured questions about food access, a food frequency questionnaire, and a modified Radimer/Cornell measure of food security.

We also performed a quantitative study which involved multivariate analysis of the latest country-level Solomon Islands Household Income and Expenditure Survey dataset to examine affordability and acquisition of healthy food across different socio-demographic groups.

Results/findings
In the qualitative study, all participants reported food insecurity. There was a high frequency of unhealthy food consumption patterns characterised by foods high in refined sugar and fat. The reasons for food choice involved an interplay of factors including physical access and convenience, but price was the most important.

The quantitative study showed a difference between urban and rural areas in terms of food price and food source. Of urban food acquisition, 84% is acquired via cash, compared with 35% in rural areas. Our multivariate analysis showed that high household wealth was the variable most strongly associated with fruit and non-starchy vegetable consumption (Beta Coefficient 301, p<0.001; Odds Ratio 2.3, p<0.001).

Conclusions
Taken together, our research shows that in Solomon Islands the food environment is dysfunctional largely due to cheap unhealthy food availability, which is influenced by rapid rural-to-urban migration, unhealthy food imports, and with roots in a post-colonial food culture. Cash-based food acquisition is increasingly important especially in urban areas, meaning improving affordability of healthy food should be a major priority area for policy makers involved in non-communicable disease prevention.
16900

SO21, SO21.1

Physical activity and sedentary behaviour in French population: evolution over the last 10 years between the two French nutrition and health surveys (ENNS 2006-2007 and Esteban 2014-2016)

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Assessment and methodologies in behavioral nutrition and physical activity (Chair: Kirstin Corder), Club E, 2:20 PM - 2:55 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: Insufficient physical activity and sedentary behaviour are key factors for noncommunicable diseases. Monitoring these behaviours is essential to adapt prevention and public health strategies. This work studies the evolution of the prevalence of physical activity and sedentary behaviour of the French population during the last decade.

Methods: Data come from the two French nutrition and health surveys (ENNS 2006-2007 and Esteban 2014-2016). Studies were based on cross-sectional population-based surveys, using a multistage sampling design. Physical activity and sedentary behaviour were assessed by questionnaires: IPAQ for adults and adolescents and a child-specific questionnaire in ENNS (nardults=2971 and nchildren=1358); and RPAQ for adults, YRBSS and child-specific questionnaire in Esteban for children and adolescents (nardults=2678 and nchildren=1182). Being physically active was defined according to the WHO recommendations on physical activity for health and daily leisure screen time was used to report sedentary behaviour. Samples have been compared by adjusted Wald tests and design-based Pearson tests (gender-stratified, weighted and standardized data).

Results: In 2015, 53% of women and 70% of men were physically active compared to 63% and 64% respectively in 2006. Physical activity decreased among women whatever their age or education level, whereas it increased among 40-54 year-old men and remained stable in the other age groups. Among children, ¼ of 6-10 years old were physically inactive in 2015 (multiplied by 4 since 2006) and more than 60% of children aged 11-17 (with no significant change). Only 28% of boys and 18% of girls reached the WHO recommendations on physical activity, without significant evolution since 2006. Daily leisure screen time has strongly increased in 10 years, both for adults and children (+1h32 in men, +2h02 in women, +1h58 in 15-17y/o, +1h17 in 11-14y/o, +26min in 6-10y/o). Daily screen time increased with age in children and was higher among the least educated.

Conclusions: These results highlight a lack of physical activity and consequent sedentary behaviours among the French population and a degradation of these factors over the last 10 years. In a public health perspective, a particular attention must be carried to women and children, to whom these factors considerably declined since 2006.
SO21, SO21.2

Positive Deviance of Parent Engagement in School- Family-based Interventions

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Assessment and methodologies in behavioral nutrition and physical activity (Chair: Kirstin Corder), Club E, 2:20 PM - 2:55 PM

Objective: Research integrity in school- and family-based nutrition interventions are complicated by low parent engagement. Since serious examination of this common occurrence has been limited, this study focused on highly engaged parents in Fuel for Fun (FFF), a multi-option school- and family-based culinary intervention.

Methods: FFF was evaluated in a cluster-randomized design targeting 4th graders and their families with 2 youth treatment arms (intervention/control) and 4 parent treatment arms with asymmetric participation opportunities. Measures included validated surveys about eating behaviors/attitudes, ht/wt, accelerometry, attendance/participation logs, and 24-hour dietary recalls. The number of potential parent activities ranged from 1 to 8 depending on treatment arm. One index indicated number of activity types (Profile; range 0 - 8) and another was calculated to denote participation intensity (Intensity; range 2 - 48) by considering frequency and weighting based on factors, e.g., convenience, effort. Profile and Intensity indices were standardized (0 - 100%) to account for asymmetric engagement opportunities of treatment arms. Positive deviation, i.e., parents participating in 75% or more of possible activities (75+) were compared with those completing < 75% of activities (-75) using Chi square and independent t-tests.

Results: Of 1440 FFF youth, 777 (54%) had some level of parent engagement varying from 1 (n=416) to 7 activities (n=2). Profile mean was 1.9 ±smn; 1.2 activities; Intensity mean was 7.46 ±smn; 5.2 (range 2-30). Standardized Profile and Intensity means were 43% ±smn; 26%; and 29% ±smn; 21% respectively. 75+ (n=117) did not differ from -75 on demographic or behavior parameters with the exception of > indulgent and < uninvolved parent feeding styles for 75+ (P=0.014). Standardized Intensity was greater for 75+; 65% ±smn; 21% vs 27% ±smn; 13% (P<0.001). Differences between 75+ and -75 were related to treatment arm and activity type: > 75+ in Controls (P<0.001); > 75+ participation in online program, accelerometry, diet recall and recipe preparation (all P< 0.03).

Conclusions: Positive deviance in parent engagement in school-based nutrition interventions is a function of the intervention rather than personal characteristics. Suggestions to increase participation include minimizing requirements, providing activities that are convenient, novel, and personalized.

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Activity spaces in studies of the environment and physical activity: a review and synthesis of implications for causality

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Assessment and methodologies in behavioral nutrition and physical activity (Chair: Kirstin Corder), Club E, 2:20 PM - 2:55 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective
Public health strategies increasingly identify the environment as a modifiable determinant of physical activity. Using static measures of the environment which are focused on the residential neighbourhood may be restrictive. Activity spaces describe the locations and spaces an individual experiences as a result of their activities and are increasingly used to understand how people interact with their environment and engage in activity. We aimed to examine the application of the activity space in studies of the environment and physical activity by reviewing the published literature. We provided a synthesis of findings and methodological, analytical, and conceptual issues relevant to causal inference.

Methods
Studies were included if they comprised a spatial summary of locations visited, assessed any part of the causal pathway between the environment, physical activity and health and used quantitative or qualitative methods. We searched seven electronic databases in January 2018 with no language or date restrictions.

Results
Forty-seven studies met the inclusion criteria. The majority of study populations were adult and originated from high income countries. Most studies were cross-sectional in design and four assessed activity spaces in relation to an intervention. Activity spaces were used as both exposures and outcomes on the hypothesised environment-physical activity causal pathway and research questions related to either the features of an activity space or features within an activity space. A range of spatial and temporal summary techniques were used.

Conclusions
The use of the activity space is an emerging methodology for advancing studies of environment-physical activity relationships. A range of activity space types exist, and the activity space used within studies was often subject to the availability of data and the research question which the authors aimed to answer. The conceptual challenge of using activity spaces to strengthen causal inference was rarely considered, although some studies discussed circularity, plausibility, and temporality. Future studies should consider the mediating role of the activity space and use longitudinal and experimental designs to strengthen the basis for causal inference.
Art on a plate: A pilot evaluation of a worldwide initiative to promote fruits and vegetables in children

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Assessment and methodologies in behavioral nutrition and physical activity (Chair: Kirstin Corder), Club E, 2:20 PM - 2:55 PM

Objective: Involving children in cooking is a promising strategy to promote healthy eating behaviors. A global initiative to celebrate International Chefs Day with cooking workshops for children was initiated in 2015 and annually recurring. For activities that will take place in real-world settings, a randomized controlled trial is difficult to implement. Therefore, natural experiments or field studies evaluating the effectiveness of these activities are needed. The 2016 workshops with the theme "art on a plate" provided an opportunity for a pilot study to evaluate the workshops in various locations across the world.

Methods: In total, 433 children (4-14 y, mean=8.6y) from 14 countries in Asia, America and Europe participated in the study. Countries were free to set up the "art on a plate" workshop but had to include the recipe "spinach and fruit salad" that was evaluated. A questionnaire administered before and after the workshop assessed liking, willingness to taste and eat the salad, hunger and emotions. Intake after the event was estimated by the event coordinator. Linear and generalized linear (logit) mixed models were utilized to test statistical differences between before and after the intervention for willingness to taste and eat entirely, liking, emotions and hunger.

Results: The workshop event showed a small but significant increase in the liking score, control, and a significant decrease in hunger. 30% of children increased their liking score, while 18% of children decreased their liking scores, and the remaining 52% did not change their liking scores. The associations between increased and decreased liking scores and the proxy of intake of the salad after the workshop were in the expected direction and statistically significant.

Conclusions: There is a need to evaluate the effectiveness of activities in real-life settings that can be extended and implemented in a variety of locations and countries. Methods including study protocols, implementation evaluation materials and questionnaires need to be further developed to fully capture the effects of these events. These type of studies can provide relevant results as was shown with this study reporting positive effect of a cooking event on salad liking across a selection of countries worldwide.
Responsiveness of device-based and self-report measures of physical activity to detect behaviour change in men taking part in the Football Fans in Training (FFIT) programme

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Assessment and methodologies in behavioral nutrition and physical activity (Chair: Kirstin Corder),
Club E, 2:20 PM - 2:55 PM

Assessment and Methodologies in Behavioral Nutrition and Physical Activity (SIG)

Objective: It is vital to understand whether measures employed to evaluate public health interventions are sensitive to identifying changes in behaviour over time. The capacity of self-report and device-based physical activity (PA) measures to detect change in PA within interventions is therefore crucial. Comparing different methods of PA assessment may provide a more comprehensive reflection of PA, yielding greater insights regarding the efficacy of interventions. This study examines responsiveness of activPAL3™ (i.e. device-based) and the International Physical Activity Questionnaire (IPAQ; Short Form) (i.e. self-report) in detecting PA change during a 12 week group-based, men-only weight management and healthy living programme - Football Fans in Training (FFIT).

Methods: Participants wore an activPAL™ and completed the IPAQ pre- (n=59) and post-programme (n=30). Relative agreement and relationships between change scores were assessed by Spearman's correlations (for participants with data at both time-points (n=30)). Mean and/or median changes in PA were measured using paired samples t-tests and Wilcoxon signed-rank tests respectively. Responsiveness to change was assessed using Standardised Response Mean (SRM) interpreted in line with Cohen's d as trivial, small, moderate or large (<0.20, =0.20 to <0.50, =0.50 to <0.80, and =0.80, respectively).

Results: Both device-based and self-report measures demonstrated statistically significant changes pre-post intervention, although the Spearman's correlations between the change scores were not statistically significant. The SRM values for changes in activPAL™ metrics were: 0.45 (MET-mins); 0.43 (daily step counts); and 0.39 (MVPA), indicating a small change. SRM values for changes in IPAQ scores were: 0.83 (total PA mins/week); 0.74 (total METmins/week); 0.71 (walking MET-mins/week); 0.53 (vigorous MET-mins/week); and 0.38 (moderate MET-mins/week), revealing a small to large responsiveness to change.

Conclusions: In this study, both IPAQ and activPAL™ PA measures were found to be responsive to behaviour change across a number of outcome metrics in men following participation in a 12 week weight loss and healthy living programme (FFIT). While inclusion of both device-based and self-report measures is desirable within interventions it is not always feasible. These findings provide support for the utility of self-reported PA instruments within the context of behavioural interventions promoting increased PA, although they may overestimate PA changes, compared with device-based measures.
Legislation or self-monitoring? Which option to improve school meal quality?

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Providing evidence for policies (Chair: Trynke Hoekstra), Club H, 2:20 PM - 2:55 PM

Policies and environments (SIG)

Objective
To investigate if the nutritional quality of Swedish school meals using a unique web-based tool, including self-assessment and automatic tailored feedback, improves. The introduction of the tool in 2012 coincided with new national policy requiring school meals to meet nutritional recommendations, in addition to previous requirements that school meals are provided to all schoolchildren (6-16 y) at no cost.

Methods
The tool www.skolmatsverige.se encompasses domains of choice, nutritional quality, safe food, service and pedagogical aspects, environmental impact, policies, lunch consumption and pupil satisfaction. The focus here is nutritional quality (defined as menus meeting requirements for iron, vitamin D, fibre and fat quality). Schools self-select to use the tool and can use it as (in)frequently as they wish, in the order they wish. All 1160 schools who used it between 2013/14 and 2017/18 were included. A generalised linear mixed model was built as follows: subjects were schools, random factors were municipalities, fixed effects were schoolyear and whether the automatic feedback was accessed, and covariates were the number of times the tool was used.

Results
Schools are not nationally representative, as they are bigger, more often public and concentrated in the eastern region, but consistently so across time. Treating schools as repeated cross-sectional snapshots, using a maximum of one result per each school year and without regard to other factors, significant improvements were seen over time, from 25% meeting the nutritional criteria in 2013/14 to 32% in 2017/18. However, the model suggested that the number of times the tool was used was responsible for much of this observed effect, when controlling for other factors above. Compared to the first usage of the tool, the odds ratio for meeting the criteria were 1.7 (0.6-1.0) on the second usage, 2.3 (1.0-1.8) on the 3rd, 3.4 (1.8-3.6) on the 4th and 6.6 (3.9-9.4) on the 5th or higher (combined) usage, all significant (P<0.001-0.013).

Conclusions
A combination of legislation and a new tool has proved successful in Sweden, with the data suggesting both have had an effect. Where the political climate does not favour legislation, other avenues may be open to public health practitioners.
Single obesity or integrated eating disorder-obesity prevention strategies
effect on weight status: a systematic review and meta-analysis

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Providing evidence for policies (Chair: Trynke Hoekstra), Club H, 2:20 PM - 2:55 PM

Policies and environments (SIG)

Purpose: Many adolescents without a diagnosed eating disorder report disordered eating, including weight control behaviors and body dissatisfaction. No previous review has described and compared weight-related interventions targeting weight status in this population. The aim was to compare the efficacy of weight-related alone interventions on BMI in adolescents versus with disordered eating behaviors. Methods: Electronic databases were conducted in July and August 2017 in MedLine/PubMed, PsycINFO, Web of Science and SciELO. The studies were restricted to randomized and quasi-experimental trials aiming to prevent obesity only or integrate obesity and eating disorder prevention. All studies targeted adolescents and had anthropometric measurements assessed at baseline and post-intervention. Following appraisal for risk of bias, extracted data were meta-analyzed using random-effects models. All analyses were conducted with RevMan (version 5.3). Results: From 12,599 records identified through database searching, 156 full-texts were assessed. Twelve studies met inclusion criteria, seven of which were obesity only prevention and five were integrated obesity and eating disorder interventions. Meta-analyses showed no significant effect on weight status for obesity only intervention [Hedge's $g$ -0.02 (95% confidence interval -0.27 to 0.23)] and integrated obesity and eating disorder intervention [g=0.47 (95%CI -0.98 to 0.05)]. The total effect size for the twelve studies was also non-significant [g=0.19 (95%CI -0.41 to 0.03)]. Integrated interventions assessed body satisfaction and showed low-significant effect [g=0.36 (95%CI -0.64 to -0.07)] and intervention group were 29% less likely to present unhealthy weight control behaviors at post-intervention compared to controls. The most frequently used conceptual framework in obesity alone interventions was the social cognitive theory and in integrated intervention were cognitive dissonance and media literacy.

Conclusion: Interventions targeting obesity only and integrated components in adolescents did not improve weight status in adolescents without a weight-related problem. This lack of effect may be because most participants were normal weight at baseline. Additional investigations into broad-reaching interventions that promote healthy weight, and weight control behaviors, and positive body image are much needed.
Value of Local Data: A case for SNAP decisions

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Providing evidence for policies (Chair: Trynke Hoekstra), Club H, 2:20 PM - 2:55 PM

Policies and environments (SIG)

Purpose: Farm Bill, the primary tool for federal food and agriculture policy, is up for renewal and congress is discussing the costs and benefits of its various components. The Supplemental Nutrition Assistance Program (SNAP), the largest part of the bill, provides a nutrition safety net for low-income individuals and families. In 2016, 43.5 million individuals from over 21.5 million households participated in SNAP.

Contrary to common perception, SNAP participation rates are higher in rural areas and small towns compared to urban metro areas. This is true nationally and in a majority of states and counties throughout the country. Further, nationally, over three quarters of SNAP households have a working adult and only 5% of SNAP families receive Temporary Assistance to Needy Families benefits, a cash benefit for families living in poverty.

Methods: In order to draw attention to facts about SNAP program participation and to highlight the reach SNAP has in different communities across the country, a set of interactive online maps and fact sheets were developed. Household SNAP participation rates at the state and county levels were obtained from American Community Survey (ACS) 5-Year data (2012-2016), and rates at the legislative level were obtained from ACS 1-year data (2017).

Results: This session will discuss the importance of local data in decision making and will introduce interactive SNAP maps to the audience. The maps and fact sheets are available at http://frac.org/research/resource-library/snap-map-snap-matters-every-community. The interactive maps were disseminated through public health, nutrition, and food security list serves and were picked up by major local and national media outlets.

Conclusion: Dissemination of evidence to decision makers in a meaningful and user friendly manner can be critical for ensuring timely and effective use of information. SNAP maps have been useful in guiding the narrative and current discussion on SNAP participation at various levels of government.
SO22, SO22.5 From attitudes to intention to purchase vitamin D fortified food: roles of personal benefit, problem awareness and product appropriateness

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Providing evidence for policies (Chair: Trynke Hoekstra), Club H, 2:20 PM - 2:55 PM

Policies and environments (SIG)

Objectives:
Sufficient vitamin D intake among adult population, especially during wintertime, is a concern in many countries. Fortifying food products is one option to increase intake at population level, but negative consumer attitudes towards fortified foods may debilitate this approach. Our objective was to study the role of personal benefits, problem awareness and product appropriateness for enrichment in intentions to purchase vitamin D fortified foods.

Method:
Online survey with a sample of adult Danish population (n=1,263). Purchase intentions and appropriateness of 10 product categories as carriers of vitamin D enrichment were measured together with attitudes towards fortification and awareness of vitamin D deficiency among the Danish population. All measures were rated on 7-point category scales. The data were analysed using regression and regression-based mediation analysis with the PROCESS macro for SPSS (Hayes, 2018).

Results:
Personal benefit partially mediated the relationship between attitudes and intentions to buy vitamin D fortified products. However, level of perceived benefit was higher when problem awareness was high as well. Intentions to purchase vitamin D fortified products were stronger with higher perceived benefit, but only when product categories were at the high end in appropriateness for fortification. Thus, highest intention ratings were observed when respondents were aware of the vitamin D issue, considered the products as appropriate and perceived them to provide a personal benefit.

Conclusion:
The intention to buy vitamin D fortified food products is a result of an interplay among perceived personal benefits, general problem awareness and perceived product appropriateness, which reflects the descriptive social norm on what is available in the market. Thus, promoting vitamin D fortified foods requires concerted action from public and private sectors: promoting consumers' problem awareness and personal benefits of adequate vitamin D intake is not enough unless they have an access to fortified foods. If consumers' attitudes towards fortified foods are initially negative, food companies may need extrinsic incentives to bring these products to the market, so that they can build the required product appropriateness and thereby social acceptance of the fortified products among consumers.
PLENARY

The nutrition transition, dynamics in low- and middle-income countries, and current policy and regulatory activities to address nutrition-related health issues

Popkin B

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Keynote (Chair: Annie Anderson), Congress Hall, June 7, 2019, 3:00 PM - 4:00 PM

The world has entered a stage of the nutrition transition dominated by increasingly unhealthy diets and activity patterns. Body composition distribution and NCDs related to diet and activity are increasing, especially in low and middle-income countries (LMICs). LMICs face an accelerating shift as global food systems and technology have dramatically changed food supplies and physical activity patterns. Food processors, food services, retailers, and agribusinesses have assumed the major role in food provision, and their voluntary efforts have failed to improve global diets. The shifts in diet and activity patterns are discussed. Most major policy initiatives by LMICs have been utilizing large-scale regulatory strategies to improve diets with limited focus on physical activity. Two approaches are foremost. First is a combination of taxation and price subsidies that make unhealthy foods and beverages, especially sugar-sweetened beverages, expensive and healthy traditional foods and beverages, such as fresh produce and legumes, more affordable. Second is prohibition of marketing that does not promote healthy behaviors. In addition to controls on media aimed at children, which have limited value, some countries are implementing full controls on all media, sometimes in combination with front-of-the-package profiling and positive or negative logos on products that encourage consumers to make healthier food purchases. Another initiative is placing controls on foods and beverages in schools and other public institutions. Few countries have introduced national programs to promote physical activity, yet that lifestyle component cannot be ignored. Important evidence regarding the impacts of large-scale actions is emerging. We are entering for the first time an era where many large-scale regulatory approaches are being evaluated and we will finally begin to test and then refine approaches that are more likely to prevent obesity and improve our diets in a way that will reduce the risk of many noncommunicable diseases and intermediate cardiometabolic risk factors.
FRIDAY JUNE 7 2019
OPEN PANEL
There is a global need to diminish climate gas emissions, and a simultaneous call for enhanced levels of physical activity. Increased physical activity entails both reduced risk for overweight and chronic diseases, as well as a potential to reduce transport’s major contribution to global CO2 emissions. Therefore, we (Bjørnarå et al., Scand J Med Sci Sports, 2017) introduced the concept of sustainable physical activity:

- Sustainable physical activity includes those activities that are conducted with sufficient duration, intensity and frequency for promoting health, yet without excessive expenditure of energy for food, transportation, training facilities or equipment. Sustainable physical activities have low environmental impact and they are culturally and economically acceptable and accessible.

This presentation will present this concept, with some thoughts about what we might do from a behavioral physical activity perspective. The four following factors will be discussed:

- Active transportation represents carbon-friendly means of transportation as well as an opportunity for enhanced physical activity.

- Physical activity conducted in the local community is likely to favor sustainability through less use of fossil fuel, as it makes transportation redundant.

- Going “back to basic”, using less equipment and appliances for everyday tasks could contribute toward energy balance through increased physical activity, and could decrease resource use.

- Balancing food intake and energy expenditure would require less food production with accompanying energy savings.
Dr Waterlander will present her perspective on how we can achieve more sustainable population diets and how we can change people’s behaviours towards more sustainable dietary patterns. Here she will discuss the potential for different intervention approaches such as food pricing strategies and food system changes. She will present the findings from the Lancet Commission on Obesity report where she worked on extracting policy recommendations from high-level UN reports on improving diets for obesity, under nutrition and climate change.
OPEN PANEL

Triple duty actions for nutrition, climate and community

Allender S
1Deakin University

Public Panel (Moderator: Knut-Ingle Klepp), Congress Hall, June 7, 2019, 4:35 PM - 5:35 PM

The most pressing public health concerns are characterised by their complexity and resistance to change. This resistance to change is due to the multiple relationships of cause and effect, interaction of these variables over differing time scales and alternate goals of different actors in a system. In this presentation the interweaving themes of climate change, under and over nutrition are explored under the aegis of a global syndemic of these three interlinked global health challenges. More specific attention is given to the role of food and food security and in particular the role and means for community level action in the prevention of chronic disease and local mitigation of the effects of climate change.