Abstracts
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P451 Physical activity before school, including active commuting to school: associations with cognition and academic achievement in adolescents
P452 Is the association of physical activity and sedentary behavior with CVD risk factors dependent on weight status? The NEXT Generation Health Study
P453 Physical fitness percentiles for Portuguese children and adolescents aged 10 to 18 years
P454 Light-intensity physical activity and cardiometabolic biomarkers in US adolescents: NHANES 2003-06
P455 Relationship between body mass index, cardiorespiratory fitness and pulse pressure in Portuguese youth
P456 Healthy effect of different EPA/DHA proportions of fish oils supplementation: a proteomic approach in rats
P457 Physical fitness and academic performance in Japanese junior high school students
P458 Differential action of the EPA/DHA ratio on metabolic syndrome markers in animal models: updating healthy evidences on w3 supplementation
P459 Association between skipping breakfast and overweight in Portuguese children
P460 Association between TV viewing and physical activity and obesity in Portuguese children
P461 The influence of active commuting to school on physical activity and weight status in a representative sample of 9 year old Irish children
P462 Screen time or physical activity-which is a more important predictor of overweight in Irish 9 year old boys and girls?
P463 Relationship between breakfast frequency and healthy body weight in children aged 9-10 years
P464 Association between amino acids consumption and serum lipid profile in European adolescents participating in the HELENA Study
P465 Milk matters: Is there an association between dietary calcium or total milk consumption and BMI in 5-6 year old children participating in the West Midlands Active Lifestyles and Healthy Eating in School Children (WAVES) study?
P467  Cardiorespiratory fitness status and cardiometabolic risk markers in 10-11 year old children
P468  Relationship between BMI, waist circumference and objectively measured physical activity between Chinese-Australian and Anglo-Australian adolescents
P469  Physical activity and, insulin resistance in obese Hungarian children
P470  The contribution of different types of physical activity to helping adolescents achieve the current physical activity recommendations, and their subsequent impact on health
P471  Pedometer determined physical activity, BMI and energy expenditure of Greek preschoolers
P472  Cross-sectional associations of physical activity frequency and health-related quality of life in a representative sample of German male and female adolescents
P473  Associations of blood lipid profile and physical fitness (EUROFIT) in urban and rural Ecuadorian adolescents
P474  Milk intake and leisure-time physical activity related to abdominal obesity among adolescents
P475  Patterns of adolescent sports participation in Australia and relationship with health behaviors

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Food and health policy in the 20\textsuperscript{th} century was highly successful. It produced more food, lowered prices, revolutionised supply chains, altered consumer choice. It also left humanity with new patterns of disease and alarming environmental impacts through food. Inequalities and mal-distribution remain but in new forms. The 21\textsuperscript{st} century challenge is now more complex: how to integrate health, environment, social values, economy and quality, and how to underpin all this with good food governance. This paper proposes that an emerging policy perspective now challenges the ‘old order’ of productionism – the belief that producing more food would resolve health problems. In an era of over-, mal- and continuing under-consumption, the productionist paradigm is too crude. Today, public health practitioners must address how to shift culture towards sustainable diets and how those can reshape land use and food supply chains to deliver sustainable food security. This ecological public health approach offers public health practitioners the chance to work in an interdisciplinary way and to give coherent messages to policy makers. The mismatch of bodies, food and culture requires a re-alignment of human health with eco-systems health.
KN3  Mustivation or motivation? The nurturing role of basic psychological need satisfaction
Vansteenkiste M
Department of Developmental, Personality and Social Psychology, Ghent University, Ghent, Belgium

Self-Determination Theory (SDT; Deci & Ryan, 2000; Vansteenkiste, Niemiec, & Soenens, 2010) is an increasingly popular framework that distinguishes between volitional or autonomous and pressurred or controlled forms of motivation. Recent empirical research will be reviewed suggesting that dynamics of autonomy versus control are critical in diverse life domains, including exercising, physical education, obesity, and eating regulation, and for a diversity of outcomes, including physical activity levels, weight-loss, eating pathology, and well-being. Further, the satisfaction and support of the psychological needs for autonomy, competence, and relatedness fosters autonomous motivation and the optimal regulation of the physical needs for food and rest.

KN4  Why is weight loss so difficult? Psychological processes might interfere
Jansen A
Department of Clinical Psychological Sciences, Faculty of Psychology and Neuroscience, Maastricht University, Maastricht, the Netherlands

In times of abundance, eating behaviour is mainly determined by psychological processes. These psychological processes might do their work without people being aware of them. They contribute to overeating and current weight problems, making weight loss and its maintenance difficult. An overview will be given of cognitive mechanisms that strongly drive eating desires and eating behaviour, like reward sensitivity, response disinhibition, cue reactivity, and mindset. A focus on interventions tackling these maintaining cognitive mechanisms might be more effective in weight reduction and the prevention of overweight than current 'lifestyle' treatments.

KN5  Genes, physical activity and obesity - Actions and interaction
Loos R
Genetics of Obesity and related Metabolic Traits Program, R. Bronfman Institute for Personalized Medicine, Mount Sinai School of Medicine, New York, United States

Obesity is a common condition caused by an intricate interplay between genes and environment. In the past five years, genome-wide association studies have identified >50 genetic loci that determine one’s susceptibility to obesity. Follow-up studies have shown that this genetic obesity susceptibility is attenuated by up to 40% in individuals who live and active lifestyle, highlighting the genes - physical activity interaction. Although physical
activity is considered a mediating factor in the gene-obesity association, none of the obesity-susceptibility genes are associated with measures of physical activity. Yet, focused gene-discovery studies have started to report genetic loci associated with physical activity.

**KN6**

**Gadgets and geeks: using wireless technology to improve the assessment and intervention of physical activity and diet**

Marshall SJ

*Center for Wireless and Population Health Systems, Department of Family and Preventive Medicine, University of California San Diego, La Jolla, California, United States*

Dr Marshall will present an evidence-based rationale for using wireless and mobile technologies to more rapidly and accurately assess and modify physical activity and dietary behavior. Mobile phones, particularly smartphones, have possibly the greatest potential to assist these efforts because they are virtually ubiquitous and have capacity to collect, aggregate, analyze, and feedback multi-level data in real time. This ‘mobile health’ (mHealth) approach has the potential to transform how we conduct research in physical activity and diet but it requires transdisciplinary science because it spans multiple research domains and is often at odds with the dominant scientific paradigm.
Health related food taxes are a hot topic and most people have a (mostly strong) opinion about them – ‘no nanny state’ is a frequently heard opinion - However, food prices are much more complex than most people realize. For example, agricultural policies and the commercialization of our food production have a large influence on food availability and costs. My PhD focused around the feasibility and effectiveness of food pricing strategies to stimulate healthy eating and in my post-doc I continued working on this topic. In my talk, I will present some of my most important study results; including the results of a large randomized controlled supermarket trial on food pricing strategies. These findings will give you some insight into the effectiveness of food pricing strategies and the role of price in food choice. Also, I will talk about the complexity of studying food prices and present some innovative research methodologies. Subsequently, I will take a broader look into food prices and challenge the audience to think about how complex our food system really is and whether interventions aimed at individual behaviour change can ever be enough to solve problems around unhealthy population diets. Here, I will discuss issues such as ‘what determines the price of food?’ and discuss the need of building towards solutions that look at the whole food system and interlink global health and sustainability.

In developed countries, approximately one in three persons will be directly affected by cancer before the age of 75 years, with breast cancer, melanoma, colorectal cancer and prostate cancer comprising the most common diagnoses. Advances in early detection and treatment have improved survival rates over the past decades, with approximately 60% of patients living over five years after diagnosis. However, cancer and its treatment are often associated with physical and psychosocial problems, negatively affecting quality of life. Physical activity in cancer survivors during and after treatment has been shown to improve physical and psychosocial outcomes, including physical fitness, fatigue, depression, and quality of life. In addition, observational studies showed higher levels of moderate-to-vigorous physical activity to be associated with higher cancer free and overall survival.

Recent physical activity guidelines for cancer survivors suggest that physical activity should be an integral and continuous part of care for all cancer survivors. However, the development of these guidelines has been limited by the research conducted. The guidelines are currently generic, and more research is needed to develop more personalized physical activity guidelines. These studies should focus on identifying clinical, personal, physical, psychosocial, and intervention moderators explaining ‘for whom’ or ‘under what
circumstances’ interventions work. Further, more insight into the working mechanisms of exercise interventions on health outcomes in cancer survivors is needed to improve the efficacy and efficiency of interventions. Finally, existing programs should embrace interests and preferences of patients to facilitate optimal uptake of interventions. Several ongoing studies from our institute aiming to fill those research gaps will be highlighted.

**IL3**  
**A journey through preschool children’s physical activity**  
Hinkley T  

*Centre for Physical Activity and Nutrition Research (C-PAN), School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia*

Recent evidence suggests that preschool children (ages three to five years) spend only a small proportion of their day being physically active and that few meet physical activity recommendations. Additionally, physical activity during early childhood is associated with improved health and psychosocial outcomes both during that period and in subsequent years. This presentation will report a range of findings from the HAPPY (Healthy Active Preschool Years) study, a cohort study involving 1004 children at baseline (3-5 years). HAPPY objectively assessed preschool children’s physical activity and parents reported on a comprehensive range of potential correlates. A brief recap of published findings from this study will be provided. For instance, only 5% and 56% of children in this sample met the Australian/Canadian and NASPE recommendations, respectively, for participation in physical activity. Several methodological issues, such as reliability of accelerometry data in this population, the impact of different cut-points, and their effect on estimates of compliance with recommendations, will also be discussed. A range of potential correlates across multiple domains were examined and correlates of physical activity were found to differ between boys and girls and between week and weekend days. Correlates of parent-reported screen time will also be presented. Examples of specific correlates and implications of these findings for future research will also be covered. Finally, an overview of challenges still faced by researchers when investigating preschool children’s physical activity, as well as gaps in the knowledge base, will be discussed.

**IL4**  
**Understanding eating behaviours: application of dietary pattern methods to behavioural nutrition research**  
McNaughton S  

*Centre for Physical Activity and Nutrition Research (C-PAN), School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia*

Dietary patterns have increasingly become the focus of research in public health nutrition. A greater understanding of dietary patterns can assist in the development and application of food-based dietary guidelines, public health interventions and policies. Measures of dietary patterns reflect multiple aspects or dimensions of diet simultaneously and use of dietary pattern measures shifts the focus from individual nutrients (such as energy, fat or fiber
intake) or food groups (such as fruits or vegetables) to the more complex dietary patterns that exist in the population. Measures of dietary patterns have been used in epidemiological studies to investigate associations with particular health outcomes or as a confounder when investigating other exposure-disease relationships. In behavioural research, they may be used to investigate interactions with other health behaviours, examine the determinants of healthy eating patterns, identify at-risk groups and evaluate health promotion interventions. Dietary indices, may be used in monitoring and surveillance to assess how well people comply with dietary guidelines, to monitor trends in the population over time, and to target diet and nutrition messages for the public. Dietary pattern measures may be useful in behavioral research as many aspects of diet are interrelated, and changing one aspect of dietary behaviour may impact other aspects of the diet in both positive and negative ways. In addition, small differences or changes across a range of dietary behaviours may be more adequately examined as shifts in overall dietary patterns or diet quality. Examples of the application of dietary pattern approaches from the literature will be examined.

IL5 The physical environment and its relationship with physical activity and sedentary time in adults and adolescents
Van Dyck D
Department of Movement and Sports Sciences, Ghent University, Belgium

In recent years, an increasing amount of research in developed countries has focused on the importance of the physical environment, next to the importance of individual and psychosocial attributes, to explain physical activity and sedentary time. Also in Belgium, a growing body of evidence on this topic is now available. During this presentation, an overview will be given of the results of the BEPAS (Belgian Environmental Physical Activity Study) in adults and adolescents, where the relationship between the objective and perceived physical environment and health behaviors was examined in adults (20-65 years) and adolescents (13-15 years) living in the same neighborhoods. A critical question is: are similar environmental factors in the local neighborhood related to physical activity and sedentary time in different age groups? Furthermore, the Belgian results will be framed in the context of the IPEN (International Physical activity and the Environment Network) study, where data on the relationship between the physical environment and health behaviors in adults were collected in 12 countries worldwide. Moreover, a part of the presentation will be dedicated to the importance of examining the interplay between physical environmental factors and other levels of the ecological models of health behaviors, such as psychosocial and sociodemographic attributes. Finally, some challenges faced by researchers conducting environmental research, as well as important opportunities for future research, will be discussed.
Intervening to prevent obesity among young children requires changing the behaviours of their caregivers. However, engaging parents and caregivers in prevention interventions is challenging. Formative research shows that parents of preschool-age children are enthusiastic about learning general parenting skills, such as discipline strategies, but less interested in nutrition and physical activity. In this presentation, Dr. Haines will describe two research studies using interventions that attempt to capitalize on this enthusiasm. The first, Healthy Habits, Happy Homes, is a randomized controlled trial of a home-based intervention designed to improve household routines known to be associated with childhood obesity among a sample of low-income, racial/ethnic minority families with preschool aged children. The second, Parents and Tots Together, is a randomized controlled trial of a family-based intervention that embeds weight-related messages within an existing general parenting program among a sample of low-income, racially diverse families with preschool aged children.
SYMPOSIA
DS1  Food taxes, a new holy grail?

Chair: Devisch Ignaas  
*Bioethics Institute Ghent, Ghent University, Ghent, Belgium*

Discussant: Steenhuis Ingrid  
*Department of Health Sciences, VU University Amsterdam, Amsterdam, the Netherlands*

This symposium was identified by ISBNPA’s Advocacy and Policy committee as a highlighted symposia reflecting the Advocacy and Policy interests of ISBNPA

PURPOSE: In an effort to reduce the growing prevalence of overweight and obesity, food taxes have been introduced in several European countries, the so called ‘obesitax’. As yet little evidence is at hand, we want to organize a debate on the pros and the cons of food taxes as a policy means to counterweight the consumption of unhealthy food or the increasing diet-related diseases.

RATIONALE: Can food taxes become an appropriate and just policy measure to reduce overweight and obesity and therefore increase consumer’s health?

OBJECTIVE(S): First of all, can it be effective? This question deals with both the clinical and factual meaning of the word effective. We urgently need more research on the predictive health effects of an overall obesitax: is fat food indeed the main factor in the growing prevalence of overweight and obesity and would an decreasing consumption of it also reduce overweight? And if this would be the case, is an obesitax an innovative and effective tool to conduct us towards less consumption of greasy ingredients: are changes in prices likely to affect demand by whom we want to? 1-3 We are neither served by an effective tool which does not generate the desired health effect, nor an inefficient tool which would not bring us to the point it would have to lead us to. As many instruments have been developed to reduce obesity, this is also a crucial question for the valorization of our research. Although research has been done, we urgently need more research on this.4 Secondly, can goof taxes take part of an economically stimulative climate to change food production and distribution? It can never be a simple matter of changing food consumption, but also of food production and distribution. How then to create an economic and fiscal favorable climate that stimulates industrial nutrition companies towards the production of more healthy and affordable food, to facilitate healthy consumption patterns? And thirdly, we have to reflect upon the conditions if and how an obesitax can be an innovative tool to improve our ‘choice architecture’ in a socially and ethically acceptable way – socially by challenging the given that the prevalence of obesity is more present in lower social classes (justice); ethically by respecting the free choice of individuals in the consumption of food (individual autonomy)? Starting from these challenging questions, both speakers of the panel will explore the pros and cons of food taxes.
DS1.1  Food taxes, a new holy grail  
Devisch I  

PURPOSE: If an obesitax would be introduced, it needs to be based on scientific evidence, economic prerogatives and social and ethical standards. Since ‘malnutrition’ – under- and overnutrition – is a problem with higher prevalence in lower social classes, the objectives of governmental policy to reduce overweight and obesity should not only include health parameters; also economic aspects and ethical guidelines have to make part of this proposal. We think an obesitax should not only be effective, but also fit into an economically stimulative and socially and ethically right policy, rather than a restrictive or paternalistic one.  

METHOD: Literature review  

RESULT(S): to be presented  

CONCLUSION(S): We need to develop a framework within which we can develop choice experiments who respect the principles we put forward as being crucial: justice and autonomy. Only within these conditions, we will be able to answer our quest for a valorizable tool to reduce overweight and obesity in our society, an intervention which should be the most effective for those we most want to target.

DS1.2  Food taxes, how to implement them?  
Steenhuis I  

PURPOSE: Explore the conditions needed to implement food taxes  

METHOD: Presentation of research data from the Netherlands  

RESULT(S): Book published: ‘Put the money where the mouth is’ (Waterlander, 2012)  

CONCLUSION(S): to be presented at debate
DS.2 Theoretical application in behavioral nutrition and physical activity research – Where do we go from here?

Chair: Yaroch Amy L
Gretchen Swanson Center for Nutrition, Omaha, Nebraska, United States

PURPOSE: As Kurt Lewin famously opined, “there is nothing so practical as a good theory.” However, whether the current use and application of theory in behavioral nutrition and physical activity is furthering the field as much as it could be remains in question. The purpose of this debate symposium is to facilitate discussion regarding the use of theories to guide nutrition and physical activity research.

RATIONALE: Theory is a set of interrelated concepts, definitions, and propositions that present a systematic view of events or situations by specifying relations among variables in order to explain or predict events (i.e., behaviors). Integration of theory, research, and practice is critical for the successful implementation of evidence-based nutrition and physical activity interventions into population level public health. However, the current state of theory utilization and testing appears stagnant. To date, much of the research applying theory to health behavior has focused on individual-level psychosocial factors, with failure to consider the broader systems in which behaviors and individuals exist. Further, the application of individual-level theories has not been complete, often selecting variables and/or constructs without testing theories in their entirety. As a result, the utility of theory in behavioral nutrition and physical activity remains unclear. Although many in the scientific community concur that theories must have practice utility and be tested in real-world settings, there is debate about whether behavioral nutrition and physical activity research would be best suited to the use of multiple theories, or more in-depth study of individual theories.

OBJECTIVE(S): 1. To debate whether an approach utilizing individual theories intact is more or less suited to research on nutrition and physical activity behavior change and maintenance, compared to an approach utilizing the constructs with strongest predictive utility from multiple theories. 2. To present the limitations of current applications of theory to behavioral nutrition and physical activity and suggest a pathway to more comprehensive study of existing theories. 3. To present a novel approach to applying components of multiple theories to behavioral nutrition and physical activity as a means to better understand the complex factors influencing these behaviors and develop more specified interventions.

DS2.1 Utilization of multiple theories through a systems science framework
Pinard CA

PURPOSE: A major limitation of applications of theory to health behaviors is that many researchers become closely aligned with a particular theoretical perspective and use that to
guide their behavioral interventions. Thus, science has suffered from minimal flexibility in applications of theory and the capacity to use multiple theories within single studies. Studying multiple theories may provide unique opportunities to better understand complex health behaviors and ultimately develop more efficacious interventions.

METHOD: Not applicable to debate symposia, per conference organizers.

RESULT(S): To date, theoretical constructs have been shown to account for very little variance in behavioral outcomes. Thus, single theories have limited utility in advancing behavioral nutrition and physical activity research. Further, many theories applied to health behaviors operate at the individual level and fail to consider the broader social and contextual factors influencing behaviors. Despite these limitations, much can be learned from the existing literature. For example, constructs such as self-efficacy, motivation, and intentions have been shown in multiple studies to influence behavioral outcomes. However, each construct typically accounts for very little variance in outcomes and these constructs are typically studied more singularly. Systems science methodologies may offer more insight to guide this field, where cultural, social and contextual factors in behavior change can be studied in tandem with more traditional individual psychosocial variables.

CONCLUSION(S): Systems science methodologies may offer a particularly unique way to clarify how the most effective variables from individual theories and perspectives could be integrated into a comprehensive conceptual model to better understand nutrition and physical activity behaviors.

DS2.2 In-depth testing and utilization of single theories to advance the evidence base
Patrick H

PURPOSE: Theory is critical to developing and advancing effective interventions to promote behavior change and maintenance. To best identify variables in the pathway of behavior change and maintenance, improved study of individual theories is needed.

METHOD: Not applicable to debate symposia, per conference organizers.

RESULT(S): Theory provides a lens through which to view behaviors, findings and the ways in which complex variables interrelate. Further, theory addresses how (i.e., mediators) and under what circumstances (i.e., moderators) variables are likely to be associated. Thus, theory offers insight into additional and, in some cases, more proximal targets for intervention. Despite these potentials, theory has often been criticized because theoretical variables explain little variance in behavioral outcomes. Rather than representing a problem with theory, this reflects limitations in the ways that theories have been applied and theoretical constructs measured. Theories are rarely studied in whole. Often, one or two constructs from a theory are employed as mediators (e.g., self-efficacy) with failure to apply the complexities specified by the theory. Too frequently, theory is an “after-thought” in research development, resulting in improper use of constructs, and “cookbook” approaches
which combine variables from multiple theories with little empirical reason for doing so. Measurement of theoretical constructs also warrants attention, particularly with regard to how closely conceptualization of psychosocial variables reflects lived experience. This is critical for dissemination of theory-based interventions into clinical practice.

CONCLUSION(S): In sum, given the nascency of this literature and limited application of complete theories to interventions, it is premature to combine constructs from multiple theories.
S01  
Active mobility: from adolescence to adulthood, from recreational to utilitarian, from Belgium to Australia

Chair: Oja Pekka¹  
Discussant: Oja Pekka¹  
¹ UKK Institute, Tampere, Finland

PURPOSE: Active mobility (utilitarian cycling and recreational cycling) has important health implications, because it holds the potential of being physically active on a regular basis. Barriers and facilitators to active mobility will play an essential role in the choice adolescents and adults make. The purpose of this symposium is to look at different aspects (barriers and facilitators, health enhancing potential of recreational cycling and electrical assisted cycling) of active mobility in adolescents and adults.

RATIONALE: This symposium will add an important contribution to the ISBNPA congress as it will provide new insights in different aspects of active mobility in Belgium and Australia. Health enhancing effect of electric assisted cycling, understand the contribution of recreational cycling to meet the physical activity guidelines, and determination of transport choice will be discussed.

OBJECTIVE(S): 1. Uncover the factors influencing the choice between transportation modes over short distances to various destinations in older adolescents using focus groups. 2. Comparative epidemiology to provide population estimates and trend for recreational cycling by subgroups, and to understand the contribution of recreational cycling to meet the physical activity guidelines. 3. What are the health benefits of cycling on electric assisted bicycles?

SUMMARY: During adolescence people will get access to more choices for transportation. Looking at barriers and facilitators of active mobility during adolescence will play an essential role in helping scientists and policy makers on how to avoid the downfall of active mobility during adulthood. Two alternatives are discussed on whether they are suitable to serve as an alternative to utilitarian cycling and walking: use of electrical assisted bicycles and cycling for recreational purposes.

S01.1  
Factors influencing the choice of transport mode for short distances in older adolescents: a qualitative study

Simons D, Clarys PP, De Bourdeaudhuij I, de Geus B, Vandelanotte C, Deforche B

PURPOSE: Since a decline in activity levels occurs in adolescence, active transportation could be important to increase daily physical activity in older adolescents (17-18 years). To promote active transport, it is necessary to be aware of the barriers and facilitators of this type of transport, but also of other transport modes. This study sought to uncover the factors influencing the choice between transportation modes over short distances to various
destinations in older adolescents using focus groups.

METHOD: 32 focus group volunteers (mean age of 17 ± 1.2 yrs) were recruited from the 2 final years from a secondary school in Antwerp (Belgium). Five focus groups were conducted (5 to 8 participants/group). Content analysis was performed using NVivo 9 software (QSR International). Grounded theory was used to derive categories and subcategories.

RESULT(S): Data were categorized in 3 main themes with several subcategories: personal factors (high autonomy, low costs and health), social factors (good social support) and physical environmental factors (short travel time, good access to transportation modes and to facilities, good weather, an adapted built environment, perceived safety and ecology).

CONCLUSION(S): For older adolescents, the interplay between short travel time, high autonomy, social support, low costs, good access to transportation modes and facilities, and good weather was important for choosing active transport over other transport forms for travelling short distances to various destinations. Other well-known factors such as safety, ecology and health seemed not to have a big influence on their transportation mode choice.

FUND SOURCING: Fonds voor Wetenschappelijk Onderzoek - Levenslijn

S01.2  Recreational cycling in Australia and its contribution to health enhancing physical activity
Titze S, Merom D, Rissel C, Bauman AE

PURPOSE: Comparative epidemiology to provide population estimates and trend for recreational cycling by subgroups, and to understand the contribution of recreational cycling to meet the physical activity guidelines.

METHOD: The Exercise, Recreational and Sport Survey (ERASS) for the years 2001-2009 were used. Approximately 13,000 Australian adults (≥15 years) were interviewed each year in all seasons. Information was collected about the frequency of cycling during the past 12 months and average duration of a cycling session since 2005. Three thresholds for meeting the physical activity guidelines were considered: > 150 minutes, >300 minutes, and 5 sessions of 30 minutes cycling per week.

RESULT(S): The pooled prevalence of recreational cycling was 10%. Employed middle-aged men with an university degree have a higher prevalence of recreational cycling compared to their comparison groups. Among all cyclists a third met the physical activity guidelines of 150 minutes per week and less than 20% met the guidelines of 300 min/week or 5 sessions of 30 minutes each /week, respectively.

CONCLUSION(S): Recreational cycling is a successful way to accumulate minutes of moderate to vigorous intensity physical activity. However, further investigation is needed to understand the unevenly distribution of participation rate by gender.
S01.3 Health benefits of electric assisted cycling
de Geus B, Meeusen R

PURPOSE: The purpose of this presentation is to look at studies that assessed the influence of physical active commuting to work using an EAB on different health and physical parameters. Different strategies will be addresses in order to define for who the EAB could be used.

METHOD: Tests were performed at 3 different time points over a 10 week period, including 4 weeks of passive (control period) and 6 weeks of active commuting. ANOVA for repeated measures was used to test differences between the testing series for the most important physiological parameters: Pmax(/kg), VO2peak(/kg), fixed blood lactate concentration (2, 4 mmol/L).

RESULT(S): Maximal external power (Pmax(/kg)) significantly increased in men and women after 6 weeks of active commuting. Power output at 2 mmol/L significantly increased in women (P = 0.001) but not in men (P = 0.0604). Power output at 4 mmol/L significantly increased for men and women. VO2peak(/kg) did not differ.

CONCLUSION(S): The results of this study clearly show that the exercise load during physical active commuting using an EAB, is sufficient to significantly improve maximal external power and increase the submaximal power output. The EAB seems to be a promising tool towards commuter cycling as a health enhancing physical activity, for those who will benefit the most in terms of health related fitness, namely the physically inactive, the elderly and the overweight, but also for people cycling in regions with hilly roads and strong headwinds.
S02  Health promotion in organized youth sports

Chair: Wold Bente  
*Department of Health Promotion and Development, University of Bergen, Bergen, Norway*  
Discussant: Duda Joan L  
*School of Sport and Exercise Sciences, University of Birmingham, Birmingham, United Kingdom*

PURPOSE: The symposium is innovative by systematically addressing how organized youth sports may contribute to the improvement of public health.

RATIONALE: Recent policy documents underline the importance of the role of the sport movement as a tool for health-enhancing physical activity, suggesting that sport has a greater influence than any other social movement. The recognized potential of the sport movement to foster health-enhancing physical activity and take into account the wider health promoting goals remains under-utilized and needs to be developed.

OBJECTIVE(S): 1. Examine whether participation in organized sports ensures that youth meet PA recommendations. 2. Examine how participation in organized sports relates to subjective health and life satisfaction. 3. Develop standards for health promoting sport clubs for young athletes.

SUMMARY: The potential of organized youth sports to improve public health, in particular with regard to health enhancing PA and positive mental health, is presented. The first paper examines the extent to which participation in organized sports ensures that youth meet PA recommendations on practice days during soccer and baseball practices in a US sample. The next paper focus on how youth soccer clubs may represent a health promoting setting for young athletes in terms of increased health-enhancing physical activity, subjective health and life satisfaction. Two Norwegian samples of 13 year-olds are compared; soccer players randomly selected for an intervention study, and participants in a nationally representative survey. The third paper reports on a study examining the extent to which Finnish clubs organizing youth sports has health promotion on their agenda, based on data from surveys of club leaders, administrators, coaches and athletes. Ongoing work to develop standards for health promotion in sports clubs will be presented. Finally, the findings from the three studies will be discussed with the aim to identify how organized youth sports can contribute to improve health and well-being among young people.

S02.1  Physical activity during youth sports practices: differences by sport, sex, and age  
Sallis JF, Carlson JA, Leek D, Henrichon S, Cain K

PURPOSE: Participating in sports is a common way for children to accumulate physical activity. We evaluated minutes and intensity of children’s physical activity patterns during soccer and baseball practices.
METHOD: Children ages 7-14 were recruited from a soccer league (boys N = 55; girls N = 48) and baseball/softball leagues (boys N = 50; girls N = 50); 29 total teams. Minutes of moderate to vigorous physical activity (MVPA) and percent of practice time in MVPA were calculated from accelerometry data.

RESULT(S): The overall mean MVPA was 45.1 minutes and 46.1% of practice time. Participants on soccer teams (+13.7 minutes, +10.6 percent of practice time vs baseball/softball), boys (+10.7 minutes, +7.8 percent of practice time vs girls), and those aged 7-10 (+7.0 minutes, +5.8 percent of practice time vs 11-14 years old) did significantly more MVPA than their counterparts. Participants on soccer teams spent an average of 17.0 more minutes and 15.9 more percent of practice time in vigorous-intensity PA than those on baseball/softball teams, which is important because vigorous PA is more protective against weight gain. Overall, 24% of participants met the 60 minute PA guideline during practice, but fewer than 10% of 11-14 year-olds and 2% of girl softball players met the guideline.

CONCLUSION(S): Participation in organized sports does not ensure youth meet PA recommendations on practice days. The health impact of youth sports could be improved by adopting policies that ensure participants obtain PA during practices.

FUND SOURCING: University funding.

S02.2 Subjective health and life satisfaction among young soccer players
Wold B, Ommundsen Y, Samdal O

PURPOSE: Examine whether participation in organized youth soccer is related to higher levels of MVPA during leisure-time, satisfaction with life and subjective health.

METHOD: Questionnaire responses from two Norwegian samples of 13 year-olds are compared; soccer players (n=326) randomly selected for an intervention study (the PAPA project) and participants (n=1320) in a nationally representative survey (the HBSC study).

RESULT(S): The soccer players scored statistically significantly higher on all comparable variables (leisure-time moderate to vigorous physical activity (MVPA), subjective health and life satisfaction, self-reported family wealth). In the HBSC sample (which of course also included soccer players and children who was engaged in other types of organized sports as well as inactive children) 20 % reported MVPA once per week or less, compared to only 7 % of the soccer players. 38 % of the HBSC sample rated their health as excellent, compared to 51 % of the soccer sample. The corresponding figures regarding high family wealth was 25 % versus 35 %.

CONCLUSION(S): The findings suggest that participating in organized youth soccer is beneficial in terms of health-enhancing physical activity and subjective health, but social selection processes that may explain these associations need to be further examined.

FUND SOURCING: University, EU’s FP7 Grant Agreement No.223600
S02.3  Developing the concept and actions of health promoting sport club  
Kannas L, Kokko S

PURPOSE: The Health Promoting Sport Club (HPSC) concept views a sports club as a health promoting setting in which various health issues are considered with multi-level activities. In Finland about 40% of 15-year old adolescents are active sport club members. The aim of this presentation is to introduce a study program in which the purpose was to determine the standards for the HPSC and to identify health promotion profiles of the sport clubs in Finland,

METHOD: During three rounds of the Delphi study 27 specialists of health promotion and sport club activity evaluated a total of 81 standards proposals. As a result of the Delphi study 15 most relevant standards for HPSC were identified. Secondly a Sport Club Survey was conducted in order to study the health promotion profiles of the clubs based on these standards. A total of 97 sport clubs participated to the study, information was gathered from club officials (N=273), coaches (N=240) and male young athletes N=646).

RESULT(S): Sport Clubs in Finland were fairly health promoting measured by HPSC index. However the variation between the clubs was quite wide. The guidance activities in the clubs towards the coaches were quite common in sports performance issues but much less prevalent in more comprehensive health promotion issues.

CONCLUSION(S): The presentation will address proposals for further research in developing the HPSC concept and related indicators as well as how to make sport clubs more health promoting.

FUND SOURCING: University of Jyväskylä
S03 Physical activity promotion among Mexicanos and Mexican Americans: context, application, and future directions

Chair: Mama Scherezade K  
*Texas Obesity Research Center, Department of Health and Human Performance, University of Houston, Texas, United States*

Discussants: Estabrooks Paul A and Lévesque Lucie  
1,2 *Virginia Polytechnic Institute and State University, Department of Human Nutrition Foods & Exercise, Blacksburg, Virginia, United States*

PURPOSE: The purpose of this symposium is to evaluate the context, application and implications of physical activity promotion among Mexicans and Mexican Americans.

RATIONALE: The majority of Mexicans (58.2%) and Mexican Americans (47.1%) are physically inactive, placing them at high risk for related health compromising conditions and escalating health care costs. Physical activity promotion efforts that address contextual factors related to physical activity beyond the individual are greatly needed.

OBJECTIVE(S): This multinational panel will evaluate the environmental and organizational context of physical activity promotion for Mexicans and Mexican Americans framed within the Ecologic Model of Physical Activity (EMPA), illustrate its application in Mexico and the USA, and discuss implications for promotion efforts and program evaluation.

SUMMARY: Dr. Rebecca Lee (USA) will evaluate how the Ecologic Model of Physical Activity can be operationalized in an environmental and cultural context born in Mexico, but broadly adopted by Mexican Americans in the USA with special attention to physical activity resources, health care settings and existing interventions. Ms. Scherezade Mama (USA) will discuss the relationship between physical activity resources, including a sample of parks and plazas, and physical activity levels of adults and children through direct observations using the System for Evaluating Play and Recreation in Communities (SOPARC) in Puerto Vallarta, Mexico. Ms. Karla Galaviz (Mexico/Canada) will discuss the physical activity built environment in hospitals and hospital physical activity promotion efforts in Guadalajara, Mexico. Dr. Samantha Harden (USA) will present a systematic review of physical activity intervention research conducted in Hispanic populations and the degree to which this literature provides a description of the individual and organizational context related to the implementation and testing of interventions. Discussion, led by Dr. Paul Estabrooks (USA), will focus on the implications of the symposium presentations for research, practice and policy in Mexico. Particular attention will be paid to developing recommendations for researchers to consider broader contextual factors that are likely critical in developing interventions appropriate for Mexican and Mexican American and also have a high potential for translation into typical community and clinical settings.
S03.1 Physical activity among Mexicans and Mexican Americans in an ecologic systems framework
Lee RE, Lévesque L, Jauregui E

PURPOSE: To operationalize the Ecologic Model of Physical Activity (EMPA) in an environmental and cultural context born in Mexico, but broadly adopted by Mexican Americans in the USA.

METHOD: Participant observation occurred over an immersive, ten month period in Jalisco, Baja California South, and the Distrito Federal, Mexico. Numerous meetings with researchers, school personnel, state health departments, and residents helped define environmental factors, cultural values, and the political context of Mexico. The EMPA was adapted to include examples from physical activity resources, health care settings and behavioral interventions.

RESULT(S): Micro-level environments such as parks and plazas are unique settings in which PA occurs. Meso-and Exo-level environmental factors are the dynamic social and physical linkages such as culturally driven communication and transportation styles between micro-level environments. These linkages connect events from one micro-level environment to events in another either via direct or indirect pathways. Macro-level environmental factors like the health care system and political changes impact large numbers of the population across many micro-level environments. Forces of change such as technological innovation impact all levels in unpredictable ways. These environmental factors directly and indirectly impact on PA.

CONCLUSION(S): Mexico is a middle income country undergoing technological advancements leading to acceptance of westernized recreational activities and lower rates of physical activity (PA). It is important to uniquely consider the environmental and cultural context when operationalizing the EMPA to aid PA promotion efforts in Mexico and among Mexicans and Mexican Americans.

FUND SOURCING: Dr. Lee was funded by a Fulbright García-Robles award and NIH 1R01CA109403.

S03.2 Association between physical activity resource quality and use in Mexicans through objective observation
Mama SK, Pacheco A, Soltero E, Lee RE

PURPOSE: The purpose of this study was to explore the relationship between physical activity resource (PAR) quality and physical activity (PA) in Mexican children and adults.

METHOD: Features, amenities and overall incivilies of two free PARs, one park and one plaza, in Puerto Vallarta, Mexico were assessed using the Physical Activity Resource Assessment© (PARA). A composite index was computed ((features+ amenities)-incivilies) for each PAR to determine an overall access to quality physical activity resources (QPAR).
Two trained research team members used the System for Evaluating Play and Recreation in Communities (SOPARC) to assess gender, age group, and PA level of PAR users through direct observations.

RESULT(S): The park had more features and fewer incivilities; the plaza had greater amenities. The park was better quality (QPAR=21 vs. 14) and had a greater number of users (n=208 vs. 100). The majority of people using PARs were Latino (91.2%) adult (58.1%) women (58.4%). There were more Latinos (96.2%) at the park than at the plaza (81.0%), and most users (61.4%) used PARs for walking, with more people walking at the plaza (73.0%) than at the park (55.8%). QPAR was positively correlated with PA (Kendall’s τ=.320, p<.001).

CONCLUSION(S): Resource quality may increase PA in users. Parks are better quality and have a greater number of features, but plazas are quite common in Mexico and still promote walking, the most popular form of physical activity in adults. Improving the quality of plazas may be an economical strategy to increase PA in Mexicans.

FUND SOURCING: Funded by a Fulbright García-Robles award to Dr. Rebecca Lee at the University of Houston.

S03.3 Is the Mexican health care environment promoting physical activity?  
Galaviz K

PURPOSE: The purpose of this study was to describe the physical activity (PA) environment and the availability of PA and health messaging promotional materials in health care settings from Guadalajara, Mexico.

METHOD: Forty clinics and hospitals from Guadalajara were randomly sampled. A tool for measuring the PA built and promotional environment of health care settings was developed. The tool assessed the availability, accessibility, visibility, signage, cleanliness, and safety of the stairs, elevators, and green spaces in the foyer of each clinic/hospital. The tool recorded the presence of written materials promoting PA such as posters, brochures, leaflets, flyers, articles and ‘cartels’ (hand-made posters) in the foyer and one waiting room of each clinic/hospital. The content and message frame (gain vs. loss) of these materials were also assessed.

RESULT(S): About 75% clinics/hospitals had stairs, 42% had elevators and 55% had green spaces. The PA environment score reflected by the stair, elevator, and green space indicators was low across clinics/hospitals (Mean=3.7, SD=2.7, Range=-2-10) meaning that the environment is not conducive to PA. Posters and cartels were the only PA promotional materials available in 11 (28%) primary care clinics/hospitals. Nine clinics had a generic health promotion poster that included a single sentence about PA. Two clinics had cartels; one about diabetes prevention that included PA recommendations and the second about PA benefits and recommendations. The message frame employed in all posters/cartels was gain frame.
CONCLUSION(S): The Mexican health care environment is not promoting PA. Strategies to enhance the PA promotion environment in Mexican health care settings are discussed.

S03.4 Physical activity Interventions among Hispanics: a RE-AIM review

PURPOSE: To determine the degree to which physical activity interventions for Hispanic populations reported on both internal and external validity factors using the RE-AIM framework (reach & representativeness, effectiveness, adoption, implementation, maintenance).

METHOD: We systematically identified English (PubMed; EbscoHost) and Spanish (SCIELO; Biblioteca Virtual en Salud) language studies published between 2001 and 2012 that tested physical activity interventions in Hispanic populations. We reviewed 142 abstracts and identified 40 studies that met the eligibility criteria (27 in English and 13 in Spanish). A validated 21-item RE-AIM abstraction tool was used to determine the quality of reporting across studies (0-7=low, 8-14=moderate, and 15-21=high).

RESULT(S): English and Spanish language articles did not differ on the number of indictors reported (average=8.1 vs 7.9), but Spanish articles were superior in reporting reach (59% vs 43% of indicators) while English articles were superior in reporting effectiveness (69% vs 56%). Representativeness of participants and settings was rarely reported regardless of publication language with no studies reporting on characteristic differences between settings that participated and those that did not. Only 14% of the studies reported on participant representativeness. Further, only 11% of studies reported on cost of implementation and none reported on costs associated with start-up or maintenance of the intervention and no study conducted a cost effectiveness analysis.

CONCLUSION(S): Regardless of language of publication, physical activity intervention research for Hispanics should increase the attention to, and measurement of, external validity and cost factors that may be critical in the research to practice decision-making process.

FUND SOURCING: Multinational Collaboration to Increase Physical Activity in Hispanics (1R13CA162816)
Innovative methodologies to study environment-health behavior relationships

Chair: Van Cauwenberg Jelle
Human Biometry and Biomechanics, University of Brussels, Brussels, Belgium

Discussant: Foster Charles E
Department of Public Health, British Heart Foundation Health Promotion Research Group, University of Oxford, Oxford, United Kingdom

PURPOSE: This symposium aims to discuss the use, strengths, limitations and future research opportunities of “innovative” methodologies (i.e. GPS, ecological momentary assessment, digital life logging, and photographs) to study environment-health behavior relationships.

RATIONALE: Typically, previous studies had a cross-sectional design in which participants’ health behaviors were linked to subjective (i.e. questionnaires targeting perceptions) or objective measurements (i.e. Geographic Information Systems or audit instruments) of their neighborhood environments. Although these methods have provided useful information, several shortcomings can be identified. First, knowledge of where people actually are physically active or sedentary and where they buy/eat (un)healthy food is limited. Second, when using questionnaires to assess perceptions, participants have to recall their experiences in certain environments. This might not accurately reflect what participants really experience while being in the environment. Third, previous studies suffered from limited environmental variation and environmental co-variation. Fourth, previous studies strongly focused on conscious processes, whereas unconscious processes have received little research attention. Recently, studies using new methods that try to tackle these issues have been conducted. However, developing and using innovative methodologies is a process of trial and error. Researchers interested in using these methodologies could benefit from others’ experiences.

OBJECTIVE(S): This symposium aims to: 1) describe and exemplify innovative methodologies to study environment-health behavior relationships; 2) discuss their strengths, limitations and recommendations for future use, and; 3) facilitate a discussion on “where and how to go” in the research area of environment-health behavior relationships.

SUMMARY: The rationale behind the symposium and the presenters will be introduced by the chairperson. Then, four presentations, each focusing on a specific innovative method to examine environment-health behavior relationships (i.e. GPS, ecological momentary assessment, digital life logging, and photographs), will be held. The use, strengths, limitations and future possibilities of these methods will be emphasized. In the discussion afterwards, the potential contributions to the research area will be discussed.
S04.1 Use of GPS to study environment-health behavior relationships
Schipperijn J, Kerr J, Duncan S

PURPOSE: Demonstrating the possibilities, strengths and limitations of using GPS as an alternative method to study environment-health behavior relationships, and provide recommendations for other researchers who plan to use GPS.

METHOD: This presentation will address GPS device selection criteria, device settings, participant data collection, data cleaning, data processing, and integration of data into Geographic Information Systems (GIS).

RESULT(S): Three main factors should be considered selecting a GPS device: chipset sensitivity/accuracy, battery life, and fix time. Device settings are primarily based on how many days of data need to be collected and how much data can be stored. Missing data must be dealt with by e.g. filtering methods or smoothing techniques. The first step in processing GPS data is to compute derived variables (e.g. duration, distance traveled, direction, speed, acceleration, elevation delta, grade etc.) from the inputs supplied by the GPS (timestamp, latitude, longitude, elevation). Afterwards, additional analyses such as location clustering, trips, and modes of transportation can be performed. Much of the true potential can be maximized when GPS data are compiled in a GIS to be combined with other spatial data.

CONCLUSION(S): The use of GPS in health research is becoming more prevalent and collecting GPS data in large quantities becomes easier, but data processing, cleaning and analysis becomes increasingly challenging. The creation of relevant environmental exposure parameters in GIS also requires considerable expertise.

S04.2 Ecological momentary assessment of physical activity behaviors and contexts
Dunton G, Liao Y, Kawabata K, Intille S

PURPOSE: Advances in portable electronic technologies have created opportunities to collect real-time self-reports of physical activity and sedentary behavior in naturalistic situations. Ecological Momentary Assessment (EMA) uses common mobile phones to deliver electronic surveys on the display screen of the device. Unlike recall instruments, which are prone to recall errors and biases, EMA can measure behaviors as they occur. In addition, this strategy is able to provide contextual information about physical activity such as where and with whom behaviors are taking place; how individuals perceive environmental features of those settings; and how individuals feel before, during, and after physical activities.

METHOD: This presentation will describe how EMA methods can enhance the measurement of physical activity and related contexts.

RESULT(S): EMA is a feasible and valid method to measure physical activity and sedentary behaviors in children and adults. EMA data indicate that physical activity levels differ across
types of social and physical contexts. A growing area of interest is the use of EMA to examine time-lagged effects of affective and physical feeling as antecedents and consequences of physical activity bouts across the day. The next wave of Context-Sensitive Ecological Momentary Assessment (CS-EMA) will integrate information from external sensors (e.g., air pollution monitors, asthma inhalers) to trigger electronic surveys in response to key exposures and experiences.

CONCLUSION(S): EMA offers great potential to complement and expand upon objective physical activity and location monitoring. Further work is needed to develop sophisticated data management and analytic capabilities to take full advantage of EMA methodologies.

**S04.3 Use of digital life logging to study environment-health behaviour relationships**  
Kelly P, Cowburn G, Doherty AR, Duncan D, Hamilton AW, Foster CE

**PURPOSE:** To demonstrate the possibilities, strengths and limitations of using visual images from digital life logging devices to add value to research into the relationship between the environment and health behaviours, and provide recommendations for research practice.

**METHOD:** This presentation will address device options, ethics, data collection with other devices, data cleaning, data processing, and analysis.

**RESULT(S):** Digital life logging systems allow the capture of real time environmental in situ data of health behaviour. Images improve the validity of recall of environment and behavior interactions. Devices can use passive automatic image capture and sensors, generating up to 3,000 images per day per participant. These images, alongside other devices (e.g. accelerometers) provide temporal data for the behaviour and the environmental conditions. From two UK studies we have coded a set of environmental factors that move beyond the presence or absence of popular correlates, like pavements, street lights, traffic. The images allow information on to a qualitative domain of such factors including circulation level (pedestrians on pavements, parked cars, etc.), weather, light levels on paths, quality of green space. Images also confirm contexts and environmental factors for behaviours such as active travel, physical activity and sedentary behaviour and can add valuable images to counts per minute and GPS traces.

**CONCLUSION(S):** Digital life logging systems offer researchers the added value of placing real behaviours, in environments, in real time. As such methods are becoming more accepted this generates challenges for device synchronization, analysis and interpretation, plus the ethics of wearing devices in public and private spaces.
S04.4 Use of photographs to study the environmental factors that invite to be physically active through conscious and unconscious pathways
Van Cauwenberg J, Van Holle V, De Bourdeaudhuij I, Clarys P, Deforce B

PURPOSE: To present and discuss the use of panoramic photographs to investigate the environmental factors related to an environment’s invitingness to walk for transportation among older adults through conscious and unconscious processes.

METHOD: During a pilot study 40 panoramic photographs, depicting different walking environments, were developed and rated by experts on 19 physical environmental factors. Next, older participants were interviewed, performed a choice task based on the 40 panoramic photographs (unconscious invitingness-measure) and scored the individual photographs (conscious invitingness-measure). Multilevel cross-classified modeling was used to analyze the relationships between the environmental factors and both invitingness-measures.

RESULT(S): The presence of vegetation, benches and surveillance were significantly positively related to both the conscious and unconscious measure of invitingness. Upkeep and the presence of historic elements were significantly positively related to the conscious invitingness measure. For the unconscious measure, significant positive relationships emerged for the land use category “residential and shops” and for a separation between sidewalk and cycling path by markings or color, but only in functionally limited participants.

CONCLUSION(S): The use of panoramic photographs carries potential to increase our understanding of environment-health behavior relationships. Future research could benefit from using photographic manipulations and Implicit Association Tasks to study the conscious and unconscious processes involved in environment-health behavior relationships.

FUND SOURCING: JVC was supported by a Ph.D. Fellowship – Research Foundation Flanders (FWO).
S05  It’s all in the head: a life course perspective of associations between physical activity and sedentary behaviours with psychosocial and academic outcomes

Chair: Hinkley Trina  
Centre for Physical Activity and Nutrition Research, School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia

Discussant: Reilly John J
Physical Activity for Health Research Group, School of Psychological Sciences and Health, University of Strathclyde, Glasgow, Scotland, United Kingdom

PURPOSE: Research investigating associations between lifestyle behaviours and psychosocial and academic outcomes is sparse despite the importance of these outcomes to a healthy life. This novel symposium includes presentations on both physical activity and sedentary behaviours and is framed by a life course perspective. Associations between physical activity and sedentary behaviours with psychosocial and academic outcomes during three important life stages – childhood, adolescence, and adulthood – will be investigated and presented.

RATIONALE: With few exceptions, little research has investigated psychosocial or academic outcomes of physical activity and sedentary behaviours. Understanding behavioural precursors to these outcomes is imperative in the identification of possible intervention targets to support learning and optimal quality of life. Identifying potential associations between physical activity and sedentary behaviours with these outcomes may also support additional avenues for the promotion of optimal levels of those behaviours.

OBJECTIVE(S): The symposium aims to present the latest evidence from diverse cohort studies on psychosocial and academic outcomes of physical activity and sedentary behaviours across various life stages: childhood, adolescence and adulthood.

SUMMARY: During the symposium, four presenters from Finland, Australia and Belgium will discuss their research and findings. The session and speakers will be introduced by the chair. The first presenter will share her findings on associations between compliance with screen entertainment recommendations during the preschool period with social and emotional skills in children during early primary school. The second speaker will present findings from the Northern Finland Birth Cohort on over 8000 children investigating the mediating effect of physical activity between childhood motor function and adolescent academic achievement. The third speaker will present her data on almost 2000 women investigating associations between various sedentary behaviours and depressive symptoms across a three year period. The final speaker will present associations between sitting and mental health in over 4000 adults. Finally, the discussant will briefly overview the main issues of the presentations and facilitate discussion between presenter and audience.
S05.1  **Do little couch potatoes later struggle with social skills?**
Hinkley T, Salmon J, Timperio A, Hesketh K

PURPOSE: Children who engage in more screen time (ST) and less physical activity (PA) may spend less time engaged in social interaction, missing opportunities to develop social and emotional skills. This study investigated associations between ST and PA during the preschool period with children’s social and emotional skills during primary school.

METHOD: Participants were a sub-sample (n=100) of the Healthy Active Preschool and Primary Years (HAPPY) Study. Baseline data collection occurred in 2009 (age 3-5y); follow-up data collection in 2012 (age 6-8y). Parents reported their child’s ST (TV/DVD/video, computer/internet, e-games) at baseline; children wore an accelerometer to capture PA. Compliance with Australian/Canadian ST (≤2h/d) and PA (≥3h/d) recommendations was determined. At follow-up, children completed the Bar-On Emotional Quotient Inventory (short version) to assess social and emotional skills (low/average/high skills). Logistic regression analyses will examine associations between baseline compliance with ST/PA recommendations and follow-up social and emotional skills.

RESULT(S): Preliminary descriptive analyses on the first 32 children with follow-up data suggest differences in social and emotional skills for baseline ST compliance. More children who met ST recommendations at baseline reported high scores on intrapersonal (56% vs. 22%), interpersonal (44% vs. 13%) and adaptability (44% vs. 13%) scales at follow-up. Fewer children who met recommendations reported low scores for total EQ (0% vs. 22%). No differences were apparent for PA.

CONCLUSION(S): Early exposure to ST may be associated with children’s social and emotional skills in the early primary years. Interventions to support development of social and emotional skills could potentially target reductions in early childhood ST.

FUND SOURCING:  Deakin University; Australia Research Council

S05.2  **Physical activity and obesity mediate the association between childhood motor function and adolescents’ academic achievement**

PURPOSE: This prospective study investigated whether childhood motor function predicts later academic achievement via physical activity, fitness, and obesity. We hypothesize that compromised motor function in childhood would lead to adolescent obesity, physical inactivity, and low cardiorespiratory fitness, all of which are, in turn, associated with academic underachievement.

METHOD: The study sample included 8,061 children from the Northern Finland Birth Cohort 1986 (NFBC 1986), which contained data about parent-reported motor function at age 8
years and self-reported physical activity duration, predicted cardiorespiratory fitness (cycle ergometer test), obesity (body weight and height), and academic achievement (grades) at age 16 years. Structural equation models with unstandardized (B) and standardized (β) coefficients were used to test whether, and to what extent, physical activity, cardiorespiratory fitness, and obesity at age 16 mediated the association between childhood motor function and adolescents’ academic achievement.

RESULT(S): Physical activity was associated with a higher grade-point average, and obesity was associated with a lower grade-point average in adolescence. Furthermore, compromised motor function in childhood had a negative indirect effect on adolescents’ academic achievement via physical inactivity (B = −0.023, 95% CI = −0.031, −0.015) and obesity (B = −0.025, 95% CI = −0.039, −0.011), but not via cardiorespiratory fitness.

CONCLUSION(S): Physical activity and obesity may mediate the association between childhood motor function and adolescents’ academic achievement. Compromised motor function in childhood may form an important factor driving the effects of obesity and physical inactivity on academic underachievement.

S05.3 Prospective associations between sedentary behaviour and risk of depression in socio-economically disadvantaged women
Teychenne M, Ball K, Salmon J

PURPOSE: Socio-economically disadvantaged women are at a high risk of engaging in sedentary behaviour (e.g. TV viewing) as well as experiencing depressive symptoms. Although recent cross-sectional research has suggested a positive association between sedentary behaviour and risk of depression, few studies have assessed the longitudinal relationship. This study aimed to investigate longitudinal associations between sedentary behaviour and risk of depression in socio-economically disadvantaged women.

METHOD: 1,802 women, aged 18-45, completed self-report validated measures of sedentary behaviour (TV viewing, computer use, overall sitting time and screen time) as well as depressive symptoms (CES-D 10) in 2007/08 (T1) and 2010/11 (T2). Logistic regression analyses, adjusting for clustering by women’s suburb of residence were conducted to examine the association between different sedentary behaviours and depressive symptoms both cross-sectionally and longitudinally.

RESULT(S): Cross-sectional results showed that women reporting greater time sitting at the computer, screen time and overall sitting time had higher odds of depressive symptoms compared to those reporting low levels (Adjusted odds ratio (AOR): 1.35, 1.31, 1.28 respectively). Although preliminary longitudinal analyses indicated no association between baseline sedentary behaviours and depressive symptoms at follow-up, additional analyses showed that depressive symptoms at baseline were associated with higher levels of TV viewing (AOR: 1.03) and screen time (AOR: 1.03) at follow-up.

CONCLUSION(S): Changes in women’s sedentary behaviour may not predict depressive
symptoms; however, women’s risk of depression may be predictive of engaging in sedentary behaviour. Confirmation of these findings using further prospective and intervention study designs is required.

S05.4   **Physical activity and sitting time independently relate to mental health**  
De Cocker K, Asztalos M, De Bourdeaudhuij I, Cardon G

PURPOSE: There is sufficient evidence suggesting a negative association between sedentary behaviour (=sitting) and physical health, independent form physical activity. Knowledge on the associations between sitting and mental health (MH) is however limited. Therefore this study aims to investigate the relationship between sitting and MH; and to test the interactions between sitting and demographics [gender, age, socio-economic status (SES)] and between sitting and physical activity (PA) for significance in their association with MH.

METHOD: The Belgian National Health Survey provided data on sitting and PA (IPAQ), and on MH (GHQ12 and SCL-90-R) in a nationally representative cohort of 4016 adults (24-65 years). Multiple linear regression analyses were used to examine the associations of sitting; and sitting interactions [sitting*age, sitting*gender, sitting*SES, sitting*MVPA (moderate to vigorous intensity PA)] with five MH disorders (psychological distress, depression, anxiety, somatization and sleeping problems).

RESULT(S): Fully adjusted analyses - adjusted for demographics and MVPA - showed significant positive associations between sitting and the five MH disorders (p<0.05). Sitting interactions showed no significant associations with MH, except for sitting*age with somatization (p=0.005); and sitting*MVPA with psychological distress (p=0.019), depression (p=0.004) and anxiety (p=0.038).

CONCLUSION(S): More sitting is independently associated with more MH disorders. The associations between sitting and MH are similar for men and women, low and high SES groups, and in both younger and older adults, except for somatization; and for both active and inactive persons, except for psychological distress, depression and anxiety.
S06 Longitudinal development of social inequalities in early dietary behaviours and physical activity

Chair: Lien Nanna
Department of Nutrition, Faculty of Medicine, University of Oslo, Oslo, Norway
Discussant: Roos Eva
Folkhälsan Research Center, University of Helsinki, Helsinki, Finland

PURPOSE: The purpose of this symposium is to bring together researchers interested in social inequalities in dietary behaviours and physical activity and to present longitudinal data that can contribute to the understanding of when such inequalities are established and how they develop through the life course.

RATIONALE: Non-communicable diseases (NCDs) and social inequalities in health are considered important health problems across the world. Dietary behaviours, physical activity and sedentariness are important factors for preventing the most common NCDs. Understanding social differences in the establishment and development of these behaviours through the life course is important to inform the development of interventions aimed at preventing NCDs to ensure that the interventions also contribute to reducing social inequalities. However, longitudinal studies are scarce and suffer from practical and methodological challenges.

OBJECTIVE(S): 1) To present a model of how adolescence might contribute to adult health social inequalities. 2) To present longitudinal studies on diet, physical activity and social inequalities at important transition stages from childhood to early adulthood 3) To have a discussion about what is known and what is not known on this topic and to assess the interest for further collaboration on this topic

SUMMARY: The symposium will start with a presentation of a model of potential pathways and mechanisms in adolescence contributing to adult health inequalities and followed by three presentations on longitudinal studies. The first study, followed a group of Finnish children from age 13 months to 19 years and investigated the dietary habits in relation to educational level (upper secondary schools versus vocational schools). The second study, studied the transition from kindergarten to school in a Portuguese sample with regards to changes in sedentary behavior, physical activity, dietary behaviors by parental education. The third study, follows a Belgium cohort and investigates whether socio-economic status at age 10 predicts physical activity, nutrition and sedentary behaviour at age 20 when controlling for previous behaviour.
S06.1  
**Pathways and mechanisms in adolescence contribute to adult health inequalities: “the Adolescent Pathway Model”**

**PURPOSE:** To present a model that encompasses pathways and mechanisms working over adolescence that contribute to adult health inequalities by reviewing evidence on the four mechanisms: socially differential exposure, tracking, socially differential tracking, and socially differential vulnerability.

**METHOD:** We conducted literature searches in English-language peer-reviewed journals using PubMed (from 1966 to May 2009) and PsycINFO, and combined these with hand-searches of reference lists, journals, and authors of particular relevance.

**RESULT(S):** Most health indicators are socially patterned in adolescence and track into adulthood, with higher risks of adverse outcomes among individuals from lower socioeconomic positions. Adolescent health behaviours track into adulthood. Both physical activity and fruit and vegetable intake are socially patterned. Relational dimensions like lone parenthood and bullying are socially patterned and track over time, and there are indications of a socially differential vulnerability to the effects of these types of relational strain. Very little research has investigated the social patterning of the above indicators over time or studied social vulnerability of these indicators from adolescence to adulthood. However, all four mechanisms seem to be active in establishing social differences in adult educational attainment.

**CONCLUSION(S):** The Adolescent Pathway Model was useful for providing an overview of what elements and mechanisms in adolescence may be of special importance for adult health inequalities. There is a lack of knowledge of how social patterns of health, health behaviours, and social relations in adolescence transfer into adulthood and to what extent they reflect themselves in adult health.

**FUND SOURCING:** Nordea Foundation and the TRYG Foundation

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S06.2  
**The level of secondary education and dietary habits in the participants of the longitudinal STRIP study**
Talvia S, Lagstrom H, Saarinen M

**PURPOSE:** The aim of the study was to evaluate the association between educational level and longitudinal dietary choices in Finnish adolescents who studied at upper secondary schools (USS) or vocational schools (VS). Dietary consumption was observed both during secondary education and time before that.

**METHOD:** The participants (n=310, 157 girls and 153 boys) participated in an interventional cardiovascular disease prevention project, the STRIP study. Their food consumption, specifically consumption of fruit and vegetables and energy-dense, low-nutrient-density
foods (LNDF) was evaluated by four-day food records (from 13 months to 19 years). The differences in consumption were analysed with repeated measures analysis of variance (RM ANOVA).

RESULT(S): USS students ate more fruit and vegetables than VS students during secondary education. The difference in fruit and vegetable consumption was evident already before secondary education: during primary education those adolescents who later continued at USs ate daily 30-35 grams more fruit and vegetables than those who continued education at VS. During secondary education this difference in consumption increased into 60-70 grams. The energy adjusted consumption of LNDF was lower in girls studying in USS than in girls studying in VS during secondary education but the consumption did not differ between the groups before that. There was no difference in energy adjusted consumption of LNDF in boys or in absolute consumption of LNDF in girls or boys during secondary education or time before that.

CONCLUSION(S): Fruit and vegetable consumption were associated with adolescents’ educational level during secondary education and even before that.

FUND SOURCING: University of Turku

S06.3 The transition from kindergarten to first-grade: what happens with sedentary behavior, physical activity, dietary behaviors and other lifestyles factors according to parental education?
Vale S, Mota J

PURPOSE: Transition to first grade is a major point of change in the lives of young children. It marks their entry into formal education. This usually represents major changes in the daily contexts related to a variety of behavioral and psychological variations in young children. The aim of this longitudinal study was to identify the changes in children's sedentary behavior (SB) physical activity (PA), dietary behaviors (DB) and other lifestyles factors upon entry to first-grade of elementary school, during school hours, after school hours and weekend according to parental education.

METHOD: The sample comprised 84 preschool children (37% female), recruited from kindergartens located in the metropolitan area of Porto, Portugal. Each child was evaluated twice: firstly in kindergarten and again in first-grade of elementary school. The age (X±SD) of children at kindergarten was 5.9 +/- 0.4 years and 6.9 +/- 0.4 years at the first-grade. SB and PA was assessed during 7 consecutive days by accelerometer (Actigraph GTM1). We analyzed the recommendation of at least one hour daily of moderate-vigorous PA (MVPA). Dietary intake will be obtained by a 3-day dietary record (2 weekdays and 1 weekend) will be completed by parents. Percentage of fat mass (%MG) was estimated from four skinfolds thicknesses. Mothers reported the amount of screen time (watching television and/or playing videogames) the child spends daily as well as the sleeping time for both week days and weekends. Parental Education was analyzed according to the Portuguese education system.
RESULT(S): Will be ready before the symposium.

CONCLUSION(S): To be done

S06.4 Does SES of children at age 10 predict physical activity, nutrition and sedentary behaviour 10 years later: the Longitudinal Eating and Activity (LEA) study
De Bourdeaudhuij I, Cardon G, van Damme J, Maes L

PURPOSE: To examine whether the SES of children at age 10 is a predictor of healthy behaviours 10 years later, when they are young adults.

METHOD: This study is a longitudinal study in which children are first measured at age 10 in 2002, when they were in fifth grade (n=1670). Children were followed up during different waves, and now in 2012 when they are about 20 years old. Children were originally recruited out of 59 Flemish elementary schools. Follow-up measures were performed through mailing paper and pencil questionnaires or online questionnaires. Parental education level was used as a proxy for SES. The highest level of education of the parent who filled in the questionnaire in 2002 was used dichotomized into ‘higher education’ (college or university) or ‘no higher education’ (no education, primary or secondary school). The 6 year follow-up study included 727 adolescents (51.9% girls, 51.9% high SES, 9.9±0.4 years at baseline), resulting in a response rate of about 45%. We are currently still gathering data on the last wave. We hypothesize to be able to gather about 600 participants at 10 year follow-up.

RESULT(S): Results will be available at the moment of the finalizing of the wave, which will be at the end of this year 2012. We will first execute drop-out analyses. Further, we will execute multiple regression analysis and predict health behaviours based on the parental SES status when the child was 10 years old. We will include baseline measures of these behaviours as covariates.

CONCLUSION(S): To be done.
S07  The healthy nutrition program, results and how to go on in national and international context

Chair: Brug Johannes
EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, the Netherlands
Discussant: Crawford David
Centre for Physical Activity and Nutrition Research, School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia

PURPOSE: Will present and discuss the rationale for and results of a Dutch Nutrition Research program initiated by the Netherlands Organization for Health Research and Development (ZonMw). This program aims at gaining a deeper understanding of how consumers can best be encouraged to make healthy eating choices as well as a better understanding of the links between eating patterns and the initiation of chronic disease. The proposed symposium presents the behavioural nutrition research of the program and discusses its implications in the international ISBNPA context.

RATIONALE: Promoting adoption and continuation of healthy eating requires carefully planned, designed and conducted behavioural epidemiological and psychological research. This specific ZonMw research program aimed to fund such research and initiate and promote information exchange and collaboration between researchers. The rationale for and aims of the program are now being continued and expanded in a European Joint Programming Initiative. All projects within the program will be finalized in 2013, and thus the results of each of the studies will be available at the time of the ISBNPA conference.

OBJECTIVE(S): To present the latest results obtained in the projects of the behavioural studies of the Nutrition Research Program and discuss these results in the international ISBNPA context. To identify aims for future research that could inform the continuation of the Nutrition Research Program

SUMMARY: Start with a brief introduction of the Nutrition Research Program and its relevance in the international behavioural nutrition research arena. Thereafter four of the projects within the program will present their results. The program and its projects will be discussed by an international discussant.

S07.1  Socioeconomic inequalities in food choice behaviour maximizing benefits within resources available
Kamphuis C, Jensen T, Mackenbach JP, van Lenthe FJ

PURPOSE: To examine the contribution of cultural capital to educational inequalities in unhealthy food choices.

METHOD: Data were obtained by a follow-up survey in 2011 (N=3862; response rate 67.1%; age range 31-96; 46% men) among participants of the GLOBE cohort study, including the...
adult population of Eindhoven and surrounding cities, Netherlands. Institutionalised cultural capital (e.g. education of partner, father and mother), incorporated cultural capital (e.g. cooking skills, universal values) and objectivised cultural capital (e.g. possession and use of cooking equipment) were measured with a systematically developed questionnaire. Logistic regression analyses were carried out for daily vegetable intake (no vs. yes) as the outcome.

RESULT(S): Compared to higher educated, low educated were more likely to not eat vegetables daily (OR 1.74, 95% CI 1.31-2.32; adjusted for age, sex). Having low cultural capital was associated with no daily vegetable intake, for instance, having a partner with low education (OR 1.85, 95% CI 1.15-2.98), low recipe use (OR 1.58, 95% CI 1.25-1.99), low openness to change (OR 1.21, 95% CI 1.02-1.45), and little cooking equipment (OR 1.53, 95% CI 1.28-1.81) increased the risk of no daily vegetable consumption (adjusted for age, sex, education). Overall, low educated had lower levels of cultural capital than higher educated. Taking cultural capital into account moderately reduced the educational inequalities in daily vegetable consumption.

CONCLUSION(S): Cultural capital may offer new entry points for reducing educational inequalities in unhealthy food choices. Results for several unhealthy food choices are currently explored and will be presented at the conference.

S07.2 **Variation and changeability of dietary patterns: a prerequisite for public health interventions**

PURPOSE: For prevention of metabolic syndrome it is important to study not only dietary intake but also dietary intake related behaviours which can be used as target for nutrition interventions. We will study the association between nutrition behaviour, diet quality and risk factors of metabolic syndrome. The nutrition behaviours of interest are e.g. skipping breakfast/having dinner out-of-home/and frequency of snacking. Exploratory analyses in the Dutch national food consumption survey of 2007-2010 showed that skipping breakfast and having dinner out-of-home were associated with lower diet quality and higher energy intake. Furthermore, high frequency of snacking was associated with modestly lower diet quality. We expect that the nutrition behaviours of interest will be associated with lower diet quality and consequently higher risk of metabolic syndrome.

METHOD: Data of ~1100 persons of the ”Nutrition Questionnaires-plus” study will be used. Participants filled in a general questionnaire, dietary behaviour questionnaire based on theory of planned behaviour, and the Dutch Eating Behaviour Questionnaire. Dietary intake was assessed by three 24-hour recalls. One by telephone and two administered online using the newly developed application ”Compl-eat”. In these recalls information on location and time of meals, and company during meals was registered. Dietary intake was used to calculate the Dutch Healthy Diet-index--a measure of diet quality based on the Dutch dietary guidelines. At the research centre weight/height/blood pressure/and waist-hip circumference were measured. Blood was taken for measurements of triglyceride and HDL
cholesterol.

RESULT(S): Results/conclusions: data analyses are now being conducted. The results will be ready for presentation at the ISBNPA conference.

CONCLUSION(S): -

S07.3 Stopping automatic behavior automatically: A new approach to changing unhealthy eating habits
Veling H, van Koningsbruggen G, Aarts H, Stroebe W

PURPOSE: Eating behavior is for a large part determined by impulsive influences. Therefore, we tested whether dieting behavior can be facilitated by employing a short stop signal training (SST) that links palatable foods to behavioral stop signals. This intervention was presented online, and compared to an intervention that uses implementation intentions to foster dieting behavior.

METHOD: Dieters were randomly assigned to one of the conditions of a 2 (training: SST vs. control training) by 2 (implementation intentions: dieting vs. control) between-subjects design. Dieters performed a training (4 times in four weeks) in which behavioral stop signals were consistently (or not in the control condition) presented upon presentation of palatable foods in a computerized go/no-go task. Furthermore, they either formed implementation intentions to diet (e.g., If I open the fridge I will think of dieting!) or not (control intentions). Participants’ weight was measured before and after the intervention. Dieting motivation and body mass index (BMI) were included as moderators.

RESULT(S): Both the SST and dieting implementation intentions facilitated weight loss. Furthermore, a predicted double dissociation was found. First, dieting implementation intentions facilitated weight loss particularly among people with a relatively high dieting motivation, whereas the SST facilitated weight loss independent of this factor. Second, the SST, but not formation of dieting implementation intentions, was primarily effective among dieters with a relatively high BMI.

CONCLUSION(S): A short SST that is presented online can be effective to facilitate weight loss particularly among dieters with relatively high BMI, and independent of people’s dieting motivation.
Health on impulse: promoting healthy food choices under low self-control conditions

Salmon S, Fennis BM

PURPOSE: Food choices are often made mindlessly, when people are not able or willing to exert self-control. Under these low self-control conditions, people have difficulties to resist palatable, unhealthy food products. Consequently, many food choices involve unhealthy ones. In contrast to previous research aiming to foster healthy choices by promoting high self-control, the present study exploits situations of low self-control, by promoting the healthy option through the use of the social proof heuristic (the tendency to adopt the option preferred by others).

METHOD: This experimental study used a 2 (low vs. high self-control) x 2 (social proof heuristic vs. no heuristic) x 2 (trade off vs. control choice) design, with the latter as within subjects factor. 177 students (67% men) participated in this experiment. The dependent variable was the amount of healthy food choices on a food choice task.

RESULT(S): In line with previous studies on self-control, the results revealed that when no heuristic is available, people make less healthy food choices when they are low, compared to when they are high in level of self-control. However, we showed that this negative effect of self-control on food choice can be reversed: When the social proof heuristic is manipulated, low self-control individuals make more healthy food choices compared to when no heuristic is available, and even compared to individuals high in self-control.

CONCLUSION(S): These findings suggest that exploiting situations of low self-control is a novel and promising method to promote health on impulse.
Innovating computer-tailored interventions: how to better communicate the message

Chair: Vandelanotte Corneel
Institute for Health and Social Sciences Research, Central Queensland University, Rockhampton, Australia
Discussant: Oenema Anke
Department of Health Promotion, Maastricht University, Maastricht, the Netherlands

PURPOSE: The purpose of this symposium is to showcase several innovative methods to deliver computer-tailored information to intervention participants, and were possible discuss their effectiveness.

RATIONALE: Given the high burden of disease associated with physical inactivity, poor diet and overweight/obesity the use of web-based interventions is increasing. However, the internet is a very dynamic and competitive setting to deliver health interventions and the challenges in attracting, engaging and retaining participants are huge. Previous studies have demonstrated that to be effective web-based interventions need to be interactive and provide personalised feedback to participants. Interventions that have used a computer-tailored component have shown good outcomes, though there are limitations in simply providing ‘text on a page’ in an online environment, even when it is personalised. Furthermore, computer-tailored interventions have traditionally provided feedback based on an online survey instrument, though other methods can be used to provide more accurate information in generating personalised feedback. Hence, to keep up with Internet developments and to improve accuracy, innovative computer-tailored interventions need to be developed and evaluated. Therefore, the proposed symposium will present a range of innovative computer-tailored interventions that either assess people in a new way or deliver the message in a new way.

OBJECTIVE(S): 1. To showcase innovative methods to improve the provision of online personalised behaviour change feedback through either more accurate assessment or through applying different feedback delivery methods. 2. To present outcomes on the effectiveness of these innovative computer-tailored methods. 3. To guide other researchers on the challenges involved in developing web-based interventions.

SUMMARY: The first presentation will address why there is a need for more innovative computer-tailored interventions and will make the case for using video-based personalised feedback by presenting the outcomes of a pilot study conducted in Australia (Queensland). The second presentation will discuss the development of a video- and text-based computer-tailored intervention to prevent obesity developed in the Netherlands. The third presentation will address why there is a need for more accurate assessment methods in computer-tailored interventions and will make the case for using pedometers by presenting the outcomes of a pilot study conducted in Belgium. The final presentation will present outcomes of a web-based weight-loss trial conducted in Australia (New South Wales), which applied innovative mechanisms to provide personalised feedback to participants.
Why innovative computer-tailored interventions are needed – A case for a video-tailored approach  
Vandelanotte C, Duncan MJ, Mummery K

PURPOSE: Low activity levels illustrate the need to refine interventions that can reach large numbers at low cost and increase their effectiveness. This presentation will address why there is a need for more innovative web-based interventions and will make the case for using video-based personalised feedback by presenting the outcomes of a pilot study which evaluated the acceptability and effectiveness of a computer-tailored physical activity intervention in three delivery-modes: video, text, or both.

METHOD: Australian adults (N=803), recruited via e-mail, were randomized into the three delivery-modes and received personal physical activity advice. The Active Australia Questionnaire was used to measure physical activity at baseline, one week and one month. Repeated measures ANOVA’s were used to compare the three groups regarding acceptability, website usability, and physical activity. The website usage data was also collected.

RESULT(S): At one month follow-up 288 participants responded. Website usability was high in all groups. Although the contents of the advice were identical across groups, participants in the video group accepted the content of the advice significantly better (F=5.59;p<0.01), and spent significantly more time on the website (F=21.19;p<0.001). Total physical activity improved significantly over time in all groups (F=3.95;p<0.01). Though the combination group increased physical activity the most, few significant differences between groups were observed.

CONCLUSION(S): These outcomes demonstrate the usability and acceptability of this intervention. Unfortunately this pilot study was underpowered to detect differences in physical activity between groups. More research is required to examine the full effect of this intervention in a large RCT.

FUND SOURCING: This work was supported by the Central Queensland University ‘Merit Grant’ [RDIM1004]; Dr Vandelanotte was supported by the National Health and Medical Research Council of Australia [#519778], and the National Heart Foundation of Australia [#PH 07B 3303].

Systematic development of a text-driven and video-driven web-based computer-tailored intervention to prevent obesity among adults  
Walthouwer MJL, Oenema A, Lechner L, De Vries HH

PURPOSE: The purpose of this presentation is to give insight into the systematic development of a video-driven and text-driven web-based computer-tailored intervention to prevent obesity among adults. The video-driven intervention is specifically aimed at
individuals with a low socioeconomic status, as interventions for this high risk group are scarce.

METHOD: Both interventions are developed using the Intervention Mapping protocol. The main focus of this presentation will be on the systematic development and content of the video-driven intervention, a recent innovative development in the field of computer-tailoring.

RESULT(S): Both interventions have exactly the same content, only a different delivery format of the tailored messages. The interventions are framed around models of self-regulation and consist of six sessions. In the first two sessions, participants receive tailored feedback about their weight, dietary intake, and physical activity level. In these sessions, participants have to set goals and formulate action plans. After session two, participants can start with the behaviour change. In the last four sessions, participants receive tailored feedback about their progress including feedback to help them deal with difficulties they may encounter. In the video messages, two professional actors read the advices aloud in different settings (e.g. cooking studio and a gym). In addition, different narratives, in which eighteen actors talk about their experiences with the program, are included to give advice implicitly.

CONCLUSION(S): The evaluation of these interventions will provide insight into their effectiveness and result in recommendations for future web-based computer-tailored interventions and the additional value of using video tailoring.

FUND SOURCING: This work was supported through The Netherlands Organisation for Health Research and Development (ZonMw), grant number: 200110001.

S08.3 How to use more accurate assessment methods in computer-tailored interventions: a computer-tailored, pedometer-based physical activity advice
De Cocker K, Spittaels H, Cardon G, De Bourdeaudhuij I, Vandelanotte C

PURPOSE: Most computer-tailored physical activity interventions provide feedback based on self-reported data. The present aims are to (1) briefly discuss the need for using more objective measures when providing computer-tailored feedback; (2) describe the development of a pedometer-based, computer-tailored step advice; (3) report on its perceived acceptability; and (4) evaluate its efficacy in comparison with a standard condition.

METHOD: Incorrect assessment might result in less effective, less credible or less acceptable feedback. Therefore the present tool was designed so that participants needed to provide a 7-day pedometer-based baseline step level in order to receive personalized feedback. Tips and suggestions to increase steps were tailored to the individual’s step level and psychosocial correlates of achieving 10,000 steps/day. Steps and self-reported IPAQ data were compared between the intervention condition (n=45) and a standard condition (n=47; pedometer-based intervention with generic information in booklets).
RESULT(S): Of those who received the advice, everyone found it understandable, the majority found it credible (94%), relevant (83%), not too long (72%), instructive (72%), and encouraging to increase steps (67%). Pilot efficacy testing showed that steps increased in both conditions from baseline (9237±3749 steps/day) to 3-months post-intervention (11,876±4574 steps/day; p=0.04). No intervention or other time effects were found. Apart from reporting on development and pilot outcomes, some preliminary findings of a larger ongoing effectiveness trial using this intervention will also be presented.

CONCLUSION(S): The computer-tailored, pedometer-based physical activity advice was well accepted. However, the pilot study showed no superior effects in the tailored condition compared with the standard condition.

FUND SOURCING: De Cocker K was supported by the Research Foundation Flanders (FWO) (post-doctoral research fellowship: FWO11/PDO/097).

S08.4 Efficacy of a web-based commercial weight loss program applying automated and personalised e-feedback

Collins CE, Morgan PJ, Neve M, Callister R

PURPOSE: To determine whether overweight adults randomized to an online commercial weight loss program with additional support features (automated system-generated, personalized e-feedback on diet and physical activity and reminders to use the program) (Enhanced) experience a greater weight loss and program usage after 24 weeks compared to a standard online version (Basic).

METHOD: Assessor-blinded RCT comparing 301 adults (42% male, 42(10) years, BMI 32.2±3.9kg/m2) randomly allocated to Basic or Enhanced versions of a commercially available web-based weight loss program for 24 weeks.

RESULT(S): More Enhanced group participants attended the 24-week follow-up compared to Basic (B 69%, E 81%, p=0.012). In the intention-to-treat analysis of covariance using baseline observation carried forward, after 24 weeks both groups had significant reductions (P<0.05) in key outcomes with no between group differences; BMI (B=-1.1±1.5kg/m2, E=-1.3±2.0kg/m2, P=0.3), weight (B=-3.3±4.7kg, E=-4.0±6.2kg, P=0.2), waist circumference (B=-3.1±4.6cm, E=-4.0±6.2cm, P=0.09) and waist-to-height ratio (B=-0.02±0.03, E=-0.02±0.04, P=0.1). The Enhanced group logged in more at both 12- and 24-weeks respectively (E 34.1±28.1 and 43.1±34.0 vs. B 24.6±25.5 and 31.8±33.9, p<0.0017). In the completers analysis, weight loss was correlated with number of logins at both 12 and 24-weeks (r = -0.50, p<0.001).

CONCLUSION(S): The addition of personalized e-feedback in the enhanced program provided limited additional benefits compared to a standard program (p<0.05), but it supported greater program retention and website usage, which was related to weight loss. Further research is required to identify optimal usage patterns and examine web-based features that enhance engagement and increase weight loss within web-based programs.
FUND SOURCING: This trial was funded by an Australian Research Council Linkage Project grant (2009-2012) (LP0990414, G0189752), with SP Health as the Industry Partner Organization (G0189753). Clare Collins is supported by a National Health and Medical Research Council Australian Career Development Fellowship (#6315005). Melinda Neve is supported by a Post-doctoral fellowship from the Priority Research Centre in Physical Activity and Nutrition, The University of Newcastle.
Interventions to prevent obesity in younger children: the TOYBOX-study

Chair: Lobstein Tim
*International Association for the Study of Obesity, London, United Kingdom*

Discussant: Reilly John J
*Physical Activity for Health Research Group, School of Psychological Sciences and Health, University of Strathclyde, Glasgow, Scotland, United Kingdom*

**PURPOSE:** The main purpose of this symposium is to demonstrate and disseminate the work of the ToyBox-study which focuses specifically on preschool-aged children, their teachers and their families. The symposium aims to share the conceptual development of the ToyBox intervention design, and to invite discussion on the evidence gaps and future research into obesity prevention in preschool aged children.

**RATIONALE:** Obesity in younger age groups has risen substantially in the last two decades in the European region. The ToyBox-study is developing a multi-factorial intervention among preschool-aged children using behavioural models for obesity prevention, and is currently implementing the intervention with a total of more than 4800 children, their teachers and their families in six European countries. The large scale of the intervention and the focus on young children and their specific requirements should be of particular interest to ISBNPA members.

**OBJECTIVE(S):** The session aims to achieve: (i) greater awareness of the ToyBox-study among ISBNPA members, (ii) discussion of the particular issues associated with designing interventions for preschool-aged children, (iii) discussion of the particular issues associated with measuring energy-balance-related behaviour in this age group, (iv) a discussion of the evidence gaps and future research needs in this area.

**SUMMARY:** The presentations will reflect the headline findings of a series of new systematic reviews, pooled analyses and original data in the fields undertaken by the partners and will relate these to the development of the ToyBox intervention and how the effects of the intervention will be assessed. These themes follow the logical flow of the ToyBox study. The presentations will be followed by a discussion led by the ToyBox scientific adviser, John J Reilly.

Interventions to prevent obesity in younger children: overview of existing data and the goals of the TOYBOX-study

Manios Y, Oysseas A, Grammatikaki E, on behalf of the ToyBox-Study Group

**PURPOSE:** The purpose of this presentation is to describe the logic of the ToyBox-study, and to share the results of systematic reviews, pooled analyses and original data that have been undertaken in the first phase of the ToyBox-study.

**METHOD:** The methods include: a systematic review and pooled analysis of the prevalence
of overweight and obesity in younger children in the six countries where the ToyBox intervention is taking place, a systematic review and pooled analysis of the energy-balance-related behaviours associated with overweight and obesity in preschool-aged children in Europe, and a systematic review and focus group sessions to assess the nature of the determinants of these energy-balance-related behaviours, in this age group.

RESULT(S): The results will be presented briefly. The prevalence of overweight and obesity in children aged 4 to 6 years ranged from 8-30% and 1-13%, respectively, with highest rates observed in Spain and Greece. Additional results concerning the importance of sedentary behaviour as a determinant of weight gain, the problems of introducing healthier foods into young children's diets, and the role of parents and of teachers in influencing health behaviour will be presented.

CONCLUSION(S): Within the framework of PRECEDE-PROCEED model and Intervention Mapping protocol the results of the first phase of the ToyBox-study have guided the development of a multifactorial school based family involved intervention, providing both home and school based activities. This intervention is currently implemented in six European countries with a total sample of more than 4800 children, their teachers and their families.

FUND SOURCING: The TOYBOX project is funded by the Seventh Framework Programme of the European Commission, under grant agreement no. 245200. The content of this symposium is the responsibility of the participants. The European Commission is not liable for any use that may be made of the information contained therein

S09.2 Assessment of the determinants of young children’s energy-balance-related behaviour at home and in school and kindergarten settings

De Bourdeaudhuij I, De Craemer M, De Decker E, Cardon G, on behalf of the ToyBox-Study Group

PURPOSE: The purpose of this presentation is to describe some of the concepts which were used in the creation and development of the ToyBox intervention, and in particular the views of teachers and parents on the determinants of young children’s sedentary behaviour, physical activity and diet.

METHOD: The ToyBox partners have undertaken a series of qualitative studies to obtain a better understanding of the determinants of young children’s energy-balance-related behaviour. In the six countries participating in the ToyBox intervention, the views of 122 parents, clustered into small focus groups (up to 10 participants) were collected. Each country ran two focus groups with lower SES parents and two with medium-high SES parents. In addition, focus groups were run with 87 teachers in 18 groups in the six countries of the ToyBox intervention.

RESULT(S): The findings from these qualitative studies support and elaborate the findings from previous investigations. They show significant differences between different social groups, rural/urban locations and the importance of a range of environmental and social
influences on sedentary behaviour, physical activity and diet. These range across a variety of determinants of young children’s behaviour, from factors such as parents’ opinions on the value of TV-watching through to the role of the prevailing weather conditions.

CONCLUSION(S): These findings are of value in understanding the multifactorial issues and modifiable risk factors which determine child obesity in this age group. The ToyBox partners can make use of these findings in the design and production of materials for use in the intervention.

FUND SOURCING: The TOYBOX project is funded by the Seventh Framework Programme of the European Commission, under grant agreement no. 245200. The content of this symposium is the responsibility of the participants. The European Commission is not liable for any use that may be made of the information contained therein.

S09.3 Design of the TOYBOX intervention: from concept to materials
Birnbaum J, Duvinage K, Geyer C, Koletzko B, on behalf of the ToyBox-Study Group

PURPOSE: The purpose of this presentation is to describe the stepwise process of developing the intervention materials which are being used in the ToyBox intervention.

METHOD: For developing effective intervention materials a stepwise process is needed. In the case of the ToyBox intervention, systematic reviews, secondary data analyses and focus group interviews identified the behaviour associated with obesity in childhood, determinants of the most important energy balance related behaviours, behavioural models and educational strategies. An overview of policies, legislation, regulations and existing health promotion activities in the preschool setting is also required. The outcomes are used for applying an intervention mapping (IMP). Through the different steps a set of objectives and determinants are identified, effective methods and strategies devised and finally operationalized into practical materials.

RESULT(S): Based on IMP and existing experience, an intervention program was developed with different materials directed towards children, teachers and parents for four different behaviors. Manuals for teachers include best practice strategies and activities in school setting. Parents are involved via different tools. Examples will be available for inspection at the symposium.

CONCLUSION(S): The development of intervention material is supported by use of an intervention mapping. It is challenging to ensure that the intervention materials are suitable for the varying conditions in all participant countries, reach their target audience and effectively achieve their goals and objectives.

FUND SOURCING: The TOYBOX project is funded by the Seventh Framework Programme of the European Commission, under grant agreement no. 245200. The content of this symposium is the responsibility of the participants. The European Commission is not liable for any use that may be made of the information contained therein.
S10  The epidemiology of meal habits – And directions of future research

Chair: Rasmussen Mette  
National Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark
Discussant: Neumark-Sztainer Dianne  
Epidemiology & Community Health, University of Minnesota, Minneapolis, United States

PURPOSE: To present key findings from cross-sectional and longitudinal US, Norwegian, Australian and Danish epidemiological studies of meal habits among children, adolescents and young adults – a field of research in public health that is still relative new. Further, by bringing together key international researchers the symposium aims to discuss future directions in this innovative and growing research area.

RATIONALE: Within public health nutrition the relevance of meal habits for health and well-being are increasingly being recognized. Still, the causal networks behind patterns of meal habits are relatively poorly understood and yet only few innovative health promotion programmes have integrated meal habits. Therefore, there is a need for increased focus and a discussion of future directions.

OBJECTIVE(S): To describe and discuss 1) predictors of young adults meal habits including stability patterns in meal habits from adolescence into adulthood by gender and socioeconomic position, 2) socio-economic patterns in meal habits among adolescents, 3) key findings from research on family meals in the Project EAT. 4) Finally the symposium aims to initiate discussions on next steps in terms of research and interventions.

SUMMARY: Analyses of Norwegian longitudinal data show that frequency of meals decreased from adolescence into the early 20ties, but increased again at age 30. Higher stability of total meal frequencies was found in highest level of family education. Analyses of Australian data showed that compared to breakfast consumers, a higher proportion of young women skipping breakfast reported poorer health status, had poorer diet quality, were current smokers, had lower nutrition knowledge, and tended not to prioritise their own healthy eating when busy looking after their family. Specifically focussing on adolescence, analyses of Danish schoolchildren age 11 to 15 years showed a strong and graded increase in low meal frequency by decreasing social class. Analyses on US adolescents specifically focussing on family meal patterns showed that more frequent family meals were associated with better adolescent dietary intake, fewer disordered eating behaviours, and stronger psychosocial well-being and there were indications that family meals protects against obesity. There is a need for discussion of implications for future research and interventions to increase frequency of meals and improve both nutritional and social quality of family meals.
**S10.1 Longitudinal analysis of meal frequencies from age 14 to 30 in the Norwegian Longitudinal Health Behaviour study**  
Lien N, Skare Ø

PURPOSE: The aim of the study was to describe change and stability of frequencies of breakfast, lunch, dinner and supper, as well as total meals from age 14 to age 30 by gender and socio-economic status.

METHOD: In 1990, participants were recruited through schools in Hordaland county, Norway. Data were collected in school and later by mail using questionnaires at nine time points (n=918 at age 13, n=464 at age 30). The meal frequency questions had four answers; daily to once a week or less. Data on parental education was based on parental report supplemented by adolescent’s report for those with missing. Data were analysed by linear mixed models using the statistical software package R.

RESULT(S): The mean frequencies of all four meals decreased until the early 20ties, but increased again at age 30. Males had significantly higher frequencies of the meals during adolescences, but females had higher frequencies of breakfast at age 30. Significant differences were found for breakfast with higher frequencies among those from the highest educated families, except at age 30, but the total meal frequencies did not differ by education. The group from the higher educated families also had the lowest within-person variability in total meal frequencies, indicating greater stability of the meal pattern.

CONCLUSION(S): Changes in mean meal frequencies by age were found. There were also differences in mean meal frequencies by gender and family education, and higher stability of total mean meal frequencies was found among those with the highest family education.

FUND SOURCING: Norwegian Research Council

**S10.2 Social inequality in breakfast, lunch and evening meal frequency among adolescents: a cross-sectional study**  
Meilstrup CR, Pedersen TP, Rasmussen M, Holstein BE

PURPOSE: Regular meal habits facilitate healthy dietary habits and especially low breakfast frequency shows associations with risk of overweight among adolescents. Studies on social inequality in meal frequencies among children and adolescents are limited, and especially studies of lunch and evening meals are lacking. The present study aims to investigate the association between socioeconomic position and breakfast, lunch and evening meal frequencies among adolescents.

METHOD: Data are from the Danish contribution to the International cross-sectional questionnaire study Health Behavior in School-aged Children in 2010. The study includes schoolchildren in three age groups, 11-, 13-, and 15-year olds from a random sample of schools, participation rate 86.3%, n=4922. Socioeconomic position was measured by parents’ occupational social class. Breakfast, lunch and evening meal consumption were measured by frequency questionnaire. Multivariate logistic regressions were conducted adjusted by age,
gender and family structure.

RESULT(S): Analyses showed that adolescents from low family social class had significantly higher odds of low breakfast, lunch and evening meal frequency than adolescents from high family social class (breakfast: odds ratio (OR) = 2.22, lunch: OR = 1.56, evening meal: OR = 1.80). For all three meal types the odds of low frequency increased gradually by decreasing social class. There were no significant interactions with gender.

CONCLUSION(S): The results indicate social inequalities in adolescent meal frequencies. Adolescents from lower socioeconomic position are more likely to have low breakfast, lunch and evening meal frequencies. It is essential to consider socioeconomic position when promoting regular meal habits among adolescents.

FUND SOURCING: The Nordea Foundation

S10.3 Breakfast skipping among women living in socioeconomically disadvantaged neighbourhoods
Smith KJ, McNaughton SA, Cleland V, Crawford D, Ball K

PURPOSE: Breakfast skipping has been shown to have negative effects on a variety of health outcomes including overweight and obesity. Breakfast skipping has also been shown to be more common in adults of low socio-economic position however little is known about the factors associated with breakfast skipping among this group. The aim of this study was to identify potential correlates of breakfast skipping among women from socioeconomically disadvantaged areas.

METHOD: Analysis was based on self-report data from 4123 participants in the Resilience for Eating and Activity Despite Inequality (READI) study of women from socioeconomically disadvantaged neighbourhoods in Victoria, Australia. Women who reported they “never/rarely” ate breakfast were classified as breakfast skippers (n=498). Associations between breakfast skipping and behavioural, cognitive and social factors were assessed using Poisson regression and prevalence ratios and linear trends were calculated.

RESULT(S): Compared to breakfast consumers, a higher proportion of women who skipped breakfast reported poorer health status (PTrend<0.001), had poorer diet quality (PTrend<0.001) and were current smokers (PTrend<0.001). Breakfast skippers had lower nutrition knowledge (PTrend=0.046), and tended not to prioritise their own healthy eating when busy looking after their family (PTrend=0.011).

CONCLUSION(S): In conclusion, a range of health, behavioural, cognitive and social factors were associated with breakfast skipping. While further longitudinal research is needed, these findings suggest there may be multiple influences on this behaviour and that programs that aim to promote breakfast consumption in this population group should consider targeting nutrition knowledge and family-related barriers to healthy eating.
S10.4 Family meals: key findings from Project EAT and future directions
Neumark-Sztainer D

PURPOSE: To describe key findings from over a decade of research on family meals in the Project EAT studies and to discuss next steps in terms of research and interventions.

METHOD: Projects EAT-I, II, and III (Eating and Activity in Teens and Young Adults) comprise a ten-year longitudinal study in which family meals have been examined during adolescence and the transition to young adulthood in a large and diverse population-based sample. Data of family meals were initially collected from adolescents in 21 focus groups; information collected guided the inclusion of questions on different aspects of family meals in surveys that were completed by respondents at three time points at five-year intervals. To build upon this work, more recently data were collected from a new cohort of adolescents (EAT 2010) and their parents (F-EAT) to learn more about family meals.

RESULT(S): There was great diversity in family meal patterns and the types of foods served at meals. More frequent family meals were associated with better dietary intake in adolescents, fewer disordered eating behaviors, and stronger psychosocial well-being, in both cross-sectional and longitudinal analyses. In general, findings suggest that family meals are protective against obesity, although the picture is not as clear-cut as for other findings.

CONCLUSION(S): Findings strongly suggest that family meals have a number of benefits for youth. Implications for future research and interventions to increase the frequency of family meals and improve both the nutritional and social quality of family meals will be discussed with symposium presenters and audience participants.

FUND SOURCING: National Heart, Lung and Blood Institute, National Institute of Health
S11

Active transportation in children and adolescents

Chair: Cardon Greet
Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium

PURPOSE: The symposium aims to discuss new insights in active travel in children and adolescents.

RATIONALE: To date active travel has been identified as an important target for increasing physical activity levels. However, correlates of cycling to school for those living within a reasonable cycling distance to school stay undiscovered. Furthermore, in order to take up and maintain active travel to school, predictors of active travel to school should be assessed. Moreover, the influence of parents’ perceptions on active travel to school should be examined and more research is needed to gain insight into the relationship between active travel and weight status across different countries.

OBJECTIVE(S): 1) To discuss correlates of never and always cycling to/from school in children living within a 3.0 km distance from school. 2) To introduce factors which predict uptake and maintenance of active travel to school. 3) To discuss associations between several hypothesized correlates and active travel to school. 4) To discuss the relationship between active travel and weight status and to discuss potential country differences in these relationships.

SUMMARY: This symposium will present new insights in active transportation in children and adolescents. The chairperson will open the symposium and will introduce all speakers. The first presentation will present individual, social and physical environmental correlates of never and always cycling to/from school among 10 to 12 year old children living within a 3.0 km distance from school. The second presentation will present individual, socio-cultural and environmental predictors of uptake and maintenance of active travel in 10 year-old children. The third presentation will describe the associations between several hypothesized correlates (demographics, physical environment, perceived barriers and perceived active travel norms) and active travel to school among 4th and 5th grade children. The fourth presentation will examine associations between mode of commuting to school/work and weight status in 10-12 year olds and their parents. Furthermore, potential country differences in these relationships will be described.

S11.1

Individual, social and physical environmental correlates of ‘never and ‘always’ cycling to school among 10 to 12 year old children living within a 3.0 km distance from school
Ducheyne F, De Bourdeaudhuij I, Spittaels H, Cardon G

PURPOSE: This study examined individual, social and physical environmental correlates of never and always cycling to/from school among 10 to 12 year old Belgian children living within a 3.0 km distance from school.
METHOD: 850 parents completed a questionnaire to assess personal, family, behavioral, cognitive, social and physical environmental factors related to the cycling behavior of their children. Parents indicated on a question matrix how many days a week their child (1) walked, (2) cycled, was (3) driven by car or (4) public transport to and from school during fall, winter and spring. Multivariate logistic regression analyses were conducted to examine the correlates.

RESULT(S): Overall, 39.3% of children never cycled to school and 16.5% children always cycled to school. Children with high levels of independent mobility and good cycling skills perceived by their parents were more likely to always cycle to school (resp. OR 1.06; 95% CI 1.04-1.15 and OR 1.08; 95% CI 1.01-1.16) and less likely to never cycle to school (resp. OR 0.84; 95% CI 0.78-0.91 and OR 0.77; 95% CI 0.7-0.84). Children with friends who encourage them to cycle to school were more likely to always cycle to school (OR 1.08; 95% CI 1.01-1.15) and less likely to never cycle to school (OR 0.9; 95% CI 0.83-1.0). Regarding the physical environmental factors, only neighborhood traffic safety was significantly associated with cycling.

CONCLUSION(S): Individual, social and physical environmental factors were associated with children’s cycling behavior to/from school. However, the contribution of the physical environment is limited.

FUND SOURCING: This research was supported by the Life line campaign of the Research Foundation - Flanders (FWO) FWO B10823/02/03

S11.2 Individual, socio-cultural and environmental predictors of change in children’s travel to school
Panter J, Corder K, Griffin S, Jones AP, van Sluijs EMF

PURPOSE: Active commuting is prospectively associated with physical activity in children. Few longitudinal studies have assessed predictors of change in commuting mode. We aim to assess the individual, socio-cultural and environmental predictors of uptake and maintenance of active commuting in 10 year-old children.

METHOD: Children were recruited in 2007 and followed-up 12 months later. Children self-reported usual travel mode to school. 31 child, parent, socio-cultural and physical environment characteristics were assessed via self-reported and objective methods. Associations with uptake and maintenance of active travel were studied using multi-level multiple logistic regression models in 2012.

RESULT(S): Of the 912 children (59.1% girls, mean +SD baseline age 10.2+0.3yrs) with complete data, 15% changed their travel mode. Those children who lived less than 1km from school were more likely to take up (OR: 4.73, 95% CI: 1.97, 11.32, p=0.001) and maintain active commuting (OR: 2.80 95% CI: 0.98, 7.96, p=0.02). Children whose parents reported it was inconvenient to use the car for school travel were also more likely to take up (OR: 2.04, 95% CI: 1.08, 3.85, p=0.027) and maintain their active commuting (OR: 5.43 95%CI: 1.95,
Lower socio-economic status and higher road safety were also associated with uptake.

CONCLUSION(S): A combination of factors may need to be addressed in order to promote take up and maintenance of active commuting, including improving road safety and reducing the convenience of the car. Studies assessing effectiveness of such interventions should consider the distance required to travel.

FUND SOURCING: National Prevention Research Initiative, UK

S11.3 Parents´ perception influences active travel to school in US children; the WTS Study
Chillón P, Hales DP, Vaughn AE, Ward DS

PURPOSE: To examine associations between several hypothesized correlates (demographics, physical environment, perceived barriers and perceived active travel norms) and active travel to school among 4th and 5th grade children.

METHOD: Data were gathered as part of the National Evaluation of Walk to School Project (WTS). The sample included 4th-5th grade children from 18 schools across multiple states in the US. Active travel to school was self-reported at 8 monthly time points by children (n=10,809 surveys). Temperature was obtained from www.almanac.com/weather. Walkability-bikeability of the school environment was assessed with the WABSA protocol (direct observation). Perceived barriers and active travel norms about school travel were assessed via self-administered surveys given to children and their parents. Parent surveys also assessed distance to school. Generalized linear mixed models with logistic link function were used to explore the correlates (demographic, physical environment, parents´ and children´ perceived barriers and active travel norms). All the analyses were adjusted by distance to school.

RESULT(S): Active travel to school was positively correlated with percentage of Hispanic children (P<0.001) and with parent’s perception of the suitability of the route to school (P=0.002), and inversely correlated with parents´ perceptions of safety and weather (P<0.001) and the child’s resistance to walking to school (P<0.001).

CONCLUSION(S): Future interventions should focus on parents’ concerns to promote walking to school as a normative behavior.

FUND SOURCING: This study was supported by a cooperative agreement from the Centers for Disease Control and Prevention, Special Interest Project (SIP 09-02). Palma Chillón was supported by a grant from the Spanish Ministry of Education (José Castillejo program, JC2009-00238).
S11.4  Associations between modes of commuting to school/work and weight status in eight European countries

Bere E, Haraldsen E, Manios Y, Brug J

PURPOSE: To assess the association between mode of commuting to school/work and weight status in 10-12 year olds and their parents in eight countries across Europe.

METHOD: The data used is from the cross-sectional study within the ENERGY project. Modes of commuting and potential socio-demographic correlates for 10-12 year old children and their parents were measured by a questionnaire. Weight and height were measured by project staff for the children, while self-reported by parents. A total of 7903 school children and 6455 parents were included in the study. Binary logistic regression was preformed to assess how being overweight varied by the different modes of commuting.

RESULT(S): For the full sample, the only mode of commuting associated with weight status was cycling to school/work. For each day/week commuting by bicycle to school/work, the crude OR for being overweight was 0.86 (95% CI= 0.82-0.91) for children and 0.91 (95%CI=0.87-0.96) for parents. Both children and parents with low socio-economic status and non-native children and parents used bicycle less frequently to school/work and had a higher overweight prevalence than families with high socio-economic status and native children and parents. Large country differences were observed regarding both the frequency of cycling and the prevalence of overweight, and no significant associations between cycling to school/work and weight status were observed when analyses were conducted separately for each country.

CONCLUSION(S): This study shows that bicycling to school/work was significantly associated with being overweight for school children and adults across Europe, but not within each country.

FUND SOURCING: Seventh Framework Programme (CORDIS FP7) of the European Commission
S12.1 Do increases in self-efficacy lead to sustained improvements in diet?
Tinati T, Simmonds G, Ntani G, Lawrence W, French D, Baird J, Barker M

PURPOSE: Several systematic reviews have identified increased self-efficacy and methods to increase self-efficacy as key factors in increasing physical activity. However, there is much less certainty about the nature of the relationship between self-efficacy and improvements
in dietary quality. This study aims to address this gap.

METHOD: A systematic review was carried out of papers reporting studies where changes in self-efficacy were measured and related to changes in diet. Studies of all age groups, settings, and socio-economic status were included. Medline, Psycho-info and other relevant databases were searched.

RESULT(S): Of the 8293 papers identified through the search strategy, 78 met the inclusion criteria and described studies examining the relationship between self-efficacy and changes in diet. Intervention studies accounted for 73 of these, and the remainder were observation studies. The studies were largely based in the community (64), and the remainder in a clinical setting. The majority of studies focused on adults (61), the rest were of children (16) and there was one study of whole families. More than two thirds of the studies (53) reported a relationship between increases in self-efficacy and improvements in diet. The remainder identified no relationship with self-efficacy.

CONCLUSION(S): The systematic review identified a range of studies, the vast majority of which were interventions. Improvements in self-efficacy were consistently related to improvements in diet, measured in a variety of ways, across settings and in different age groups. A meta-analysis of these studies is planned to clarify the precise nature of this relationship, and the mean effect size.

FUND SOURCING: Medical Research Council, UK

S12.2 Which behaviour change techniques are most effective at promoting physical activity self efficacy and behaviour in community-dwelling “healthy” older people?
French D

PURPOSE: Increasing self-efficacy is an effective mechanism for increasing physical activity, and may be even more important for older people. Previous reviews identified the behaviour change techniques (BCTs) that are associated with change in physical activity self-efficacy and behaviour in younger, healthy people and in obese people. The aim of this review was to identify BCTs that increase self-efficacy and physical activity behaviour in older people.

METHOD: Samples of “healthy” community-dwelling adults over 60 years old were eligible (i.e. not institutionalised and samples not defined by common diagnosis). A systematic search identified 39 studies reporting self-efficacy towards engaging in physical activity following an intervention. All interventions were coded using Michie et al’s (2011) CALO-RE taxonomy. Meta-analysis quantified the impact of the interventions on physical activity self-efficacy and behaviour. Moderator analyses examined whether changes in self-efficacy and physical activity were associated with whether specific BCT’s were included.

RESULT(S): Interventions containing four BCTs (plan social support, prompt self-monitoring
of behaviour, action planning, and prompt practice) produced higher levels of self-efficacy. Interventions containing 12 BCTs produced higher levels of physical activity. There was an association between BCTs that increased self-efficacy and BCTs that increased physical activity \((r=0.47, p=0.022)\).

CONCLUSION(S): In common with younger, healthy adults, but not obese adults, there was a strong association between change in self-efficacy and change in physical activity: this supports self-efficacy as a key route to behaviour change in this population. The BCTs that were effective for older adults related to self-regulation processes as well as social support.

FUND SOURCING: Macmillan Cancer Support

S12.3  A comparison of effects of self-efficacy and planning interventions on exercise and body fat tissue in adolescence
Luszczenska A

PURPOSE: The study investigated the influence of intervention promoting exercise and healthy diet on behaviors and body fat among mid- and late adolescents. We evaluated effects three types of interventions: (1) promoting self-efficacy, (2) planning, (3) a combination of planning and self-efficacy. Interventions’ effects were compared with changes observed in a control group receiving two education sessions.

METHOD: Baseline data were collected among 1258 adolescents (aged 14-18, \(M = 16.39, SD = 0.80, 52\% \text{ girls}\)). Participants were randomly allocated to four study groups. Follow-ups took place at 2 and 14 months later. Physical activity, nutrition behavior, intention, planning, self-efficacy, body weight, height, and body fat tissue were assessed at three measurement points. The intervention took place after the baseline measurement. A booster session was provided 2 months later.

RESULT(S): Among girls, a significant reduction in body fat at 14-month follow-up was found only in the self-efficacy intervention group. Among boys, a significant decrease in body fat was observed in the combined (planning and self-efficacy) intervention group. No effects on body mass index were found. The effects were mediated by changes in exercise self-efficacy and nutrition self-efficacy (both genders), changes in physical activity (girls) and sweet and salty snacks intake (boys). The changes in the respective intervention groups may be explained by a reduction of fat tissue in overweight and obese participants.

CONCLUSION(S): Including a self-efficacy component in a healthy lifestyle promotion intervention may prompt a reduction of body fat in adolescence, in particular among those with overweight and obesity.

FUND SOURCING: Warsaw School of Social Sciences and Humanities
S12.4  Considering maternal self-efficacy as a mediator of a low dose healthy lifestyle intervention in families of young children
Campbell KJ, Spence A, Hesketh K

PURPOSE: Overweight is common in children as early as preschool age, suggesting that associated lifestyle behaviours may be entrained from infancy. The objective of this study was to assess the effectiveness of a parent-focussed intervention on young children’s obesity risk behaviours.

METHOD: The Melbourne InFANT Program was a cluster-RCT involving 542 first-time parents of infants aged 3 to 18 months. The intervention was delivered to pre-existing social groups and focused on improving maternal self-efficacy, knowledge and modelling to support development of positive diet and physical activity behaviours and reduced sedentariness in infants. Primary outcomes were child diet (3x24-hour diet recalls), television viewing (parent report), and physical activity (accelerometry). Secondary outcomes were likely mediators of primary outcomes including maternal self-efficacy.

RESULT(S): Compared with controls, intervention group children had improved diet (diet quality index 15.6 out of 30 compared to 14.4, p = 0.014) and viewed less television (OR 0.67, 0.41; 1.09). Intervention group mothers had improved self-efficacy for limiting unhealthy foods (p=0.05) and for limiting television viewing (p=0.002), compared to controls. Amongst those of lower education level, maternal self-efficacy was shown to be strongly related to child diet quality (β 2.13, 0.25; 4.00).

CONCLUSION(S): An intervention targeting first-time parents’ self-efficacy, knowledge and modelling resulted in improvements in toddler’s diet and reductions in television viewing. While intervention effects on self-efficacy were modest, these analyses highlight the importance of addressing self-efficacy in such interventions, particularly for mothers of lower education level.

FUND SOURCING: World Cancer Research Fund
S13 Environmental determinants of children’s physical activity and sedentary behavior

Chair: Hinckson Erica A
Centre for Physical Activity and Nutrition, Auckland University of Technology, Auckland, New Zealand
Discussant: Deforche Benedicte
Department of Human Biomechanics and Biomechanics, Faculty of Physical Education and Physical Therapy, Vrije Universiteit Brussel, Brussels, Belgium

PURPOSE: To discuss findings from research relating to environmental determinants of physical activity and sedentary behavior in children.

RATIONALE: Over the last several decades there has been a steady decline in children’s physical activity and an increase in sedentary behavior levels with a concurrent and alarming rise in childhood overweight and obesity. Recent evidence suggests a link between physical activity and built environment in adults which necessitates an investigation into the same relationship in other age groups. Furthermore, very little is known about the effect of the environment on sedentary behavior in children.

OBJECTIVE(S): (1) to present studies that address environmental determinants of physical activity and sedentary behavior with a focus on children, (2) to provide a forum to discuss results with a wider audience, (3) to discuss future direction and application of findings.

SUMMARY: The chair person will begin the session with a brief introduction on the rationale, purpose and format of the symposium. Following the four presentations, there will be an interactive session where the discussant will first provide an overview of the main issues of the presentations and will facilitate further discussion. Individual speakers will cover four related areas: (1) effects of the local neighborhood environment on sedentary behavior in children, (2) associations between children’s journeys or destinations with physical activity and/or sedentary behavior levels, and identify whether these are associated with features of the built environment, (3) relationship between play space at home, neighborhood walkability and sedentary behavior in children, and (4) parental perceptions on preschoolers’ sedentary behavior at home and influencing factors of this behavior in the preschool setting. Symposium participants will be exposed to new information regarding environmental factors that determine physical activity and sedentary behavior in children.

S13.1 Neighborhood environment and sedentary behavior in children
Hinckson EA, Mcgrath L, Hopkins WG

PURPOSE: To objectively quantify the effect of the built environment on sedentary time in children after-school on school days.

METHOD: Children (5-13 y, n=268) from four cities in New Zealand who participated in the URBAN study wore an accelerometer for seven days. Minutes spent sedentary
(accelerometer count <100 min⁻¹) were derived for school days for the two hours after
school (1600-1759) when children are likely to be sedentary. Access to destinations, street
connectivity, dwelling density were calculated using GIS. The local environment was audited
using SPACES. Neighborhoods were ranked from high to low for each built environmental
item for analysis. Proportions (%) of sedentary minutes were analyzed with a mixed linear
model.

RESULT(S): Children in the afternoon participated in approximately 60% of the time being
sedentary particularly in neighborhoods with high presence of traffic control devices (e.g.
traffic lights, speed humps, roundabouts), moderate condition and quality of paths, and in
neighborhoods with medium dwelling density. Least sedentary time was observed in
neighborhoods with some presence of traffic control devices and lowest walkability index.

CONCLUSION(S): Provided the relationships observed are real, children’s sedentary behavior
can be affected by specific built environment features in the local neighborhood.

FUND SOURCING: Health Research Council New Zealand

S13.2 Journey or destination. What determines children’s physical
activity?
Quigg R, Docher C, Reeder A, Gray A

PURPOSE: Socio-ecological theory posits that children’s physical activity behaviors are
influenced by more than just the child’s innate traits. Operationalizing socio-ecological
theory can be difficult because of a lack of reliable measurements of these complex inter-
related behaviors. An opportunity to undertake analysis of data collected at a number of
levels was provided by a recent New Zealand (NZ) study.

METHOD: Data was collected in 2007 for the baseline of an intervention study in Dunedin,
NZ, from 184 children aged five to 10 years using accelerometers, GPS units, and a validated
parental questionnaire instrument. The Personal Activity Location Measurement System
(PALMS, University of California, San Diego, USA) was used to merge accelerometer and GPS
data. Geographic information (GIS) data, including road networks, parks and recreation
spaces and features, school locations, and zoning details was provided by the Dunedin City
Council.

RESULT(S): GIS analysis is underway to consider whether journeys or destinations are
associated with higher levels of physical activity and/or sedentary behavior, and identify
whether these are associated with features of the built environment, time of day or day of
week, familial or individual characteristics.

CONCLUSION(S): This study will add to the knowledge base around children’s physical
activity and/or sedentary behavior as the analysis is not framed by pre-determined locations
assumed to be associated with activity (i.e. schools, parks or playgrounds), but can
investigate and compare the activity undertaken on the journey as well as at the destination.
S13.3 Does ‘having a place to play at home’, moderate the relationship between neighborhood walkability and children’s screentime and objectively measured sedentary behavior
D’Haese S, Deforche B, Cardon G, De Bourdeaudhuij I

PURPOSE: Little is known about the relation between walkability and children’s sedentary behavior. As children spend most of their time at or around home, it is hypothesized that for children with sufficient playspace at home, walkability is less important in relation to sedentary behavior. Whereas, for children with insufficient playspace at home it is hypothesized that walkability may negatively influence sedentary behavior in children. This relation was investigated for screentime and total sedentary behavior.

METHOD: 447 children from 4th, 5th and 6th grade from 16 different Belgian schools participated in the study. Children wore an accelerometer for 7 days and filled in a questionnaire with their parents. Gender, parental education, screentime and presence of sufficient playspace at home were derived from the questionnaire. Walkability was GIS-calculated. Multilevel analyses were conducted to determine the moderating effect of sufficient playspace at home in the relation between walkability and total sedentary behavior and screentime in children.

RESULT(S): For children with insufficient playspace at home, walkability was a negative predictor of screentime; whereas for children with sufficient playspace, walkability was a positive predictor of screentime. Walkability was unrelated to objectively measured sedentary behavior and no moderating effect was found of the presence of sufficient reported playspace in the relation between walkability and sedentary behavior.

CONCLUSION(S): Walkability is a negative predictor of screentime for children with insufficient playspace at home. The presence of sufficient playspace at home seems to be a more important predictor of sedentary behavior than walkability.

S13.4 Influencing factors of preschoolers’ sedentary behaviour in Europe: a qualitative study with opinions from teachers and parents

PURPOSE: Preschoolers spend 50 to 80% of their time in sedentary behavior, not only at home but also at preschool. This qualitative study aimed to explore parental opinions on preschoolers’ sedentary behavior at home and potentially influencing factors of this behavior in the preschool setting.

METHOD: Four focus groups with parents and three focus groups with teachers of four-to-six-year old preschoolers were executed in six European countries. Key findings were reported in country specific reports and were analysed using qualitative data analysis
software Nvivo 8.

RESULT(S): Eighty-seven teachers participated and reported mainly that the lack of play space, the small classroom size and the lack of play equipment at the playground were potentially influencing factors of preschoolers’ sedentary behavior at preschool. A total of 122 parents participated in the focus groups and mentioned that the weather condition is the most important influencing factor of preschoolers’ sedentary behavior at home. Parents also indicated that they use the TV as a tool to keep the children quiet during their household tasks. Furthermore, some differences about preschoolers’ sedentary behavior were found in parental opinions across the European countries.

CONCLUSION(S): Interventions focusing on decreasing preschoolers’ sedentary behavior at preschool should focus on teaching the teachers different strategies to decrease this behavior in the classroom and at the playground. To decrease preschoolers’ sedentary behavior at home, parents could be informed on how they could set rules for TV viewing and provide them with alternative activities instead of screen viewing activities.
Is physical education promoting lifelong engagement in physical activity?!: A cross-disciplinary approach combining evidence from motor development, public health, pedagogy and motivational psychology

Chair: Haerens Leen
Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium
Discussant: Borghouts Lars
Physical Activity and Health Research Group, Fontys University of Applied Sciences, Eindhoven, the Netherlands

PURPOSE: It has long been argued that health-based physical education (HBPE) should mainly aim at increasing levels of moderate to vigorous physical activity (MVPA). Starting from different disciplinary and theoretical perspectives, the present symposium aims at challenging this perspective by providing evidence on different approaches towards HBPE.

RATIONALE: Many young people, from all social backgrounds, participate in compulsory physical education (PE) for up to ten years of their school lives. Unfortunately, researchers are increasingly arguing that PE remains 'the pill not taken' (McKenzie & Lounsbery, 2009), making this topic crucially important for the present conference.

OBJECTIVE(S): • Bring together researchers in motivational psychology, public health, motor development and sport pedagogy to critically discuss similarities and differences in evidence-based recommendations for HBPE. • Discuss how the focus of HBPE could change from preschool into adolescence. • Generate innovative intervention ideas on forms of PE that effectively promote PA.

SUMMARY: Starting from different disciplinary perspectives and theoretical backgrounds, each presenter in the present symposium provides evidence on the importance of developing competence through PE. In the first and final presentation, evidence on actual competence in terms of fundamental motor skills is presented. In the second and third presentation the concept of ‘perceived competence’ takes a central place in the development of optimal motivation. • The first presentation (J. Goodway-USA) provides a review of the motor development literature to discuss causal pathways between actual motor competence, perceived motor competence, and overall PA during and outside PE, starting from the recently developed conceptual model (Stodden, et al, 2008). • The second (D. Kirk-England) and third (L. Haerens-Belgium) presenters take a motivational perspective, starting from self-determination theory (Deci and Ryan, 2000). Both presentations provide evidence on the importance of developing autonomous motivation among young people so that they learn to value and enjoy PA. • In the final presentation (SJ Belton-Ireland) a public health perspective is taken. Next to the comparison of actual motor competencies, a broad range of psychosocial and anthropometric characteristics are investigated in relation to MVPA. All results will be presented in light of its implications for the goals of HBPE and future intervention development.
S14.1  Examining the relationship between motor competence and physical activity: implications to health-based physical education
Goodway JD, Stodden DF, Seung Cho C, Kim J, Barnett LM, Brian A

PURPOSE: A conceptual model (Stodden et al., 2008) proposed a dynamic and synergistic relationship between motor skill competence (MSC) and physical activity (PA) from preschool to adolescence. Embedded within the model are health-related fitness (HRF) and perceived motor competence (PMC) as potential mediators between MSC and PA. This presentation will: 1) summarize the literature on the relationship between MSC, PA, PMC and HRF in children 3-18 year olds, and 2) discuss the implications of these findings for health-based physical education curricular.

METHOD: A systematic review of the literature was electronically conducted using multiple key terms, author searches, and 8 electronic databases. Inclusion & exclusion criteria were applied.

RESULT(S): Forty-one articles met the inclusion criteria. All articles were quantitative (65% correlational). The overall literature supports the relationship between MSC and PA (many studies p<.01). Some studies suggested object control competence was correlated with PA (specifically MVPA), and MSC in childhood predicted PA in adolescence. A few studies did not support this relationship. PMC was also correlated with MSC and with PA. High levels of HRF were associated with high levels of MSC. Gender differences were found in MSC, PA, PMC, and HRF. Typically, boys outperformed girls.

CONCLUSION(S): Overall, the review supported the relationship between MSC and PA, with PMC and HRF being potential mediators. Differential findings can be attributed, in part, to varied approaches to assessing PA and MSC. These findings have implications to health-based physical education curricula highlighting the importance of developing MSC in the primary school years.

FUND SOURCING: The Ohio State University, Texas Tech University and Deakin University

S14.2  Motivation for physical education, perceptions of competence and relationships with transfer towards physical activity in leisure time
Kerner C, Haerens L, Kerr C, Kirk D

PURPOSE: The current study aimed to examine if children's perceived competence during physical education (PE) and their motivation for PE relates to their perceptions of the extent to which PE stimulates them to engage in physical activity (PA) outside of PE.

METHOD: Design: cross-sectional. A sample of 747 13-14 year old pupils out of 38 classes and 4 schools participated in the present study. Validated questionnaires were completed at school measuring motivation for PE (Aelterman et al, 2012) and perceptions of competence
(McAuley et al, 1989) in PE. Similar to previous studies (Haerens et al, 2010) information on participants’ perceptions of transfer of learning was obtained by asking students to report the extent to which they believed PE stimulated them to engage in PA beyond the school day. Standard regression analyses were used to investigate relationships between perceived competence, motivation and transfer of learning.

RESULT(S): Perceived competence was positively related to autonomous motivation (Beta= .41, p<.001), and negatively to amotivation (Beta= -.31, p<.001), no significant relationships with controlled motivation were found. 28.1% of the variance in transfer of learning can be attributed to perceptions of competence (Beta = .21, p<.001) and, autonomous (Beta= .31, p< .001) and controlled motivation (Beta = .16, p<.005). Autonomous motivation for PE made the strongest unique contribution when all other variables were controlled for.

CONCLUSION(S): Strategies to enhance more autonomous forms of motivation and perceptions of competence within PE are likely to equip children with the skills to be PA beyond the school day.

FUND SOURCING: The Alexander Trust

**S14.3 Can physical education teachers inspire young people towards engagement in lifelong physical activity?! A motivational perspective starting from self- determination theory**

Haerens L, Verstuyf J, Vansteenkiste M, Soenens B, Aelterman N, Van den Berghe L

PURPOSE: Previous studies, grounded in self-determination theory (SDT, Deci & Ryan, 2000) revealed that pupils who were more autonomously motivated for physical education (PE) were more active during PE (Aelterman et al, 2012) and in leisure time (Haerens et al, 2010). According to SDT, pupils will be more autonomously motivated when their basic psychological needs for autonomy (psychological freedom), competence (personal effectiveness), and relatedness (closeness) are satisfied. The present study investigates how PE teachers can satisfy pupils’ needs so that they develop autonomous motivation for PE.


RESULT(S): Structural equation analyses revealed that pupils reported higher levels of need satisfaction (β=0.85, p<0.001) and autonomous motivation (β=0.57, p<0.001) when they perceived their teachers as more need supportive. Need satisfaction positively related to autonomous motivation (β=0.78, p<0.001). The relationship between need support and autonomous motivation was fully mediated by need satisfaction.
CONCLUSION(S): Pupils perceiving their teachers as more need-supportive were more autonomously motivated because their needs for autonomy, competence and relatedness were satisfied. As a recent study identified concrete need supportive teaching behaviours that are perceived as such by the pupils (Haerens et al, 2012), theory driven, concrete and evidence-based recommendations for teachers on how to promote physical activity can be formulated.

FUND SOURCING: Ghent University, Flemish Research Foundation

S14.4 Data underpinning development of the Y-PATH intervention: Youth- Physical Activity Towards Health
Belton S, O’Brien W, Issartel J

PURPOSE: To investigate the levels and determinants of physical activity (PA) in youth, with a view to developing a targeted school based intervention.

METHOD: Students from four Irish schools (N = 256; 53.5% male, 12.41 ± 0.51 years) were involved in this research. Cross-sectional data on PA levels (using self report and accelerometers), psycho-social determinants of PA, anthropometric characteristics, and the fundamental movement skill (FMS) proficiency of youth were collected. A sub sample of 59 students participated in focus group interviews to explore their understanding of physical activity and health.

RESULT(S): The majority of youths (88%) were not meeting the recommended minimum (60 mins per day) PA guidelines for health, and 89% did not achieve the FMS proficiency expected for their age. BMI data showed 20% of youth were classified as overweight or obese. was a statistically significant difference (p<.05) in Self-Efficacy (p=.015) and PA Attitude (p=.001) scores between low, moderate and high active participants (with scores increasing as activity level increased). Active youth demonstrated a clearer understanding of the health benefits of PA while inactive youth showed little acknowledgement towards these health benefits. Active youth related nutrition, exercise, energy and sports with the definition of ‘being healthy’; inactive youth attributed primarily nutritional concepts towards ‘being healthy’.

CONCLUSION(S): Data showed a clear need for targeting low levels of PA in youth through addressing poor health related activity knowledge and low FMS proficiency. The Y-PATH intervention was developed in accordance with the findings of the present study; detail of this intervention will be presented.
S15  Sustainable prevention of obesity through integrated strategies –
The SPOTLIGHT project

Chair: Lakerveld Jeroen  
Department of General Practice and the EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, the Netherlands

Discussant: 
Ball Kylie  
Centre for Physical Activity and Nutrition Research, Deakin University, Burwood, Victoria, Australia

PURPOSE: To present the results of four systematic reviews, which form a part of the evidence base of the SPOTLIGHT-project.

RATIONALE: It is increasingly being recognised that effective approaches to stimulate adults to maintain a healthy weight must go beyond interventions that only focus on a specific individual, social or environmental level. Instead, system-based multi-level intervention approaches that address both the individual and the environment are required. The EU-funded project "sustainable prevention of obesity through integrated strategies" (SPOTLIGHT) aims to increase and combine knowledge on the wide range of determinants of obesity in a systematic way, and to identify multi-level intervention approaches that are strong in terms of Reach, Efficacy, Adoption, Implementation and Maintenance (RE-AIM).

OBJECTIVE(S): The objectives of this symposium are to present: 1) the most relevant individual-level and physical environmental-level entry points for approaches aimed at changing obesogenic behaviours and environments; 2) emerging techniques based on free geospatial services for assessing environmental characteristics related to public health issues; 3) the external validity and public health impact of evidence-based multi-level interventions to prevent obesity in adults as a function of the five RE-AIM dimensions.

SUMMARY: - A short outline of the SPOTLIGHT project will be given by the chairperson, including the project’s conceptual framework and design - Eliana Carraca (PT) will present the main findings of a systematic review on the most consistent self-regulation predictors of medium and long-term weight management, physical activity, and energy intake in clinical and community behaviour change obesity interventions - Joreintje Mackenbach (NL) will summarize the existing literature on the association of physical environmental factors (objectively measured or perceived) and weight status - Hélène Charreire (FR) will present an overview of free geospatial services used in studies to assess the built environment, with a focus on public health - Sofie Compernolle (BE) will provide the results of the RE-AIM evaluation of evidence-based multi-level interventions to prevent obesity in adults - Kylie Ball (AUS) will reflect on the various results presented, and puts them in perspective of the broader goals of SPOTLIGHT, and obesity prevention in general. The findings and their implications will also be discussed with the audience.
S15.1 Success in behaviour change obesity interventions in adults: a systematic review of self-regulation mediators

PURPOSE: Lifestyle interventions for obesity have only modest success in changing participants’ behaviour; thus, literature on effective mediators of these interventions is growing rapidly. Since lifestyle interventions are heavily dependent on individual self-regulation, this review was designed to identify and characterize motivation and self-regulation factors that mediate medium/long-term weight change, physical activity, and energy intake in clinical and community behaviour change obesity interventions.

METHOD: Scientific articles were identified through electronic database searches (e.g., MEDLINE) and reference scanning. Experimental or quasi-experimental studies, published since 2000, are eligible if they report intervention effects on hypothesized mediators (e.g., self-determination, self-efficacy) and the association between these and outcomes of interest (weight change, physical activity, energy intake) in overweight/obese adults (19-65 yr). Quality and content of selected studies will be analyzed, and findings tabulated.

RESULT(S): The electronic database search yielded 193 potentially relevant papers, after removing duplicates. Studies are being screened based on information included in the title/abstract. Data extraction from relevant studies is expected to end in December 2012. Outcomes will be analyzed separately. Conclusions will be drawn based on a narrative synthesis of self-regulation mediators. If appropriate, meta-analysis will be conducted.

CONCLUSION(S): Recidivism is high in obesity interventions that involve behaviour and/or weight change. As a result, systematically identifying and summarizing relevant information on psychological mediators of change in energy balance-related behaviours (EBRBs) in overweight or obese individuals can contribute to the improvement of interventions’ design and efficacy, and to the promotion of sustainable change in EBRBs and other body weight-related outcomes.

FUND SOURCING: The SPOTLIGHT project is funded by the Seventh Framework Programme (CORDIS FP7) of the European Commission, HEALTH (FP7-HEALTH-2011-two-stage), Grant agreement no. 278186. The content of this symposium reflects only the authors’; views and the European Commission is not liable for any use that may be made of the information contained therein
**S15.2 Physical environmental factors related to obesity; objectively measured environment versus perceived environment. A systematic review**


**PURPOSE:** As informed by social-ecological theory the physical environment encompasses a range of physical elements that likely influence obesogenic behaviours such as insufficient physical activity, sedentary behaviour and unhealthy eating habits. Thus far, several reviews have examined the influence of the physical environment on obesity. However, no clear distinction has been made between objective environment and perceived environment, while it is likely that these factors influence obesity differently. The aim of this systematic review was to describe physical environmental factors (objectively measured or perceived) in relation to weight status in adults.

**METHOD:** A systematic search has been carried out in Pubmed, Web of Science, Embase and the Cochrane Library for studies relating a physical environmental factor to (measures of) weight status. Studies from 1995 up to October 2012 were considered. Two reviewers independently screened titles and abstracts for eligibility, rated methodological quality, and extracted data. Studies assessing the objective environment versus the perceived environment were assessed separately, as were studies from Europe, Australasia and the United States.

**RESULT(S):** Over seventy articles will be included in the review. Results will be available at the time of the ISBNPA conference.

**CONCLUSION(S):** This review contributes to the evidence base for the association between physical environmental factors and obesity. Getting more insight into which physical environmental factors are associated with weight status may provide entry points for intervention approaches.

**FUND SOURCING:** The SPOTLIGHT project is funded by the Seventh Framework Programme (CORDIS FP7) of the European Commission, HEALTH (FP7-HEALTH-2011-two-stage), Grant agreement no. 278186. The content of this symposium reflects only the authors’ views and the European Commission is not liable for any use that may be made of the information contained therein

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**S15.3 Remote imaging to assess characteristics of the built environment: a systematic review**

Charreire H, Ouasti M, Lakerveld J, Mackenbach JD, Brug J, Rutter H, Oppert J-M

**PURPOSE:** There is a need to improve methods to assess built environmental characteristics related to food and physical activity behaviours and obesity. We performed a systematic
literature review with a methodological focus, to evaluate the use of free geospatial services for assessing environmental characteristics related to public health.

METHOD: Four databases (Pubmed, Web of Science, PsychInfo, Google Scholar) were searched for literature published in English between 2005 (date of implementation of free geospatial services) and September 2012. Keywords included terms such as: Google Street View, Google Earth, public health, and urban environment. Reference sections of included articles were also examined. Data were extracted using a standardised template.

RESULT(S): Eleven articles were included, all published between 2010 and 2012. Among these articles, 7 were from North America, 2 from New-Zealand, 1 from Australia and 1 from the UK. Six studies were conducted to assess the feasibility of using Google Street View to perform a virtual audit of the local environment, and to assess the level of concordance between this virtual audit and observational audit. Three studies used Google Street View to define environmental variables (e.g.; walkability indexes). Two articles used Google Earth to measure sidewalk distance and assess the quality of public open space.

CONCLUSION(S): This very recent field is rapidly expanding. Despite some limitations, virtual audits may be a relevant alternative to field audits, especially to assess built environmental characteristics related to physical activity behaviours in a large area, and to compare differences across countries.

FUND SOURCING: The SPOTLIGHT project is funded by the Seventh Framework Programme (CORDIS FP7) of the European Commission, HEALTH (FP7-HEALTH-2011-two-stage), Grant agreement no. 278186. The content of this symposium reflects only the authors’ views and the European Commission is not liable for any use that may be made of the information contained therein.

S15.4 A RE-AIM evaluation of evidence-based multi-level interventions to prevent obesity in adults. A systematic review

PURPOSE: The aim of this systematic literature review is to describe the external validity and public health impact of evidence-based multi-level interventions to prevent obesity, using the RE-AIM framework.

METHOD: Electronic databases (Pubmed, Embase, The Cochrane Library) were searched to identify relevant intervention studies published between January 2000 and April 2012. Following inclusion criteria were used: (1) aiming to influence overweight/obesity related behaviours, (2) targeting adults, (3) being conducted in a geographical area/worksite, (4) being multi-level (combining both individual and environmental changes) and (5) collecting data over at least one year. Reach, Efficacy, Adoption, Implementation and Maintenance of the selected interventions were assessed.
RESULT(S): Thirty-three interventions were identified. In terms of ‘Reach’, targeted geographical area/ worksite and population sample were well reported, in contrast to participation rate and representativeness of participants. In terms of ‘Efficacy’, 97% of the studies reported information on positive outcomes, while less than 5% reported on negative outcomes. Nearly 70% provided information on intervention deliverers, while information on representativeness of organizations was limited (‘Adoption’). A great deficit was found in reporting ‘Implementation’ (e.g. completion and costs of implementation) and ‘Maintenance’ (e.g. programme sustainability and adaptations). Only ten intervention studies reported on all five dimensions. The public health impact of these interventions was examined and will be presented.

CONCLUSION(S): Determining the public health impact of interventions is difficult due to inconsistent reporting on the RE-AIM dimensions. More information on external validity and sustainability is needed in order to implement effective interventions in real-world settings.

FUND SOURCING: The SPOTLIGHT project is funded by the Seventh Framework Programme (CORDIS FP7) of the European Commission, HEALTH (FP7-HEALTH-2011-two-stage), Grant agreement no. 278186. The content of this symposium reflects only the authors’ views and the European Commission is not liable for any use that may be made of the information contained therein.
S16  Unraveling the associations between actual and perceived motor skill competence, health-related behaviors and outcomes in childhood

Chair: D'Hondt Eva
Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium
Discussant: Goodway Jacqueline D
School of Physical Activity and Educational Services, The Ohio State University, Columbus, Ohio, United States

PURPOSE: The purpose of this symposium is to gain greater insight into the dynamic role of motor skill competence (i.e., both actual and perceived) as antecedent and/or consequence of health-related behaviors (i.e., physical activity) and outcomes (i.e., physical fitness and body mass index) in children across developmental time.

RATIONALE: Recent research has highlighted the importance of well-developed motor skill and coordination in terms of potential health benefits from a young age onwards. Empirical evidence indicated that children’s actual motor skill competence is positively related to perceived motor competence, physical fitness as well as their current and future engagement in physical activity, but inversely related to weight status. To date, few studies succeeded to explore several of these interrelated factors concurrently and to examine whether associations differ according to children’s age and with (developmental) changes over time. Longitudinal research is thus imperative and needs to be intensified for a better understanding of the causal nature of relationships in order to develop targeted intervention.

OBJECTIVE(S): Our symposium aims at (1) tackling the abovementioned issues by uniting the expertise of researchers from different countries working on related topics, (2) bringing the significance of motor skill competence to the attention of experts in physical activity and nutrition, and (3) reflecting on connections and implications of reported findings with regard to both theory and practice.

SUMMARY: The first part of the symposium is based on novel cross-sectional data. The 1st presentation examines the associations between actual and perceived ball skill competence as well as time in moderate-to-vigorous physical activity, considering gender differences. The 2nd presentation provides evidence supporting the hypothesis that relationships among actual and perceived motor skill competence, physical fitness and physical activity become stronger in older children. The latter part of the symposium is built around longitudinal data. The 3rd presentation describes the predictive value of motor coordination, physical fitness and physical activity to BMI. The 4th presentation shows that children’s motor coordination negatively predicts changes in BMI z-scores, and vice versa.
S16.1  Being ‘ball skill competent’ relates to perceived competence but not physical activity in young children  
Barnett L, Ridgers N, Salmon J

PURPOSE: Movement skill competence and perceived skill competence are important to physical activity. This study investigated a) associations between children’s actual and perceived Object Control (OC) competence (commonly ball skills) and time in moderate-to-vigorous physical activity (MVPA), and b) sex differences in variables.

METHOD: The Test of Gross Motor Development-2 assessed OC competence. A modified version of the physical competence subscale of The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children assessed perceived competence in the same six OC skills. Physical activity was measured via accelerometry. Pearson correlation determined initial associations. Two general linear models had OC competence as the independent variable (adjusted for sex and age) and the outcome as i) MVPA ii) perceived OC.

RESULT(S): One hundred and nineteen children (53% boys, 47% girls) aged 4 to 8 years (6.3 ± 0.94) completed assessments. Girls were less skilled, had lower perceptions and were less active. OC competence was initially associated with MVPA (r=0.26, p=0.008) but not after adjustment for age and sex (p=0.239). OC competence was associated with perceived OC competence (r=0.28, p=0.002) and remained significant after adjustment (p=0.033). Predicted values show boys score on average 3 units higher on perceived OC competence.

CONCLUSION(S): Interventions need to target girls’ OC competence as even at this age children’s ball skill ability is related to their perceptions. These relationships are emerging in young children so a broader skill assessment may have more association with physical activity.

S16.2  Developmental trajectories of the relationship between motor skill competence, physical activity, perceived motor competence and health-related fitness  

PURPOSE: This study evaluated a conceptual model (Stodden et al., 2008) to understand the developmental relationship of motor skill competence (MSC) to physical activity (PA), health-related physical fitness (HRF), and perceived motor competence (PMC) across childhood. We hypothesized relationship strengths among variables within the model would become stronger as age increased.

METHOD: A 3 (age) × 2 (gender) cross-sectional design examined relationships among all variables in the model across three age groups. We tested 419 children (49% boys, 51% girls) ages 4-5, 7-8, and 10-11 on 12 motor skills (product & process), HRF (Fitnessgram), PA (5-day accelerometry), and PMC. Structural equation models evaluated four proposed models (1=MSC»PMC»HRF»PA, 2=MSC»HRF»PMC»PA, 3=PA»HRF»PMC»MSC, 4=PA»PMC»
HRF»MSC) among latent variable constructs within the overall conceptual model using four different model fit indices (RMSEA, CFI, SRMR, GFI) for each of the three age groups.

RESULT(S): Overall, the structure coefficients among MSC, PA, PMC and HRF generally strengthened across age groups. This supports the hypothesis that the relations between these constructs strengthen as children move from early childhood to late childhood. Global model fit indices were acceptable across age groups.

CONCLUSION(S): As hypothesized by the Stodden et al. (2008) conceptual model, these data indicate relationships among MSC, PA, PMC, and HRF were different across the three age groups tested, with relationships strengthening over developmental time. These findings have implications for the development of PA interventions across childhood. Future, longitudinal studies examining the relationships among the developmental trajectories of MSC, PA, PMC, and HRF are warranted.

FUND SOURCING: National Institute of Health R21 HD055621-01A2

S16.3 Motor coordination is a predictor of body mass index in children
Lopes VP, Rodrigues LP

PURPOSE: The purpose of this study was to examine longitudinally the effects of motor coordination (MC), physical fitness (PF) and physical activity (PA) as predictors of body mass index (BMI).

METHOD: The study has a longitudinal design. During four years 156 children of both sexes were evaluated on MC (KTK), PF [Fitnessgram: curl-ups (CU), push-ups (PU), trunk-lifts (TL) and one mile walk/run (MRW)] and 7 days PA (pedometry). BMI was calculated [body mass (kg) / height (m2)]. At first evaluation children were 4 to 9 years. MC, PF and PA were evaluated as predictors of BMI in a hierarchical linear model running in HLM version 7 with robust standard errors.

RESULT(S): There were no significant differences between boys and girls in BMI at baseline and changes over time were also similar. BMI at baseline was 17.7 kg•m-2 and increased at a rate of 0.44 kg•m-2 each year. MC and two items of PF (CU and TL) significantly predicted changes in BMI. MC and CU had a positive influence on BMI and TL a negative influence. For each unity change in MC and CU, BMI increased 0.013 and 0.008 kg•m-2 each year, respectively. And for each unit change in TL, BMI augmented 0.04 kg•m-2.

CONCLUSION(S): PA does not appear to have a significant influence on BMI changes during childhood, but MC and muscular strength attenuated the increase of BMI during this period of growth.

FUND SOURCING: N.A.
S16.4 Children’s level of gross motor coordination negatively predicts changes in body mass index z-scores, and vice versa
D'Hondt E, Gentier I, Verstuyf J, Deforche B, Lenoir M

PURPOSE: The purpose of this longitudinal study was to investigate the reciprocal relationship between children’s weight status and their level of motor skill competence, taking physical activity (PA) into account as a potential mediator.

METHOD: The following measurements were collected twice in 5- to 12-year-old children, with a time interval of two years between both test moments: (1) body height and weight to calculate body mass index z-scores (zBMI), (2) level of gross motor coordination (GMC) using the KörperkoordinationsTest für Kinder (KTK), and (3) level of PA by means of the Flemish Physical Activity Questionnaire (FPAQ). Multiple linear regression analyses were run on the data (N=760, including 51.1% boys), correcting for age and gender as well as the outcome of the dependent variable at baseline.

RESULT(S): Initial level of GMC was found to predict changes in zBMI over two years ($\beta$=-0.042, $p<0.05$), but a direct effect of total PA at baseline on future zBMI was not shown ($\beta$=0.015, ns). On the other hand, initial zBMI also predicted changes in GMC over two years ($\beta$=-0.102, $p<0.001$) also occurred. Again, total PA at baseline was not a predictor of future GMC ($\beta$=-0.013, ns).

CONCLUSION(S): Children’s GMC level negatively predicts changes in zBMI over time, and vice versa. Self-reported PA did not mediate this reciprocal relationship across developmental time. An early identification of children with relatively high zBMIs and/or low motor skill competence is essential in view of targeted interventions, since they are at risk for developing motor deficits and overweight, respectively.

FUND SOURCING: Ghent University
The effectiveness of serious games in promoting a healthy diet and physical activity

Chair: De Bourdeaudhuij Ilse

Discussant: De Bourdeaudhuij Ilse

Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium

PURPOSE: In this symposium, the researchers wish to demonstrate the importance of a dual focus on health promotion and gaming expertise in creating an effective serious game for a healthy diet and physical activity. Considering the pioneering role of healthy diet and physical activity in serious games for health, this topic is appropriate to address at an ISBNPA symposium.

RATIONALE: Serious games offer a promising and exciting method for actively engaging children and using that engagement to promote behavior change. Games can make tasks that are usually perceived as boring to be "fun" or enjoyable. An international group of presenters will demonstrate the importance of a dual focus on health promotion and game design in creating effective serious games.

OBJECTIVE(S): 1. To increase knowledge on elements from gaming and behavioural change theories which enhance effectiveness of serious health games. 2. To demonstrate serious games which are effective in increasing physical activity and improving a healthy diet. 3. To identify the key research issues to enhance the effectiveness of video games for promoting children’s diet and physical activity change. 4. To inspire future initiatives in designing serious games and providing practical tips to do so.

SUMMARY: Four presentations will be given and discussed, providing an overview of studies on serious games in physical activity and a healthy diet. The key message that a dual focus on gaming and health promotion enhances game effectiveness is supported by results from a systematic review of serious games on health promotion. Next, two serious games will be discussed by a health promotion expert and a gaming expert, each highlighting the necessary ingredients for success. Finally, directions for the future and suggestions for implementation are given.

Importance of game and behavioral change theory in creating effective serious video games for health promotion

DeSmet A, Bastiaensens S, Van Cleemput K, Poels K, Vandebosch H, De Bourdeaudhuij I

PURPOSE: Effectiveness of serious games in promoting healthy lifestyles has been amply demonstrated. The purpose of this systematic review is to evaluate whether a dual focus on health promotion theory and game design theory can contribute to a higher effectiveness of serious games for health promotion, as was suggested in recent conceptual papers.
METHOD: Pubmed database was searched between Jan. 2007 and Sept. 2012, with the keywords: (‘games’ or ‘video games’ or ‘interactive multimedia’) and health. Digital games on health-promoting lifestyle behaviors (diet & physical activity, preventive behavior, illness self-management, social behavior, mental health promotion) which reported outcome results were retained. Games not developed for both education and fun were excluded, as were games for therapy rather than healthy lifestyle promotion. The list was complemented with games from other reviews that met our criteria and by consulting our professional network.

RESULT(S): Twenty-one games were retained. Ten game studies were randomized controlled trials, three were one-group pre-post evaluations. Eight games were integrated in a non-digital approach, for which the effect of the game could not be singled out. Preliminary results suggest that using both behavioral change theories, including the target group in the game design and creating high game interactivity are important to create effective games, but differences exist according to the type of target behavior.

CONCLUSION(S): When designing a serious game for promoting a healthy diet, physical activity or other healthy lifestyles, a dual health promotion and game design focus could increase its effects.

S17.2 Youth reactions to a theory-informed serious videogame promoting fruit and vegetable consumption
Thompson D, Liu Y

PURPOSE: Fruit and vegetable (FV) consumption is associated with decreased risk of certain diseases. Youth consume fewer FV than recommended. Effective methods for reaching youth with health-promoting messages are needed. This talk presents the theoretically-informed design framework that guided development of a serious videogame promoting FV consumption and youth reactions to the game post gameplay.

METHOD: Squire’s Quest! II is a 10-episode online videogame promoting FV consumption to 4th and 5th graders (roughly 9-11 year olds); its design was informed by a multi-theoretical framework that guided key decisions, such as videogame characters and behavioral components. Youth reactions to the game were assessed quantitatively after completion of gameplay through an online questionnaire and qualitatively through semi-structured telephone interviews. Quantitative data were summed, and frequencies and percentages computed. Qualitative data were coded and analyzed using thematic analyses. All available data were used in the analyses.

RESULT(S): Four hundred 4th and 5th graders were recruited and enrolled; process data indicated 91% of enrolled youth played all 10 episodes. Preliminary analyses of post-1 outcome data (n=384) indicated that youth strongly agreed to liking the story (70%) and characters (70%). They also strongly agreed they liked (vicariously) making recipes in the castle kitchen (73%) and at home (84%). When asked if they would like to play the game again, 59% strongly agreed they would, and most (67%) strongly agreed they would
recommend the game to friends. Qualitative data provided insight into youth reactions.

CONCLUSION(S): This research suggests that theory-informed serious videogames may appeal to youth.

S17.3  Reaching young audiences with serious games: experiences from the field
Dunwell I

PURPOSE: The potential use of digital games as a medium for education is well-recognized. In particular, it has been suggested they may be an effective medium when seeking to deliver a change in the attitude or behaviour of an audience resistant to more formal methods on instruction. However, much research still needs to be done to establish how best to recognise and implement pedagogical objectives in the underlying design of a game. In this presentation, a serious game developed to promote a healthier and more active lifestyle in a school-age audience will be described, and related to other projects undertaken at the Serious Games Institute which seek to engender a change in attitudes and perceptions through play.

METHOD: This includes qualitative findings from research into the obesity prevention game, showing positive responses from both parents and 17 children, with rapid adoption and high levels on engagement. With respect to behavioural goals, the talk will include reflection on larger quantitative findings from the serious game for road safety Code of Everand, which attracted over 100,000 players, with a mean playtime in excess of 90 minutes and a broad demographic distribution.

RESULT(S): Surveys of players compared to a national baseline demonstrate improved safety awareness amongst players, but also the difficulties associated with evaluating any intervention whose ultimate aim is long-term changes in behaviour.

CONCLUSION(S): The insight gained from these studies will be of particular relevance to those seeking to develop game-based interventions for a young age group, as well as researchers seeking to establish their efficacy.

S17.4  A hypothesized mediating variable model of how serious video games for health influence behavior
Baranowski T, Baranowski J

PURPOSE: While serious video games show promise in influencing children’s diet and physical activity, little is known about how they influence behavior. An innovative model based on four behavioral theories will be presented.

METHOD: A mediating variable model will be presented which includes intervention
procedures designed to influence each mediator.

RESULT(S): The relevant theories (e.g. Self Determination, Social Cognitive, Information Processing and Transportation Theories), key variables (i.e. motivation to play video games, immersion in story and game, attention to video game activities and messages, central processing, practical knowledge for behavior change, behavior change skill development, behavioral self control skill development, behavior change attempts, motivation to change behavior, home availability/accessibility, physical resources, barriers to change, and habit), and available experimental research will be presented to support the model. Research will be proposed on how to test the model.

CONCLUSION(S): Even more effective behavior change video games should be created if we knew how serious video games exerted their influence.
S18  New and existing evidence on sedentary behaviour in young people: from measurement to health effects

Chair: Chin A Paw Mai JM
EMGO Institute for Health and Care Research, Department of Public and Occupational Health, VU University Medical Center, Amsterdam, the Netherlands
Discussant: Jago Russell
Centre for Exercise, Nutrition & Health Sciences, School for Policy Studies, University of Bristol, Bristol, United Kingdom

PURPOSE: This symposium critically discusses new and existing evidence on sedentary behaviour in young people: from measurement to health effects. Innovative aspects are the focus on youth, both self-report and objective assessment of sedentary behaviour, innovative analysis of accelerometer data, experimental data and a review of reviews. Moreover, recommendations for high quality future research are provided.

RATIONALE: Evidence in adults shows that objectively assessed sedentary time is independently associated with health, however, evidence in young people is inconsistent and of limited quality. Progressively more governments propose a maximum screen time for young people of 2hrs per day. However, the evidence base for such a health recommendation is lacking. This symposium critically discusses the state-of-the-art on sedentary behaviour in young people ranging from measurement to health effects as well as sedentary behaviour change.

OBJECTIVE(S): This symposium aims to critically discuss - How to assess sedentary behaviour in young people; - Potential health effects expected in young people and after how much sitting; - How to make our interventions more effective. Finally, recommendations for high quality future research are provided.

SUMMARY: Ms Verbestel will present results from the IDEFICS study, comparing parental questionnaires and accelerometry for assessing sedentary time in 2-9 year old European children. Prof Salmon will present results from the Transform-Us! study on associations between various patterns of sedentary and sitting time with metabolic health indicators in 8 year old Australian children. In order to examine whether the limited time spent on physical activity can compensate for the prolonged time spent sitting during the rest of the day, it is important to study the health effects of prolonged vs. interrupted sitting. Dr Altenburg will present such experimental data on acute and repeated prolonged sitting on cardiometabolic health in Dutch 18-23yr old male students. This information is crucial for the development of sedentary behaviour interventions. Prof Biddle will focus on interventions aimed at reducing sedentary behaviour, discussing a review of reviews assessing sedentary behaviour change.
S18.1 Associations between parental-reported screen-time behaviour and objectively measured sedentary time in 2-9 year old European children. Results from the IDEFICS study


PURPOSE: Agreement between commonly used measures of children’s SB have to be understood to allow correct interpretations of research findings. This study examined the association between parental-reported screen time and accelerometer-derived SB in 2-9 year old children.

METHOD: Cross-sectional data were analysed from 5988 2-9 year old children from 7 European countries who provided both accelerometer-derived and parental-reported SB measures. A cut-point of <25 counts/15s was applied for accelerometer-derived sedentary time. Parents reported their children’s daily TV viewing time and computer use, which were combined to obtain daily minutes of screen-time. Agreement between accelerometer-derived and parental-reported SB measures was calculated using spearman rank correlations.

RESULT(S): Accelerometer-derived sedentary time was significantly lower in 2-5 year olds (340.61±90.16 min/day) than in 6-9 year olds (386.58±88.67 min/day; t=19.78; p<0.001). Parent-reported screen time was also lower in 2-5 year olds (84.38±54.11 min/day) than 6-9 year olds (106.83±60.54 min/day; t=14.92; p<0.001). A significant but weak association was found between accelerometer-derived sedentary time and parent-reported screen-time in 6-9 year olds (rho=0.09; p<0.001) while no association was found in 2-5 year olds (rho=0.01; p>0.05). When stratified by country, the magnitude of the associations varied in both age groups but none of the associations was found to be acceptable (0.01<=rho<=0.19).

CONCLUSION(S): Parent-reported screen-time was not a good indicator of total sedentary time in 2-5 and 6-9 year old European children.

FUND SOURCING: European Community within the Sixth RTD Framework Programme Contract No. 016181 (FOOD).

S18.2 Patterns of children’s sedentary and sitting time and metabolic health indicators: the Transform-Us! study

Salmon J, Robinson S, Daly R, Dunstan D, Arundell L, Carson V, Ridgers N

PURPOSE: Transform-Us! was a 3-year group RCT aiming to determine the effectiveness of strategies to reduce 8-year old Australian children’s sedentary behaviour or promote their physical activity compared with usual practice at school and home. This study aims to use baseline data to examine the associations between patterns of ActiGraph accelerometer sedentary and activPAL sitting time with metabolic health indicators in children.

METHOD: Baseline data were collected in Feb-June 2010. Children wore an ActiGraph
accelerometer and a sub-sample also wore an activPAL inclinometer. Data were synthesised using a specially developed Macro. A valid day was considered to be 8 hours wear time/day. Children had their height and weight measured and a fasting blood sample collected at a commercial pathology laboratory. HOMA-IR and inflammatory markers were calculated.

RESULT(S): A total of 219 children (45% boys; mean age 8.1 yrs) provided blood samples and wore an accelerometer; a sub-sample of 140 children also wore an activPAL inclinometer. Eighty-one percent (404 mins) of the children’s day was spent sitting, with 47% accumulated during class time and 46% during outside of school hours. Children performed 18x 10-min bouts of sitting throughout the day, with a higher frequency of bouts weakly but significantly associated with BMI z-scores (r=0.16, p<0.05). Associations between patterns of sitting and sedentary time and metabolic health outcomes will also be presented.

CONCLUSION(S): Few studies have examined associations between objective measures of sitting and sedentary time and children’s metabolic health. How children accumulate this time may impact on their health.

FUND SOURCING: National Health and Medical Research Council of Australia; Diabetes Australia Research Trust

S18.3 Cardiometabolic effects of repeated uninterrupted sitting in young people
Altenburg T, Rotteveel J, Chin A Paw MJM

PURPOSE: Sedentary time, especially TV viewing, has been identified as an important and independent lifestyle risk factor of cardiometabolic health in young people. To date, the cardiometabolic effects of repeated uninterrupted sitting in young people is unknown. We examined the effects of 6 days of predominantly uninterrupted sitting on cardiometabolic indicators in young people.

METHOD: Seven healthy young males (18-23yrs) participated in this randomized crossover study, including 2 laboratory sitting days and a 6-day lifestyle sitting intervention in between. During the laboratory days, participants remained seated during 8hrs. Every hour venous blood samples were collected to assess plasma glucose. Additionally, systolic (SBP) and diastolic (DBP) blood pressure were measured hourly. During the 6-day lifestyle sitting, participants were requested to spend most of their day on uninterrupted sitting. Incremental area under the curve (iAUC) was calculated for glucose, SBP and DBP.

RESULT(S): During the 6-day lifestyle sitting, participants spent significantly more time sitting than during a normal similar time period (674 ± 36 and 576 ± 82 min, respectively; p<0.05). Longitudinal regression analysis revealed a trend for a higher iAUC for plasma glucose following 6-day lifestyle sitting compared to baseline values (B=0.23, CI= [-0.02 0.48]). iAUC for SBP (B=2.63, CI= [-4.61 9.88]) and DBP (B=0.05, CI = [-4.67 4.71]) were not significantly different between the two laboratory days.
CONCLUSION(S): Six days of predominantly uninterrupted sitting did not affect SBP and DBP. However, plasma glucose tended to increase following 6 days of predominantly uninterrupted sitting.

FUND SOURCING: Dept of Public and Occupational Health, EMGO Institute for Health and Care Research, VU University Medical Center Amsterdam

S18.4 Sedentary behaviour change in young people: Commentary, ideas and a review of reviews
Biddle S, Petrolini I, Pearson N

PURPOSE: Sedentary behaviour (mainly sitting time) has become very popular as a research topic over the past few years. However, while interventions are emerging with adults, most intervention research to date has been with young people. To help summarise trends, several systematic reviews have now been published. Therefore, we conducted a ‘review of reviews’ to make sense of the reviews that aim to summarise sedentary behaviour change in children and adolescents.

METHOD: Nine systematic reviews were summarised and they addressed sedentary behaviour (SB) change either alone or in conjunction with health outcomes (e.g. BMI).

RESULT(S): Overall, interventions that focus on decreasing SB were associated with a reduction in time spent in SB’s and/or improvements in anthropometric measurements, such as BMI and Body Fat%. Where the effect size was reported, there was a small but significant effect in favour of sedentary behaviour reduction for intervention groups (highest effect size [ES] = 0.29). Two reviews reported greater effects for in-treatment outcomes vs. outcomes measured after treatment. Some studies reported effects assessed at different times of the intervention period. Further, some difficulties arise when interpreting the effects of interventions at long term due to the limited or inconsistent measures at follow-up.

CONCLUSION(S): Interventions require better reporting of fidelity and more details from process evaluations. In addition, more needs to be known about substitution effects when one sedentary behavior is reduced.
S19 Food portion sizes: factors influencing portion size decisions & strategies to control portion size selection and intake

Chair: Wills Josephine
Discussant: Wills Josephine
1The European Food Information Council, Brussels, Belgium

PURPOSE: To present the results of data on the factors that influence portion size decisions and the identification of evidence based behavioural strategies to control portion size selection and intake.

RATIONALE: Past decades, food portion sizes increased and have been acknowledged as key factor on energy intake. Despite its major influence, many studies neglect factors influencing portion size decisions and a minority of public health interventions incorporate strategies aimed at control portion size selection and intake.

OBJECTIVE(S): To examine (1) understandings of portion information, (2) factors that influence portion size decisions, (3) the identification of evidence based strategies to control portion size selection & intake and (4) the use and evaluation of these strategies.

SUMMARY: This symposium will cover consumer data and promising public health strategies aimed at food portion size. Monique Raats will present research results from a survey of 2155 UK consumers on self-relevance of portion information on food and drink packaging and motivations for self-relevance. Violeta Stefan will present data from a large sample of Danish consumers (N=1103) on factors that influence portion size decisions at home. Moira Dean will present results of a mixed method study which identified portion control strategies, and then developed and validated measures of these behaviours. Maartje Poelman will present findings on data of an exploratory study aimed at strategies to control portion size selection and intake in the Netherlands.

S19.1 Ad hoc thinking about portion information: evidence of goal-related cognition
Raats MM, Hegarty P, Berger I, Wills J

PURPOSE: A major obstacle in developing dietary guidance has been the confusion associated with definitions of portion information. This study seeks to derive an understanding of lay perceptions.

METHOD: In a web-based survey with 2155 UK respondents completed open-ended questions on self-relevance of portion information on food and drink packaging and motivations for self-relevance. Respondents also completed items relating to demographic characteristics, use of packaging information, general health interest (GHI), need for cognition (NFC), faith in intuition (FI) objective and subjective knowledge of food (OKF and SKF).
RESULT(S): Fewer participants regarded portion information as relevant ((Ns = 891, 1264 respectively, 41.4%, 58.6% of valid responses respectively), χ²(1, 2155) = 63.61, p <.001). Compared to low relevance participants, high relevance participants were more likely to be female and reported higher educational attainment and social class, less FI, lower NFC and greater GHI, SKF and OKF. High and low relevance participants did not differ in age and BMI. Among the 891 high-relevance participants, the most frequently mentioned being management of food budgets (42.6%), weight management (30.6%), and general health concerns (16.8%).

CONCLUSION(S): It would appear that lay understandings of portion information can be considered an ‘ad hoc’ category, i.e. constructed in the service of achieving a particular goal. Barsalou (1982) characterised these categories as less-well established in memory than other more common categories (e.g. fruit). This offers an explanation as to the problems with using such a concept in dietary guidance.

S19.2 Experimental survey on portion size decisions for evening meals at home in Danish households
Stefan V, Lahteenmaki L

PURPOSE: The purpose was to study how expectations related to meal properties and person-related socio-demographics and attitudes affect and interact when making decisions about meal size at home in the evening.

METHOD: In a survey with 1103 Danish respondents (51.6% F; 48.4% M) at least partly responsible for cooking, participants chose a portion size for their dinner at home from six options with a computer-aided system using photos of real foods. The target foods were pizza, soup, salad and a four-component meal with meat, potatoes, salad and cooked vegetables. Respondents rated their expectations related to fillingness, pleasantness and healthiness on 7-point category scales (1=not at all; 7= extremely) for each meal. The main person-related factors were gender, age, BMI, emotional eating, cognitive restraint, uncontrolled eating and general health interest in food choices.

RESULT(S): From the meal properties, expected fillingness had the most constant negative impact on the selected portion size, with expected pleasantness contributing positively to portion size in three of the four meals. Men chose larger portions than women and BMI was positively associated with bigger portion sizes. From the attitudes towards eating cognitive restraint decreased and uncontrolled eating tendency increased the portion sizes. Expected healthiness or general health interest as such had very weak and occasional impact on portion size decisions.

CONCLUSION(S): When making decisions about meal sizes at home tendencies to restrained and uncontrolled eating were closely associated to selected portion sizes, whereas from meal properties mainly expected fillingness and pleasantness could explain the decisions.
S19.3  Portion control strategies: validation and consumer usage  
Dean M, Spence M, Livingstone BE

PURPOSE: In the absence of obesity interventions which have been informed by a real understanding and appreciation of the strategies employed by consumers in relation to appropriate portion size control, this study used mixed methods to explore portion size control behaviours in more depth.

METHOD: We conducted ten focus groups comprising 66 consumers, and identified self-reported portion control strategies. Validation testing of the 22-items was performed in a nationally representative sample of 1012 adults aged 18+ from the Island of Ireland. Exploratory factor analysis and reliability resulted in the retention of 21 items which reflected five constructs: ‘calorie control’, ‘serving’, ‘buying’, ‘measuring’ and ‘satiety’. The predictive validity of these constructs were tested (using multiple regressions) through their associations with: uncontrolled eating (UE), emotional eating (EE), cognitive restraint (CR), general health interest (GHI), satisfaction with food-related life (SWFL) and perceived compliance with healthy eating guidelines (PCHEG).

RESULT(S): ‘Satiety’ strategies were most frequently used. The regression analyses showed that all five strategies were significant predictors of GHI explaining 21% of the variance. In addition, the five strategies were significant predictors of CR (R2 = 37%) as well as ‘satiety’ and ‘calorie control’ strategies explaining 9% of EE and the same two practices explaining 5% of the UE. PCHEG, which was significantly linked to ‘buying’ and ‘satiety’ strategies, explained 24% of the variance.

CONCLUSION(S): These measures provide the foundation for a more nuanced understanding of the strategies which affect food portion size consumption, as well as informing the design of portion size interventions.

S19.4  Behavioral strategies to control portion size selection and intake  
Poelman MP, de Vet E, Seidell JC, Steenhuis I

PURPOSE: To identify behavioral strategies to control portion size selection and intake. Additionally, to explore to what extent these strategies are used and to evaluate the applicability in practice and usefulness in weight management.

METHOD: Portion control strategies were identified and their evidence was determined by previous studies into factors influencing portion size selection and intake. By means of an exploratory cross-sectional study, individual usage of each portion control strategy was established. Also, applicability and usefulness in weight management were determined on a five point Likert scale.

RESULT(S): Thirty-two portion control strategies were identified. Strategies were aimed at purchase behavior, stockpiling, meal and package size, non-food & food-related stimuli and portions in out-home establishments. Results on data of 52 Dutch adults (80.8% female;
32.7% BMI >25) indicated that 17.5 out of 32 portion control strategies (54.8%) were used often or very often. Furthermore, the strategies were evaluated as applicable in practice (M = 4.16 SD = 0.76, range 1-5) and useful in weight management (M = 4.06 SD = 0.93, range 1-5). During the symposium presentation, findings on data of an educational intervention study encouraging the use of the strategies are also presented.

CONCLUSION(S): On average, half of the strategies were used often to control portion size selection and intake. Overall, the strategies were evaluated applicable and useful in managing portion size selection and intake. Long-term effectiveness of the strategies in controlling energy intake and weight maintenance remains important research questions, especially in overweight and obese participants.
Physical activity in young children – Assessment, determinants, health outcomes and methodological challenges

Chair: Ahrens Wolfgang

Department of Epidemiological Methods and Etiologic Research, Leibniz Institute for Prevention Research and Epidemiology - BIPS GmbH, Bremen, Germany

PURPOSE: The primary aim of this symposium is to examine the impact of methodological decisions on physical activity assessment and interactions with health outcomes in young children using data from large cohort studies such as the IDEFICS study. A secondary aim is to critically assess popular theories of childhood obesity using unique global data sets.

RATIONALE: A prerequisite in assessing physical activity in large cohort studies is the use of objective methods such as accelerometry. However, there is very little consensus on best practice despite the acknowledged need to standardise methodological decisions in order to achieve real advances in the field. The recently completed IDEFICS study (European Union Integrated Project Grant Call identifier FP6-2004-FOOD-3-A: Identification and prevention of Dietary- and lifestyle-induced health EFFects In Children and infantS (IDEFICS), 2006-2012) provides an excellent opportunity to assess the impact of methodological decisions on physical activity assessment and interactions with health outcomes in young children. This unique collection of objectively measured physical activity and corresponding extensive phenotypic data also allow current theories of childhood obesity to be assessed.

OBJECTIVE(S): The IDEFICS study (and collaborators) provides an excellent opportunity to achieve the following objectives: 1) to examine the impact of methodological decisions on physical activity assessment in young children 2) to examine the impact of methodological decisions on the association of physical activity with standard health outcomes in young children 3) to formulate new methodological approaches for the study of childhood obesity 4) to critically assess popular theories of childhood obesity using unique global data sets.

SUMMARY: The first 3 speakers will summarise major highlights from the IDEFICS study in terms of the impact of methodological decisions on physical activity assessment and interactions with health outcomes in young children with particular reference to current theories of childhood obesity. The final speaker will focus on lessons learned from childhood obesity studies and implications for obesity prevention. Speaker 1: Professor Wolfgang Ahrens "Physical activity, bone health, obesity and metabolic disorders in children below the age of ten across Europe: The IDEFICS study" Speaker 2: Professor Iris Pigeot "How the built environment influences physical activity in children" Speaker 3: Dr Yannis Pitsiladis "Considerations in accelerometer assessment methods for children: Lessons from the IDEFICS study” Speaker 4: Dr Bernard Gutin "How can we help people to develop lean and healthy bodies? A new perspective"
S20.1 Physical activity, bone health, obesity and metabolic disorders in children below the age of ten across Europe: The IDEFICS Study
Ahrens W

PURPOSE: The IDEFICS study is an epidemiological prevention study within the 6th EU framework to investigate the complex interplay of causal factors and develop evidence-based intervention modules that counteract the epidemic of diet- and lifestyle-induced morbidity thus providing an excellent opportunity to assess physical activity, bone health, obesity and metabolic disorders in young children across Europe.

METHOD: Using standardized measurements and instruments a population-based cohort of 16,224 children aged 2 to 9 years has been established in eight European countries (Belgium, Cyprus, Estonia, Germany, Hungary, Italy, Spain, Sweden). Parents reported socio-demographic, behavioural, medical, nutritional and other lifestyle data of their children and families. This assessment was complemented by physical examinations and measurements that included anthropometry, blood pressure, metabolic blood markers, physical fitness, physical activity (PA assessed by 3-day accelerometry), DNA and heel bone ultrasonography.

RESULT(S): The combined prevalence of overweight/obesity ranges from >40% (South) to <10% (North). The proportion of children spending at least 30 minutes daily in moderate to vigorous physical activity (MVPA) varies across Europe. Children’s overweight is positively associated with spending <30 minutes in MVPA according to Evenson criteria (OR 1.56; 1.29-1.90). This association was more pronounced in primary school children as compared to children below the age of six. Relative to children spending <30 minutes daily in MVPA, children who spent >47 minutes in MVPA had a reduced odds of falling into the lowest bone stiffness category (OR 0.60; 0.41-0.86).

CONCLUSION(S): The IDEFICS study shows a strong positive effect of MVPA on children’s healthy weight status and higher bone stiffness.

FUND SOURCING: This work was done as part of the IDEFICS Study and is published on behalf of its European Consortium (www.idefics.eu). We gratefully acknowledge the financial support of the European Community within the Sixth RTD Framework Programme. Contract No. 016181 (FOOD).

S20.2 How the built environment influences physical activity in children
Buck C, Pitsiladis YP, Pigeot I

PURPOSE: Studies on objective features of the built environment and their effect on physical activity have been conducted mainly in adults. Therefore the unique data involving children aged 2-9 years from the IDEFICS study and geographic information system (GIS)-based measures of the urban environment were used to investigate the influence of built environment features on physical activity of preschool and school children in Germany.

METHOD: We considered objective data of built environment features, e.g. footpaths or
playgrounds, in two German study regions of the IDEFICS study. Based on the street network, individual neighborhoods were implemented using age-dependent distances from the home address of the children. Different urban measures were used to assess urbanity, street connectivity, and availability of green space, sport facilities, and playgrounds in the neighborhood. Moreover, urban measures were combined to a moveability index which was linked to children’s travel mode to school and accelerometer-based measures of physical activity such as moderate-vigorous physical activity (MVPA). The impact of density measures and the moveability index on PA and children’s travel mode to school were investigated using multilevel regression models.

RESULT(S): Combined urban measures impacted on travel mode and MVPA. Particularly, availability of playgrounds showed a significantly positive effect on minutes of MVPA per day. When accounting for distance to school, footpath density showed a significantly positive effect on the percentage of children walking to school.

CONCLUSION(S): Specific features of the built environment like the availability of playgrounds or footpaths can significantly influence physical activity patterns.

FUND SOURCING: This work was done as part of the IDEFICS Study and is published on behalf of its European Consortium (www.idefics.eu). We gratefully acknowledge the financial support of the European Community within the Sixth RTD Framework Programme. Contract No. 016181 (FOOD).

S20.3 Considerations in accelerometer assessment methods for children: Lessons from the IDEFICS Study
Pitsiladis YP

PURPOSE: The validity of accelerometry against doubly labeled water (DLW) criterion method for assessment of free-living energy expenditure (EE) were assessed in children.

METHOD: 49 European children aged 4-10 years were assessed by uni-axial ActiTrainer with heart rate (HR), uni-axial 3DNX and tri-axial 3DNX accelerometry. PA patterns in 30 active Kenyan adolescents (aged 14 ± 1 yrs, mean ± SD) were also assessed by accelerometry over 1 week. Daily energy expenditure (DEE), activity-induced energy expenditure (AEE) and physical activity level (PAL) were simultaneously determined using DLW in both cohorts.

RESULT(S): In the European cohort, the longitudinal axis of both devices and tri-axial 3DNX counts per minute (CPM) were significantly associated with PAL (r = 0.51 ActiTrainer, r = 0.49 uni-axial-3DNX and r = 0.42 tri-axial S3DNX). 86% of the variance in TEE could be predicted by a model combining body mass (Partial $r^2 = 71\%$; $P<0.05$), CPM-ActiTrainer (Partial $r^2 = 11\%$; $P<0.05$) and difference between HR at moderate and sedentary activities (ModHR – SedHR; Partial $r^2 = 4\%$; $P<0.05$). In the Kenyan cohort, DEE, AEE and PAL were 12.2 ± 3.4, 5.4 ± 3.0 MJ/d and 2.2 ± 0.6, respectively. A model combining body mass, CPM and time in light activities predicted 46% of the variance in DEE. Furthermore, AEE accounted for approximately 44% of DEE.
CONCLUSION(S): The comparative validity of hip-mounted uni-axial and tri-axial accelerometers for assessing PA and EE is similar. High physical activity in the Kenyan cohort was associated with much higher levels of energy expenditure than observed in western societies.

FUND SOURCING: This work was done as part of the IDEFICS Study and is published on behalf of its European Consortium (www.idefics.eu). We gratefully acknowledge the financial support of the European Community within the Sixth RTD Framework Programme. Contract No. 016181 (FOOD).

S20.4 How can we help people to develop lean and healthy bodies? A new perspective
Gutin B

PURPOSE: This presentation proffers a developmental theory, which is based on recent epidemiologic research and a new line of research dealing with differentiation of immature stem cells into mature tissues. This theory posits that the mechanical stimulation provided by vigorous physical activity causes immature stem cells to differentiate into lean tissue cells rather than into fat cells.

METHOD: Literature review and analysis of how dietary energy intake and physical activity (PA) influence development of body composition (i.e., relative amounts of fat and lean mass) in youths.

RESULT(S): Descriptive studies do not support the theory that high levels of body fatness result from a positive energy balance - i.e., relatively low total energy expenditure or high energy intake. However, vigorous PA is associated with lower body fatness. Moreover, intervention studies that focus on adequate doses of vigorous PA, without any emphasis on restriction of energy intake, produce beneficial changes in body composition.

CONCLUSION(S): The theory that excessive fatness develops as a result of positive energy balance needs to be reconsidered. An alternative theory is that vigorous PA stimulates immature stem cells to differentiate into lean tissue cells rather than into fat cells, without influencing total energy expenditure or intake. If this new theory is confirmed by future research, it implies that public health strategies and interventions that involve adequate doses of vigorous PA may be especially effective in promoting development of healthy bodies in growing youths.

FUND SOURCING: This theoretical analysis was not supported by any funding. The research of Dr. Gutin’s group at the Medical College of Georgia was supported by the National Institutes of Health of the USA.
S21 The dark side of motivation: antecedents and consequences of need thwarting in physical education?!

Chair: De Meyer Jotie
Education, Health & Social Work, University College Ghent, Ghent, Belgium
Discussant: Teixeira Pedro J
Physical Activity, Nutrition, and Obesity Research Group, Faculty of Human Kinetics, Technical University of Lisbon, Lisbon, Portugal

PURPOSE: According to Self-Determination Theory (SDT) (Deci & Ryan, 2000) thwarting of the three psychological needs (autonomy e.g. when being pressured or criticized, competence e.g. when acting in chaos, and relatedness e.g. when having cold interaction) is assumed to result in psychologically suffering, which in turn can cause dysfunctional health risk behaviors such as unhealthy eating, drinking and smoking. In the present symposium we focus on antecedents and consequences of teachers’ need thwarting teaching behaviours in the context of physical education. Consequences of need thwarting for the pupils (e.g. motivation) and for the teachers (e.g. teachers’ health) are investigated.

RATIONALE: The crucial role of motivational impact on behavioural changes (e.g. being more physical active) is well studied in Physical Education (PE) context. The undermining role of need thwarting on motivation is less studied in this field. Need thwarting behavior is important as it can lead to more negative outcomes both on pupil and teacher level.

OBJECTIVE(S): Discuss the negative consequences of teachers engaging in need thwarting in relation to important health-related outcomes. Discuss the implications of need thwarting for the field of physical activity and health promotion more broadly. Bring together researchers in motivational psychology to critically discuss the negative effects of engagement in need thwarting behaviors.

SUMMARY: All three presentations focus on teachers’ engagement in need thwarting teaching behavior. The first presentation (J. De Meyer & I. Tallir) focuses on consequences of controlled teaching behavior on pupils’ level in terms of pupils’ motivation. Further, the mediating role of perceived controlled teaching behaviour is investigated. In the second presentation (L. Van den Berghe) antecedents of need thwarting teaching behaviours will be presented. More specifically, the relationship between PE teachers’ general motivational orientation and observed teaching behavior is explored. The third presentation (R. Cuevas) focuses on consequences of need thwarting at the teacher level. More specifically, the interplay among job pressure, need thwarting, burnout and somatic complaints. Starting from an SDT perspective each presenter in this symposium provides evidence for the importance of need thwarting in PE. All results will be presented in light of their implications on physical activity and health promotion more broadly.
S21.1 How does controlled teaching behavior relate to pupils’ motivation in physical education?

PURPOSE: Self-determination Theory (SDT; Deci & Ryan, 2000) theoretically conceptualizes how the social context can actively thwart people’s needs so that less optimal forms of motivation are more likely to emerge. The purpose of the present study was to investigate need-thwarting dynamics in relation to pupils’ motivation in the context of physical education (PE).

METHOD: A sample of 702 pupils (out of 56 different classes) and their PE teachers participated in the study. Pupils’ perceptions of need thwarting were measured by the Psychologically Controlling Teaching (PCT) (Soenens et al., 2012) added by two items from the Teacher as Social Context Questionnaire (TASC; Belmont et al., 1988). The Behavioral Regulations in Physical Education Questionnaire (BRPEQ) (Aelterman et al., 2012) was employed to measure pupils’ motivation. Video-images of the 56 PE-lessons were coded every five minutes for 16 teaching behaviors tapping into different dimensions of need-thwarting behaviors.

RESULT(S): Observed controlled teaching behavior was not related to autonomous motivation and amotivation, while a positive relationship with controlled motivation (p<0.05) was found. Mediation analyses revealed that the relationships between observed controlled teaching behavior and controlled motivation (69.4% mediated, p<0.05) was significantly mediated by perceived need thwarting.

CONCLUSION(S): In conclusion, when teachers engage in controlled behaviors, pupils also notice this, which results in less optimal forms of motivation for PE. Since these form of motivations are known to induce negative outcomes such as less engagement, it is recommended for teachers to avoid controlled behavior.

S21.2 Observed need support and need-thwarting in physical education: do teachers’ general causality orientations matter?

PURPOSE: It is important to study the antecedents of teaching behavior in physical education (PE), because it relates to student outcomes, such as student motivation for PE (Koka & Hagger, 2010; Tessier et al., 2010), engagement in PE (Skinner & Belmont, 1993; Tessier et al., 2010), and intentions to be physically active outside school (Lim & Wang, 2009). This study explores the relationship between PE teachers’ general motivational orientation (i.e., their causality orientations) and observed teaching behavior.

METHOD: Teaching behavior is examined from a Self-Determination Theory (SDT, Deci & Ryan, 2000; 2002) perspective, using a validated and reliable observation tool to code four
need-supportive facets in 79 classes. Further, and exploratory factor analysis was conducted for three need-thwarting facets, which then were also used for further analyses.

RESULT(S): After controlling for various background variables, a controlled orientation related negatively to overall need-supportive teaching ($\beta = -.35$, $p<.01$) and to structure during the activity in particular ($\beta = -.42$, $p<.001$). A controlled orientation was also positively related to need-thwarting teaching ($\beta = .42$, $p<.001$) and to controlling teaching ($\beta = .35$, $p<.01$) and cold teaching ($\beta = .40$, $p<.01$) in particular. Although an autonomy orientation tended to yield the opposite pattern of correlates, these associations were non-significant.

CONCLUSION(S): The results suggest that interventions to teach teachers how to be more need-supportive may target teachers with a controlled orientation because they are least likely to teach in a need-supportive way and are most likely to engage in need-thwarting practices.

S21.3  Job pressure, psychological need thwarting, burnout and illness in physical education teachers
Cuevas R, Bartholomew K, Ntoumanis N, Lonsdale C

PURPOSE: Drawing from self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2002), the current study examined the interplay among physical education teachers’ perceptions of job pressure, psychological need thwarting, burnout and somatic complaints.

METHOD: Teachers ($N = 364$) completed an online survey tapping the aforementioned variables. Structural equation modeling analyses supported a latent factor structural model in which autonomy, competence, and relatedness need thwarting were predicted by teachers’ perceptions of job pressure.

RESULT(S): In turn, the thwarting of each psychological need was positively associated with burnout; the thwarting of the need for competence also predicted somatic complaints. Moreover, mediation analyses supported the explanatory role of need thwarting in the relationships between job pressure and these two ill-health-related outcomes.

CONCLUSION(S): The current findings point to the understudied construct of psychological need thwarting as a promising underlying mechanism for explaining the negative health-related outcomes experienced by teachers in their work environments. From an applied perspective, the results indicate that targeting school procedures and management practices that thwart teachers’ psychological needs might be instrumental in reducing levels of ill-being amongst teachers.
S22  Moderators of environmental influences on youngster’s energy balance-related behaviours

Chair: Gubbels Jessica S  
*Department of Health Promotion, School for Nutrition, Toxicology and Metabolism (NUTRIM), Maastricht University, Maastricht, the Netherlands*

Discussant: Kremers Stef PJ  
*Department of Health Promotion, School for Nutrition, Toxicology and Metabolism (NUTRIM), Maastricht University, Maastricht, the Netherlands*

PURPOSE: The current symposium discusses various moderators of several environmental influences on youngster’s diet and/or physical activity. Existing research mainly focuses on direct effects of the environment on behavior, without acknowledging contextual factors.

RATIONALE: Several authors have called for research examining moderators of environmental influences on energy balance-related behavior. An example of such a moderator is gender, which is known to moderate the effect of various environmental factors on behaviors. The urgency of research into moderators of environmental influences is stressed by the fact that effects of existing overweight prevention interventions focusing on single determinants may be limited by the moderating influences of additional factors not taken into account.

OBJECTIVE(S): The session will provide an overview of possible moderators of environmental influences in children, examining a range of various energy balance-related behaviors, settings, environmental types and ages.

SUMMARY: The symposium addresses several ages throughout childhood, ranging from infancy to pre-adolescence. The influence of various environmental settings (child-care, home, school) and types (physical, social) on energy balance-related behavior will be examined, in the light of various moderators (child characteristics as well as contextual factors). Jessica Gubbels will present a literature review, examining the child-care environment, looking for moderation by child characteristics and other environmental settings, as well as for interaction between various types of environment, in influencing young children’s (0-5 years old) energy balance-related behavior (diet and physical activity). Ester Sleddens will present data from the Dutch KOALA Birth Cohort Study, examining the moderating effects of general parenting and child characteristics on the influence of parenting practices on 6 to 8-year-old children’s eating patterns. Mona Bjelland will present findings from the UP4FUN study from 5 different counties (Belgium, Germany, Greece, Hungary and Norway), on the moderating role of gender in the relationship between parental regulation of screen time and actual screen time in 11-year-olds. Natalie Pearson will present findings regarding home environment and peer influences on fruit, vegetable and snack consumption of a community-based sample of 1638 Australian adolescents (12-15 years).
A review of moderators of childcare environment influences on children’s diet and physical activity: applying an ecological perspective
Gubbels JS, Van Kann DHH, De Vries NK, Thijs C

PURPOSE: An ecological view on environmental influences on behavior was adopted to examine the interactive impact of several ecological systems on children’s energy balance-related behaviors (EBRBs, i.e. dietary intake and physical activity) at childcare. The ecological view was operationalized into three types of interaction: 1) between types of childcare environment (physical, social, political, economic); 2) between micro-systems (the childcare and home environment) in meso-systems; and 3) between childcare environment and child characteristics.

METHOD: A systematic review of the literature was conducted. Databases PubMed, PsycInfo and Medline were searched, resulting in 3752 unique citations. To be included, studies had to regard the pre-school age, examine the association between environmental factors and EBRBs at childcare, and include an examination of one of the types of interaction described above. Two independent researchers performed the selection. Three additional papers were included based on reference tracking. Five studies complied with the inclusion criteria.

RESULT(S): Several studies support the hypothesis that the childcare environment interacts with child characteristics in determining children’s EBRBs, but only one study examined interaction between environmental types, and no studies were found examining interaction between the home and childcare environment.

CONCLUSION(S): Empirical studies supporting an ecological view on diet and physical activity at childcare are scarce. Qualitative studies and general child development research provide some insights, but in the present paper we would like to advocate quantitative research adopting an ecological perspective at environmental influences on child behavior, which is both needed and justified.

FUND SOURCING: NUTRIM School for Nutrition, Toxicology and Metabolism and the Faculty of Health, Medicine and Life Sciences, Maastricht University.

Interplay between general parenting, food-specific parenting and child eating patterns: The KOALA Birth Cohort Study
Sleddens EFC, Kremers SPJ, Stafleu A, Dagnelie PC, De Vries NK, Thijs C

PURPOSE: Research on parenting practices has focused on individual behaviors while largely failing to consider the larger context of their use. Additionally, there is evidence that child temperament interacts with parenting practices in predicting health behaviors. The current study is unique in its attempt to unravel the mechanisms through which both global dimensions of parenting and child temperament shape children’s eating patterns applying a longitudinal study design. First, we examined the extent to which food parental practices...
prospectively predict the development of children’s eating behavior. Second, we tested the moderating role of both general parenting and child temperament on the relationship between parental food practices and children’s eating behavior.

METHOD: Data were collected from a large sample of participants (about 1650) at different ages (6-9 years) from the KOALA Birth Cohort Study, the Netherlands. Parents completed questionnaires regarding their general parenting, food parenting practices, their child’s temperament, and eating behaviors. Linear regression models were fitted to assess the interplay between these variables.

RESULT(S): Controlling food parenting practices were negatively associated with unhealthy eating behaviors, and positively associated with healthy eating behaviors. Positive associations with unhealthy eating behaviors were found for pressure to eat. The final findings, including results from the moderation analyses, will be discussed during the symposium.

CONCLUSION(S): The proposed research offers important advancements to the scientific understanding of the parenting-child weight relationship, enhancing the development of more effective family-based interventions to prevent or reduce childhood obesity.

FUND SOURCING: Netherlands Heart Foundation, grant number 2008B112

**S22.3 Consistency in child and parent reported parental style of regulation of screen time and gender as a moderator in associations between parental style of regulation and schoolchildren’s screen time**

Bjelland M, Soenens B, Bere E, Lien N, Maes L, Manios Y, Moschonis G, te Velde SJ

PURPOSE: Several studies report an association between parental rules and screen time in pre-adolescents. Furthermore, autonomy-supportive (versus controlling) parenting is positively associated with children’s academic competence and social adjustments. The aim of this study was to apply the distinction between a controlling and autonomy-supportive parenting style in the domain of parental regulation of screen time in 10-12 year olds across Europe, and to explore the cross-sectional consistency between parent and child reported parental style of regulation for both watching TV/DVD and using computer/games console.

METHOD: In the UP4FUN study, a convenience sample of schools was recruited in Belgium, Germany, Greece, Hungary and Norway. There were 5117 eligible children at the 62 schools. A total of 3325 children and 3038 parents (81% mothers) completed the questionnaires. For preliminary analyses multiple linear regressions were used.

RESULT(S): The exact agreement between parent and child reported parental style of regulation for a controlling style (both TV/DVD and computer/games console) were approximately 41/42%, and 68/66% for a supportive style. Kappa values were low (0.04-
There was an association between a supportive parental style and less time used in front of TV/DVD for the total sample. An association was found between a controlling style and more time used for computer/games console. Gender moderated the associations.

CONCLUSION(S): The results from this study indicate that parental style of regulation is associated with time used for watching TV/DVD and using computer/games console. Teaching parents a supportive parental style may improve their skills in regulation of screen time.

FUND SOURCING: Seventh Framework Programme (CORDIS FP7) of the European Commission

**S22.4** Associations between family circumstance, change in home environmental and peer influences and change in dietary behaviours among adolescents
Pearson N, Crawford D, Ball K

PURPOSE: To examine associations between family circumstance, change in home environmental and peer influences and change in adolescent dietary behaviours.

METHOD: A community-based sample of 1638 Australian adolescents aged 12-15 years completed a web-based survey at baseline (2004/2005) and again two-years later, assessing their fruit (F), vegetable (V), and energy-dense (ED) snack food consumption, and home environmental (e.g. home availability of foods, parental modelling and support for healthy eating) and peer influences (e.g. modelling and support for healthy eating). Parents completed a survey at baseline assessing indicators of family circumstance (e.g. marital status, education and employment).

RESULT(S): A decline was observed in all home environmental and peer variables apart from friend support for healthy eating, which increased slightly over the two-year period. Frequency of consumption of V and ED snacks declined, whereas F consumption showed a slight increase. Main effects were seen for most of the home and peer variables for dietary behaviours (e.g. an increase in best friend modelling of healthy eating was positively associated with change in F consumption). ANCOVA revealed few significant interactions between home environmental or peer factors and family circumstance for the dietary behaviours. For example, adolescents from single parent families who reported an increase in home availability of FV showed a greater increase in F consumption compared to adolescents from dual parent families.

CONCLUSION(S): Positive change in home environmental and peer influences appear to be important for positive change in dietary intake of adolescents. In most cases, these associations transcended family circumstance.
S23. The classification of laws associated with school students (C.L.A.S.S.): evaluation tools and multi-level analyses linking policy with outcomes

Chair: Perna Frank
Health Promotion Research Branch, National Cancer Institute, United States

This symposium was identified by ISBNPA's Advocacy and Policy committee as a highlighted symposia reflecting the Advocacy and Policy interests of ISBNPA

PURPOSE: This symposium presents the rationale for a school wellness policy approach to promote healthy lifestyle and address child obesity; demonstrates a publically available web-resource (C.L.A.S.S., See http://class.cancer.gov/index.aspx) for analyzing school nutrition and physical education (PE) laws in the U.S., and presents system updates and examples of analyses assessing change over time and linkages of C.L.A.S.S. data with school and individual outcomes in national datasets.

RATIONALE: A school policy approach to combat childhood obesity has been advocated since individually targeted interventions may have limited population reach and efficacy when the school environment minimally supports healthy lifestyle. However, there is great variety in the strength of laws across states and grade levels, and strength of state law, in turn, may influence school practices and individual behavior. C.L.A.S.S. is reliable scoring system to evaluate the strength of codified law in relation to national standards for school nutrition and PE that has been used to assess differences across states, track and visualize changes in laws over time, and determine associations of policy strength with school and individual outcomes.

OBJECTIVE(S): 1) Increase understanding of the science basis and opportunities and challenges for a school policy approach to address healthy lifestyle and address child obesity. 2) Increase understanding of the C.L.A.S.S. scoring criteria and use of data visualization tools for use by researchers and stakeholders. 3) Increase understanding of how C.L.A.S.S. data may be linked with other national data to test associations of PE and nutrition laws with school practices and student outcomes.

SUMMARY: This symposium overviews the science basis and demonstration of C.L.A.S.S. as a resources for researchers and public health officials in and outside of the U.S.

S23.1 Public policy strategies for improving school physical activity and nutrition environments
Chriqui JF

PURPOSE: This presentation will review the legal and policy strategies that can be taken by governments and school districts to improve school nutrition and physical activity
environments and how developing systems for “measuring” such laws and policies are critical to understanding their impact.

METHOD: A review of the public health, policy sciences, and political science literature was conducted to identify the legal and policy strategies for improving school physical and nutrition environments; related existing state laws and school district policies; and the literature related to approaches to measuring/evaluating school-based physical activity and nutrition-related laws for use in studies seeking to assess the impact of such laws/policies on school environments and student outcomes.

RESULT(S): In the U.S., school-based physical activity and nutrition-related public policies (including legislative and regulatory laws and policies) have emanated at the state and school district levels. Most state laws and district policies focus primarily on physical education and competitive food issues although other issues also are addressed, albeit weakly. District policies tend to be stronger in states with strong laws. Methods for evaluating the strength and comprehensiveness of state laws and district policies range from simple dichotomous measures to extensive, science-based ordinal policy analysis coding schemes.

CONCLUSION(S): School-related laws and policies in this area are emerging and, in some cases, are relatively weak. Concerted efforts are needed to ensure that scientifically-based methods for collecting and evaluating the strength and comprehensiveness of these laws/policies to enable scientific assessment of their impact on school environments and student outcomes.

FUND SOURCING: partial support for this study was provided by contracts HHSN261201000350P and HHSN261201100522P from the National Cancer Institute to the University of Illinois at Chicago (PI: Jamie Chriqui).

S23.2 Description and demonstration of C.L.A.S.S. data visualization tools for state school nutrition and physical education policy research
Agurs-Collins T, Perna F

PURPOSE: State-level school nutrition and physical education (PE) policies are a potential mechanism to curb childhood obesity and promote healthy lifestyle. C.L.A.S.S. (Classification of Laws Associated with School Students) is a scoring system that monitors and evaluates state-level school nutrition policies and PE policies that have been codified into law. Policies are defined to include both statutory laws as enacted by the state legislatures and administrative laws promulgated by state administrative agencies. This presentation will: 1) Describe the C.L.A.S.S. policy areas, scoring, available resources, and procedures for downloading data for research on the site (http://class.cancer.gov/index.aspx); 2) Demonstrate the use of C.L.A.S.S. policy mapping and state profile tools to generate national maps, state profile reports; 3) Introduce new policy areas added in 2012.
METHOD: State laws were coded between 2003-2010 following an empirical coding system that can be used to assess changes in state laws over time or allow easy linkages with other data sources. Scores are based on national standards for physical education and nutrition. National maps comparing policy scores across states for each physical education and nutrition policy topic will be presented.

RESULT(S): The results of this project will demonstrate the utility of using C.L.A.S.S. data to better understand and evaluate physical education and nutrition policies across and within US states.

CONCLUSION(S): We will discuss ways in which the available data can enhance and promote context and public health policy research and practice.

FUND SOURCING: National Cancer Institute

S23.3 Change in physical education law and updates to the classification of laws associated with school students (C.L.A.S.S.)

Perna F, Agurs-Collins T, Oh A

PURPOSE: Strong physical education (PE) law has been associated with significantly more PE-time in schools, but strength of state PE law has varied. In 2007, The National Cancer Institute (NCI) developed the C.L.A.S.S. to gauge the strength of state PE law relative to national standards. However, recent School Health Guidelines have also recommended additional PE practices and policy complimentary to PE that traditionally has not been tracked. We assessed change (2003 – 2010) in codified law affecting four traditional domains of PE and present reliability data and change in four new PE policy domains added to C.L.A.S.S.

METHOD: Kappa coefficients, derived from expert raters, determined reliability of new C.L.A.S.S. policy domains (Moderate/Vigorous Physical Activity, Overall PA, PE Proficiency Requirements, and Joint-Use Agreements of PA facilities). Descriptive statistics were calculated, and nonparametric tests and generalized estimating procedures examined change over time in scores of the four traditional PE policy areas (Time, Staffing, Curriculum, and Fitness-Assessment) over time and the four new policy domains.

RESULT(S): Percent of rater agreement was over 85% for all new scales across grade levels and Kappa reliability coefficients were strong (> .80). In general, strength of law significantly, increased from 2003-2010 in several traditional PE policy domains, whereas there was minimal change in newer policy areas.

CONCLUSION(S): Small but significant changes have occurred in codified law governing traditional PE policy domains and reliable scales exist to measure new PE policy areas.

FUND SOURCING: National Cancer Institute
S23.4  Timing is everything: how the immediate effects of competitive food laws are limited to schools in high-income areas
Taber DR, Chriqui JF, Perna F, Powell LM, Chaloupka F

PURPOSE: Strong competitive foods –state laws are associated with improved school food environment and weight change. School nutrition laws could be negated in poorer areas, however, due to disadvantages in the local food environment. We determined if competitive food laws appear less effective in low-income areas.

METHOD: Based on Classification of Laws Associated with School Students (2003-2006) criteria, states requiring specific standards for competitive foods were classified as having strong laws. BMI and several measures of school food access and in-school purchasing behaviors were obtained from 3230 students progressing from 5th to 8th grade in the Early Childhood Longitudinal Study-Kindergarten Class. General linear models estimated the association between 2003 laws and 5th grade access/purchasing. Fixed-effect models estimated differences in changes in access, purchasing, and BMI from 5th to 8th grade between states with consistently strong laws, states enacting new strong laws, versus those with no laws in 2003-2006.

RESULT(S): In low-income areas, consistently strong laws were associated with smaller increases in purchases of sweets and snacks from 5th to 8th grade. New strong laws were associated with smaller increases in access to sweets and snacks only in moderate/high-income areas. Students in all areas experienced less mean BMI increase if exposed to strong, consistent laws, but new strong laws were associated with lower BMI change only in high-income areas.

CONCLUSION(S): Schools in lower-income areas may experience less immediate benefit of strong competitive food laws. Given time, however, the association between laws and students’ in-school purchasing behaviors was strongest in low-income areas.

FUND SOURCING: National Cancer Institute
S24 Walking in rhythm: using the power of music to promote health-enhancing walking

Chair: Rowe David A
Physical Activity for Health Research Group, University of Strathclyde, Glasgow, United Kingdom

PURPOSE: This symposium will a) present the theoretical and empirical background to the use of music during physical activity interventions and walking in particular, b) summarise empirical evidence for the science underlying walking intensity and responses to walking while listening to music, and c) present an ongoing intervention that has implemented these principles in a walking behaviour change programme with a clinical population.

RATIONALE: Most walking interventions have focussed on volume-oriented targets (increasing total daily steps) and other than general instructions have not monitored or regulated walking intensity. Current guidelines emphasize the importance of physical activity intensity to the improvement and maintenance of health. Due to the growth in personal mobile devices such as MP3 players and mobile phones, the ability to listen to music while walking is available to most sections of the population. Music has been shown to enhance physiological and psychological responses while engaging in physical activity, but most of the evidence has been cross-sectional and not explicitly associated with behaviour change. The potential for using music in behaviour change programmes has therefore not been addressed extensively at present. The symposium presenters will address the various gaps in knowledge, and present data that provide insight into the use of these principles in walking behaviour change interventions.

OBJECTIVE(S): 1. To generate discussion of the potential for combining music and mobile technology in order to promote health-enhancing behaviour change 2. To present data demonstrating the scientific underpinnings of using music to influence walking intensity 3. To present information on the feasibility and compliance associated with using these principles in real-world settings

SUMMARY: The first speaker will review existing theory and empirical evidence of the benefits of using music during physical activity, and people’s responses to the deliberate use of music to regulate walking intensity during walking in real-life settings. The next speaker will present recent evidence supporting the link between cadence and walking intensity, and typical responses to music prompts under controlled conditions. The third speaker will then present preliminary findings of an ongoing intervention that implements these principles, focussing on feasibility and compliance.
S24.1  
**Listen while you walk – exploring the relationship between music and walking**  
Hewitt A, Rowe DA, Sutherland R

**PURPOSE:** To review the ergogenic and psychophysical effects of listening to music during physical activity, to relate this to the potential use of music to regulate walking intensity and duration, and to present evidence of the effect on walking intensity of varying music tempo during overground walking.

**METHOD:** Participants completed two walking trials in a public park while listening to music from a mobile music player. In each trial the participant listened to a continuous music programme containing sections at a slow, medium and fast tempo. In the first trial participants were given no instruction to match their walking cadence to the tempo of the music. In the second trial, they were instructed to walk in time to the music. Per-minute stride rate was measured using accelerometer data from the mobile music player.

**RESULT(S):** In the no-instruction condition participants did not adjust their stride rate to match the tempo of the music. Where an instruction was given, participants did attempt to adjust stride rate in line with the music tempo but failed to match the tempo of the slow and fast music.

**CONCLUSION(S):** There is considerable evidence that listening to music can have positive ergogenic and psychophysical effects on walking. However, in the absence of an explicit instruction, walkers do not attempt to match their stride rate to the tempo of a music track. Interventions relying on manipulating the tempo of music to influence walking intensity should use explicit instructions and cannot assume that changes in music tempo will produce changes in walking intensity.

S24.2  
**Walking intensity and cadence – The evidence for regulating walking**  
Rowe DA, Hewitt A, Sutherland R

**PURPOSE:** To present evidence of a) the science linking walking cadence and intensity, b) habitual walking intensity and c) responses to constant-tempo music across a variety of populations.

**METHOD:** Several populations walked on the treadmill and overground, at various speeds and bout lengths. Walking intensity was determined by measuring oxygen consumption, and cadence (steps/minute) was measured using a manual hand-tally counter and accelerometry (Actigraph, Inc., Pensacola, FL). Overground walking cadence was determined during self-selected walking following instructions to walk at a “slow”, “medium”, “fast” and “brisk” pace. Cadence was also measured while listening to an auditory cue (either metronome or music) at a range of constant tempos (beats/minute).

**RESULT(S):** Overall, moderate intensity walking corresponded to approximately 100
steps/min. However, this varied considerably as a function of age and height. Walking intensity could be estimated accurately from walking cadence, height and/or age. Regardless of the instructions provided, participants walked at cadences that were above moderate intensity. Across all samples, participants were generally able to match their cadence to the tempo of the auditory cue, within ± 3 steps/minute.

CONCLUSION(S): The scientific evidence supports the use of walking cadence as an accurate indicator of walking intensity. People varying in age, gender, height, current physical activity status and clinical status are capable of matching their walking cadence to a constant tempo auditory stimulus. This provides convincing evidence of the potential for monitoring and regulating appropriate intensity walking during interventions, using music and ubiquitous technologies such as MP3 players and smart phones.

S24.3 Using technology and music in a walking intervention for overweight adults with intermediate hyperglycaemia
Faulkner MA, Murphy MH, McNeilly A, Davison G, Hewitt A

PURPOSE: Current public health guidelines recommend moderate intensity exercise for health benefits however regulating exercise intensity in a free-living environment remains problematic. Research has shown auditory prompts e.g. a metronome, can help people to regulate exercise intensity. However this stimulus may become tiresome if used long term. This study aims to use self-selected music at predetermined tempo to regulate walking cadence over nine months in overweight adults with intermediate hyperglycaemia (IHG).

METHOD: Music tracks with a tempo corresponding to height-specific stride rate guidelines (Rowe et al., 2011) were individually assigned to each participant. Playlists were created for each walking bout and preloaded onto an app on an MP3 device. Participants were asked to match their cadence to the beat of the music during free-living walking. Walking completed during each playlist was recorded via an inbuilt accelerometer.

RESULT(S): A nine month walking programme was designed to elicit at least 30 minutes moderate intensity exercise on at least five days per week. Music programmes progressed from 3-5 METS during the intervention. Walking duration ranged from bouts of 10 minutes (three per day) to at least 30 minutes on at least five days per week.

CONCLUSION(S): Music may be effective as an auditory cue to help overweight adults with IHG achieve moderate intensity physical activity and thereby meet current guidelines. Using self-selected music with the appropriate tempo may elicit moderate intensity exercise in a free-living environment over a prolonged period of time and may be a useful tool to ensure exercise intensity in physical activity interventions.
Always in touch: physical activity promotion via social media and modern technology

Chair: te Velde Sakia J  
*EMGO Institute for Health and Care Research and Department of Epidemiology and Biostatistics, VU University Medical Center, Amsterdam, the Netherlands*

Discussant: Marshall Simon J  
*Center for Wireless and Population Health Systems, Department of Family and Preventive Medicine, University of California San Diego, La Jolla, California, United States*

PURPOSE: The purpose is to present and discuss findings from recent and innovative studies using modern technology and social media to promote physical activity (PA) that can be integrated in future interventions.

RATIONALE: The use of mobile internet and smart phones is growing rapidly. Beside the basic features smart phones support third party applications, sensing, internet access and wireless connectivity. Because of the potential of apps to be personalized and to offer tailored support, linking importantly to insights from goal setting, feedback, and social influence theory, they are promising tool in promoting PA, but little is known about the effectiveness. The (mobile) internet provides possibilities to connect with a large social network via social network sites (SNS) like Facebook or twitter. Although the importance of social influences, including support, modeling and norms, has already been established, the role of social support via SNS needs to be explored. This symposium will present research using smart phones, apps or social media to promote PA.

OBJECTIVE(S): 1) To present examples of how to use modern technology to promote PA. 2) To discuss how we can translate these findings into new improved or new intervention strategies promoting PA. 3) To get an overview of the state of the art of using social media in PA promotion.

SUMMARY: During the symposium five presenters from Europe, Hong Kong, Australia and the US will share their findings followed by a discussion. The first speaker will present findings from a systematic review on the theory base of existing PA promoting apps. The second speaker will present experiences on development of a PA promoting app. The third presentation will deal with data collection and data handling from PA promotion apps. The fourth speaker will provide information on how to use Facebook in PA promotion interventions. Finally the chair will lead the discussion on how these findings should be interpreted and translated in future intervention strategies.
S25.1  The personal App-coach: Are physical activity apps theory-based? – A systematic review
Middelweerd A, Mollee JS, Van der Wal NC, Klein MCA, Treur J, Brug J, te Velde SJ

PURPOSE: The purpose is to review apps available in iTunes and Google Play on the use of behavior and behavior change theory.

METHOD: We identified relevant apps through systematic search in iTunes and Android Market. Search terms were based on Boolean logic and included AND combinations for physical activity, healthy lifestyle, exercise, fitness, coach, assistant, motivation, coach and support. Inclusion criteria were that an app (i) had to be in English or Dutch, (ii) promote PA, (iii) the target group had to be healthy people, (iv) aged between 18-64 years, (v) respect the guidelines of PA and (vi) had to give tailored feedback. Apps only giving feedback by showing logged statistics are excluded of this study. No standardized evaluation tool for apps existed. A new evaluation tool was developed based on previous research to explore how theory based apps are.

RESULT(S): Results will be ready in December 2012. Based on the results of similar studies, lack of use of behavior change theories is expected.

CONCLUSION(S): The offer of apps that promote physical activity are enormous, but it seems that they are not based on behavior change theories. The background of apps developers is not clear and no standardized taxonomy has been developed yet. Therefore, identifying effective techniques and comparing results was difficult.

FUND SOURCING: This research is supported by Philips and Technology Foundation STW, Nationaal Initiatief Hersenen en Cognitie NIHC under the Partnership programme Healthy Lifestyle Solutions.

S25.2  Development and delivery of a mobile application for the promotion of physical activity in young adults
Hebden L, Cook A, van der Ploeg HHP, Allman-Farinelli M

PURPOSE: To articulate the process of developing a smartphone application (app) for physical activity behaviour change, describe its delivery as part of a multi-component intervention trial aimed at weight management in young adults, and identify the issues for researchers to consider in these development and delivery processes.

METHOD: Development required decisions about the behaviour change strategies, relevant guidelines, graphic design, potential data collection, platform and programming design. The physical activity mobile app will be trialled as part of a multi-component intervention (TXT2BFIT), which includes three other mobile apps, text messages, emails, electronic resources, and regular phone counselling.
RESULT(S): It took 18 months to develop four apps, three for dietary behaviours and one for physical activity behaviour. Development of the physical activity app involved the fields of marketing, physical activity and information technology. Qualitative feedback revealed the slow running speed (due to a reliance on internet connection), and requirement to login, were issues for young adults. The developed apps are web-based and will be delivered online via a custom designed website to young adults participating in the TXT2BFiT trial. Process evaluation will include the number of logins to each app during the study.

CONCLUSION(S): Smartphone apps are a novel technology to facilitate behaviour change, but alone are unlikely to provide sufficient intervention for changing physical activity behaviour. This method of intervention delivery is likely to become necessary for reaching generations accustomed to communicating with mobile technologies, and as such, presents a challenge for researchers working with younger generations.

FUND SOURCING: Funding to conduct the TXT2BFiT research trial was received from the HCF Health and Medical Research Foundation (Reference No. MAUsyd1008201111). This grant is provided by HCF, a leading private health insurance company in Australia, and is listed on the Australian Competitive Research Grants Register.

S25.3 Mobile technologies and physical activity behaviour: An example of what you can do with your accelerometry and GPS data
Cerin E

PURPOSE: The ability of mobile technologies to continuously collect a large amount of objective data on physical activity (PA) and their correlates can assist the identification of potential determinants of PA behaviour. However, modelling such data, with multiple sources of dependency, can be challenging.

METHOD: Objective data on PA and locations were collected on a sample of 95 preschoolers using accelerometers and Global Positioning System (GPS) monitors. Caregivers kept a diary of their child’s locations. Data were collected at 15-second epochs for seven consecutive days (over 10,000 data points/person). Accelerometer counts/15s represented the outcome variable, while type of location (e.g., home; kindergarten; indoor play/recreational places; outdoor play/recreational places) represented the explanatory variable. Day of the week (weekend vs. weekday) and time of the day (hours from 6am to 10pm) were treated as moderators. Multilevel linear models with four levels of variation (neighbourhood, person, day and event) and a first-order autoregressive process were used to examine the associations of types of locations and objectively-measured PA.

RESULT(S): On average, outdoor play/recreational places were associated with the highest PA levels. Large inter-individual differences in PA levels were found for two locations: ‘home’ and ‘kindergarten’. Day of the week and time of the day were significant moderators of the associations between type of location and PA.

CONCLUSION(S): To fully exploit the large amount of data made available by mobile
technologies, appropriate analytical approaches that do not require data aggregation need to be applied. Multilevel linear models are one of the extant suitable options.

FUND SOURCING: Seed funding programme for basic research (HKU) # 201001159011.

S25.4 Design considerations in the use of online social networks for physical activity promotion
Cavallo DN, Valle CG

PURPOSE: Online social networks (OSNs) (e.g. Facebook) are used worldwide and have features including the ability to articulate personal networks; create affinity groups; and collect, aggregate, and share participant data that could facilitate their use as physical activity (PA) promotion platforms. Very few studies have been published that describe interventions using OSNs, providing little guidance about how to conduct them. This presentation will describe key issues in the design of PA interventions using OSNs.

METHOD: We use formative and process data from the Internet Support for Healthy Associations Supporting Exercise (INSHAPE) study, a randomized controlled trial of an intervention to promote PA in college-aged women. Qualitative data from structured interviews (n =24) and investigator experiences are compared and contrasted with quantitative data from online questionnaires (n = 120) and objective Facebook use to outline issues in the design and implementation of Facebook PA interventions.

RESULT(S): Key design issues related to using OSNs for PA promotion include: (1) choosing OSN type and mode of intervention delivery; (2) using existing social relationships vs. developing relationships; (3) IRB considerations; (4) data collection and communication strategies; (5) measures of engagement and adherence; and (6) the challenges of using rapidly evolving technology in research. Lessons learned and implications for developing future OSN interventions will be presented.

CONCLUSION(S): The few existing studies targeting PA using OSNs have not demonstrated efficacy. Future investigators need to learn from these studies to develop better designs that can capitalize on the considerable features and reach of OSNs for PA promotion.

FUND SOURCING: Research support from Lineberger Comprehensive Cancer Center Cancer Control Education Program, Predoctoral Fellowship, UNC (5R25-CA057726) and by a grant from NIH (DK056350) to the University of North Carolina Nutrition Obesity Research Center. Travel support from the UCLA Center for Cancer Prevention and Control Research Postdoctoral Training Program (R25-CA 87949)
S26 Environmental interventions and physical activity: insights into the magnitude and mechanisms of behaviour change

Chair: Ogilvie David  
*MRC Epidemiology Unit, Centre for Diet and Activity Research, Institute of Public Health, Cambridge, United Kingdom*

**PURPOSE:** To present and discuss emerging results and methodological implications of a group of studies investigating whether, how and why interventions to change the built environment might promote physical activity behaviour change.

**RATIONALE:** While the built environmental correlates of physical activity have been extensively studied, there are few longitudinal studies of the environmental predictors of behaviour change or quasi-experimental studies of the effects of interventions to change the environment. Generating evidence to support robust causal inference in this area is likely to involve using a combination of research methods to characterise and quantify changes in target behaviours, assess their relationships with changes in environmental exposures and putative mediating pathways, and understand how environmental changes are implemented and experienced. Building on a previous symposium at ICPAPH 2010 and the ISBNPA satellite meeting in Perth in 2011, and drawing on speakers from Europe and Australia, this symposium will use emerging results from intervention studies to demonstrate empirical progress in this area and will engage the expertise of conference delegates in discussion about the methodological strategies needed to advance the field.

**OBJECTIVE(S):** – To present emerging results from intervention studies regarding the relationship between physical activity and the built environment – To illustrate and discuss the implications of different ways of characterising, measuring and analysing changes in walking and cycling for transport and recreation – To illustrate and discuss quantitative and qualitative methods of investigating the implementation, mechanisms and effects of interventions.

**SUMMARY:** The opening paper will report the built environmental and other predictors of uptake and maintenance of walking, cycling and non-car travel in general in the quasi-experimental Commuting and Health in Cambridge cohort study,. This longitudinal observational analysis will lead into the second paper, which will draw on RESIDE study data to illustrate the significance of attitudes towards and enjoyment of walking in mediating and explaining how environmental change influences behaviour change. The third paper will report the predictors of use of new infrastructure for walking and cycling and its impact on overall walking and cycling in the iConnect study. The fourth paper will draw on qualitative interview data from key informants to explain how patterns of infrastructure use varied between iConnect study sites and between walking and cycling for recreation and for transport.
S26.1 Patterns and predictors of changes in walking and cycling to and from work
Panter J, Griffin S, Ogilvie D

PURPOSE: Increases in walking or cycling could contribute towards population health improvement, but few studies have assessed the predictors of changes in these behaviours. Using data from the Commuting and Health in Cambridge study, we assessed the predictors of uptake and maintenance of walking and cycling, and of modal shift to or from car use, on commuting journeys.

METHOD: Adult commuters were surveyed in 2009 and followed up 12 months later. All travel modes used, and time spent walking and cycling in particular, on the commute were assessed at both time points using a seven-day recall instrument. Associations between uptake and maintenance of travel behaviours and baseline individual and household characteristics, psychological measures and self-reported and objective measures of the environment were studied using multivariable logistic regression.

RESULT(S): 655 participants provided data at both time points. Mean within-participant changes in time spent in active commuting were relatively small (walking: +3.0 min/week, s.d. 66.7; cycling: -5.3 min/week, s.d. 74.7). In maximally-adjusted models, self-reported and objectively-assessed convenience of public transport predicted uptake of walking and cycling respectively, while convenient cycle routes predicted uptake of cycling and a pleasant route predicted maintenance of walking. A lack of free workplace parking predicted uptake of walking and alternatives to the car. Less favourable attitudes towards car use predicted continued use of alternatives to the car.

CONCLUSION(S): Improving the convenience of walking, cycling and public transport and limiting the availability of workplace car parking may be important for promoting the uptake and maintenance of active commuting.

FUND SOURCING: National Institute for Health Research Public Health Research Programme

S26.2 The influence of urban design on neighbourhood recreational walking: longitudinal results from the RESIDE study

PURPOSE: This paper uses longitudinal data to explore the mechanisms through which the built environment may influence recreational walking.

METHOD: RESIDE is a study of people building homes in 73 new housing developments in Perth, Western Australia, who were surveyed before moving into their new home (T1 n=1803; 34.6% response rate (RR)) then again 12 months later (T2: RR 83.3% of those still eligible). Walking was measured using the Neighbourhood Physical Activity Questionnaire (NPAQ). Multivariable associations between changes in access to three types of recreational
destinations (beach, park and sports field) and changes in recreational walking (min/week) were examined with progressive adjustment for sociodemographic, perceived built environmental, intrapersonal and interpersonal characteristics.

RESULT(S): For each recreational destination type that increased following relocation, recreational walking increased by 21.1 min/week (p=0.03) adjusted for changes in sociodemographic, perceived built environmental and intrapersonal characteristics. This association became insignificant after adjustment for interpersonal characteristics (17.2 min/week, p=0.08). Two interpersonal characteristics (attitudes towards and enjoyment of walking) measured the walking experience. When these were removed from the final model, recreational walking increased by 20.6 min/week (p=0.04) for each recreational destination type that increased following relocation.

CONCLUSION(S): This longitudinal analysis shows that recreational walking behaviours respond to changes in the availability and diversity of local recreational destinations, and suggests that the environmental influence on recreational walking may be partly mediated by its impact on neighbourhood attractiveness. The importance of progressive modelling to explore mechanisms through which the environment influences behaviour will be discussed using this and other examples.

FUND SOURCING: Healthway and the Australian Research Council

S26.3  Use and one-year impacts of new walking and cycling infrastructure: a controlled natural experimental study
Goodman A, Sahlqvist S, Ogilvie D

PURPOSE: To build on the small number of natural experimental studies in this field by identifying predictors of use of new infrastructure for walking and cycling and evaluating the effects of its provision and use on walking, cycling and physical activity.

METHOD: In this controlled longitudinal study, 1849 British adults completed questionnaires in 2010 and 2011 before and after the construction of infrastructure in three localities. Participants reported past-week travel and physical activity, from which we calculated changes in time spent walking and cycling for transport and for recreation and in overall physical activity. Network distance from home to the infrastructure was used to define primary exposure categories for controlled comparisons.

RESULT(S): 32% of participants had used the new infrastructure, with substantially higher usage among those living nearest or reporting higher baseline walking and cycling. There was no evidence that living near the infrastructure predicted changes in walking, cycling or physical activity (all p>0.10). There was likewise little or no evidence that using the infrastructure predicted such changes (all p=0.03, most p>0.20), although most outcomes showed non-significant trends towards small-to-moderate increases of 5-30 min/week.

CONCLUSION(S): At one-year follow-up, the new infrastructure was relatively well used.
There was not yet evidence that walking, cycling or physical activity had increased overall, although the results do not exclude the possibility of non-trivial effects associated with infrastructure use. Alternatively, the strong associations between baseline activity and use suggest that the new infrastructure may have mainly displaced walking and cycling rather than generating new trips.

FUND SOURCING: Engineering and Physical Sciences Research Council

S26.4 Evaluating new infrastructure for walking and cycling: understanding the how and the why
Sahlqvist S, Jones T, Song Y, Goodman A, Bull F, Powell J, Ogilvie D

PURPOSE: To explore patterns of use of new walking and cycling infrastructure and the mechanisms that might underlie them.

METHOD: Using a ‘complementarity’ mixed-methods approach, these analyses drew on survey data from 1849 iConnect study participants at three case-study sites reporting their awareness and use of new infrastructure, and 17 semi-structured interviews with key informants conducted to elucidate mechanisms by which it was thought the new infrastructure schemes would influence behaviour.

RESULT(S): Use of the schemes was highest in Cardiff (49%) followed by Kenilworth (28%) and Southampton (19%). Interview data suggested that this reflected the greater visibility of and perceived need for the new infrastructure at the Cardiff site. Although the intervention programme aimed to ‘provide practical solutions to overcome barriers to active travel’, only 17% of respondents reported using the new routes for walking or cycling for transport, compared with 39% using them for recreational purposes. These quantitative findings appeared to reflect a disconnect between the intended goals of the overall programme and the specific contexts of the infrastructure improvements at each site. The limited impact on active travel may also have reflected the discontinuity of the new infrastructure, which was regarded as having dangerous feeder routes at each site.

CONCLUSION(S): Overall, use of the schemes — particularly for transport — was lower than expected, perhaps reflecting the need for infrastructural improvements to be coherent and network-wide. The study also highlights the importance of building infrastructural ‘landmarks’ that are visible and therefore capable of capturing the public imagination.

FUND SOURCING: Engineering and Physical Sciences Research Council
The integration of self-determination theory and motivational interviewing: a committed engagement or simply too much resistance?

**Chair:** Teixeira Pedro J  
*Physical Activity, Nutrition, and Obesity Research Group, Faculty of Human Kinetics, Technical University of Lisbon, Lisbon, Portugal*  
**Discussant:** Vansteenkiste Maarten  
*Department of Developmental, Personality and Social Psychology, Ghent University, Ghent, Belgium*

**PURPOSE:** To critically discuss the advantages and limitations of integrating self-determination theory (SDT) – a long-standing and comprehensive psychological theory of human motivation and action – and Motivational Interviewing (MI) – a popular and well-documented approach for counselling towards behaviour change – in the context of nutrition, physical activity and obesity behavioural interventions.

**RATIONALE:** Both MI and SDT are person-centered and process-oriented, both emphasize that optimal behavior change must involve deep personal commitment, and both have at its center the concept of motivation, endorsing the development of more internal goals and autonomous forms of regulation. While SDT and MI have been developed continuously for several decades, they have more recently been increasingly used together and apart in interventions to change dietary and physical activity behaviors. Despite considerable common ground, questions remain as to whether MI can be accepted (and be used) as the intervention approach of SDT and whether SDT can be considered the psychological theory behind MI. Clear empirical tests are called for to demonstrate these links. Addressing these issues may allow advances in both theory and practice.

**OBJECTIVE(S):** Following an initial meeting to discuss this theme at ISBNPA 2009 and a related IJBNPA special issue published in 2012, the objectives of this symposium are 1) to discuss convergent and divergent aspects of SDT and MI with implications for their complementariness and integration; 2) review, synthesize and discuss experimental evidence using SDT and/or MI in physical activity, diet, and weight control; 3) present and discuss examples of intervention research in behavioral health, using E-health and remote technologies, which have drawn on SDT and/or MI.

**SUMMARY:** - A short outline of the topic and its relevance will be provided by the chairperson; - David Markland (UK) will briefly describe SDT and MI, identify common and congruent elements, and discuss themes where SDT and MI experts have diverged; - Pedro Teixeira (POR) will present an updated review of recent SDT- and/or MI-based intervention studies and discuss findings, aiming at guiding upcoming research that integrates both perspectives; - Ken Resnicow (USA) will use diet and activity tailored E-health and remote messaging interventions as examples of broad reach health promotion programs drawing on both SDT and MI; - Maarten Vansteenkiste (BEL) will reflect on the topics presented and put them in perspective of both theoretical and intervention development in behavioural nutrition and physical activity; - A general discussion with the audience will be promoted.
S27.1  Self-determination theory and motivational interviewing: convergences and (minor) divergences
Markland D

PURPOSE: Self-determination theory (SDT) is a theory of motivation and well-being. A fundamental premise of the theory is that humans have an innate tendency toward growth, the integration of the self and the resolution of psychological inconsistency. This tendency can be promoted or thwarted to the extent that the person’s interpersonal environment supports the satisfaction of basic psychological needs for autonomy, competence and relatedness. Motivational interviewing (MI) has become a widely adopted counseling approach for facilitating health behaviour change. MI is designed to strengthen individuals’ personal motivation and commitment to change. In this presentation parallels and points of convergence between SDT and MI will be discussed. It will be shown that both SDT and MI share a common position with regard to the centrality of autonomy in behaviour change and the idea that change cannot be forced or imposed. Some areas of divergence between SDT and MI will be noted, including differences in the conceptualisation of change talk. It will be argued that SDT offers a comprehensive theoretical framework for understanding the mechanisms by which MI can promote behaviour change. Additionally, an example and preliminary empirical findings from a research project designed to study an MI-based process – verbal commitment to change – from the perspective of SDT will be presented.

S27.2  An updated review of SDT and motivational interviewing intervention research in physical activity and weight control
Teixeira PJ

PURPOSE: Research in behavioral nutrition and physical activity drawing on self-determination theory (SDT) is on the rise, likely as a response to frustration with results thus far and enthusiasm for the in-depth, comprehensive analysis of human motivation offered by SDT. Despite the recent emphasis on post-motivational self-regulatory processes, persistent motivation continues to be viewed as central to health promotion in the era of lifestyle medicine. SDT uniquely specifies qualitative elements of motivation and mechanisms (and supports) by which autonomous motivation can become the basis for lasting behavioral self-regulation, features which may explain the encouraging results found thus far. Some, but not all of SDT studies have been inspired and informed by the spirit and counseling methods described by Motivational Interviewing (MI), which offers a detailed counseling method for promoting individuals commitment to change and uses well-developed protocols to measure intervention fidelity. While a substantial number of MI-based intervention studies are now available, theoretical considerations and psychological mediators have not been uniformly featured. This presentation will provide an updated review of SDT- and MI-based experimental research in physical activity, eating behavior, and weight control, focusing on 1) psychological mechanisms by which MI intervention may operate and 2) the extent to which MI (and SDT) intervention protocols are theory-consistent.
S27.3  Application of motivational interviewing and SDT in the development of e-health intervention
Resnicow K

PURPOSE: Individually tailoring health communications to user characteristics is an effective means to enhance intervention impact. The first generation of tailored programs can be characterized by the use of more directive “push” messages, such as “it is important that you...” or “you should...”. And, most were based on common models of behavioral change, such as Social Cognitive Theory, Theory of Planned Behavior, and the Transtheoretical Model. Such messages however, often build controlled motivation, and can elicit reactance. More recent tailoring research has begun to use more “pull” type messages, largely informed by Self-Determination Theory (SDT), Reactance Theory, and Motivational Interviewing (MI). These messages encourage more psychological effort on the part of the participant and aim to build more autonomous motivation. This presentation will present strategies for using SDT- and MI-based strategies to deliver tailored E-health diet and activity messaging, such as “reflective tailoring”, 0-10 important confidence rulers, values clarification activities, personal strengths, and menus with multiple behavioral options. We will draw on two recent studies, including one targeting fruit and vegetable intake, to demonstrate how these strategies have been employed and for whom they may be most effective.
S28 Weight-related behaviours in college/university students

Chair: Deforche Benedicte
Department of Human Biometrics and Biomechanics, Faculty of Physical Education and Physical Therapy, Vrije Universiteit Brussel, Brussels, Belgium
Discussant: Brug Johannes
EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, the Netherlands

PURPOSE: The purpose of this symposium is to provide an overview of studies conducted in different countries/states investigating weight-related behaviors in college/university students.

RATIONALE: Several studies have demonstrated that college/university freshman have a great risk of gaining weight. As college/university students start a new phase in life and often move to another city to study, this change might be accompanied with new and maybe less healthy behaviours.

OBJECTIVE(S): The main aims of this symposium are: (1) to present studies that investigated influencing factors of (changes in) dietary behaviour and physical activity during the transition from secondary school to college/university, (2) to introduce innovative strategies utilizing web, mobile phone and social media to control weight in college/university students and to describe characteristics and behaviours of participants in these programs, (3) to provide a forum to discuss findings of these studies and to share experiences and (4) to discuss implications for further research and practice based on the findings.

SUMMARY: The presentations in sequence will be: 1) Tom Deliens (Brussels, Belgium, Europe): “Influencing factors of eating behaviour in university students: a qualitative study using focus group discussions”. This study explores which factors influence university students’ eating behaviour. 2) Deforche Benedicte (Ghent, Belgium, Europe): “Explaining physical activity behaviour during the transition from secondary school to college/university: a longitudinal analysis using a self-determination theory approach.” Grounded by Self-Determination Theory this study investigates whether an autonomy supportive environment for physical activity satisfies the basic psychological needs and stimulates autonomous motivation towards physical activity and physical activity behaviour during the transition from secondary school to college/university. 3) Simon Marshall (San Diego, California, US): “Unhealthy weight loss behaviors among College Students participating in a Weight Loss Intervention” This study explores weight control practices prior to the beginning of a theory-based intervention utilizing web, mobile phone and social media to promote healthy eating and physical activity for weight loss in college students. 4) Leslie Lytle (Chapel Hill, North-Carolina, US): “Who are the Super-Users on a weight-gain prevention website for college students?” This presentation will examine level of engagement in the social networking website during the first 13 months of a 24 month web-supported weight-gain prevention program in college students.
S28.1 Influencing factors of dietary behaviour in university students: a qualitative study using focus group discussions
Deliens T, Deforche B, De Bourdeaudhuij I, Clarys PP

PURPOSE: Identifying critical periods of weight gain may be an important step towards the development of effective obesity prevention programs. According to US literature, university time is an at-risk period for weight gain. However, to develop effective intervention strategies it is important to understand the mechanisms behind this student weight gain. Therefore, the purpose of this study was to explore which factors influence Belgian (European) university students’ eating behaviour.

METHOD: In this qualitative study, snowball sampling was used to recruit 35 students from the 2nd, 3rd, 4th and 5th year of university. The sample consisted of 14 male and 21 female students (age: 20.6 ± 1.7 yrs; BMI: 22.8 ± 3.9 kg/m²). Using a semi-structured questioning guide five focus groups (consisting of 5 to 10 participants) were conducted. All discussions were audiotaped and transcripts of the conversations were entered into Nvivo9 to analyse the data based on grounded theory.

RESULT(S): Students reported numerous macro (legislation and laws, media and advertising), individual (psychosocial, lifestyle and biological determinants), social environmental (friends and family) and physical environmental (residency, availability and accessibility) factors influencing their eating habits. Many of the identified factors were both facilitators and barriers, depending on the individual and situational context.

CONCLUSION(S): From an ecological point of view eating behaviours in university students are subject to the continuous interaction between multiple levels of influence. To facilitate healthy eating behaviours in university students, tailored interventions should not only focus on one-level strategies but on both individual and environmental determinants.

S28.2 Explaining physical activity behaviour during the transition from secondary school to college/university: a longitudinal analysis using a Self-Determination Theory approach
Deforche B, Van Dyck DD, Verstuyf J, Deliens T, De Bourdeaudhuij I, Haerens L

PURPOSE: Grounded by Self-Determination Theory we aimed to investigate whether an autonomy supportive environment for physical activity (PA) satisfies the basic psychological needs and stimulates autonomous motivation towards PA and PA behaviour during the transition from secondary school to college/university.

METHOD: A sample of 291 students (66% girls) was followed from the end of secondary school (T1) until the beginning of second year of college/university (T2). Autonomy support from parents and friends to be PA, need satisfaction in PA, motivation towards PA and PA behaviour was assessed using validated questionnaires.
RESULT(S): Students showed a 40% decrease in PA from T1 to T2 (p<0.001). Structural Equation Modeling analyses showed that at T1 need satisfaction was positively related with support from friends (β=0.48, p<0.001), but not with support from parents (β=0.19, n.s.). Need satisfaction was further positively related with autonomous motivation (β=0.74, p<0.001), but not with controlled motivation (β=0.19, n.s.). Finally, PA behaviour was positively related with autonomous (β=0.43, p<0.001), but not with controlled motivation (β=0.03, n.s.). These relationships were confirmed prospectively: support from friends at T1 predicted need satisfaction at T2 (β=0.47, p<0.001), need satisfaction at T1 predicted autonomous motivation at T2 (β=0.71, p<0.001) and finally autonomous motivation at T1 predicted participation in PA at T2 (β=0.39, p<0.001). However, only autonomous motivation significantly predicted changes in PA from T1 to T2 (β=0.29, p<0.001).

CONCLUSION(S): This is one of the first studies to test principles of Self-Determination Theory in explaining PA prospectively. Lower levels of autonomous motivation in secondary school predict decreases in PA at college/university.

S28.3 Unhealthy weight loss behaviors among College Students participating in a Weight Loss Intervention
Marshall SJ, Davila EP, Patrick K, Kansagara A

PURPOSE: Unhealthy weight loss practices have been documented in samples of college students and can lead to serious health problems. The aim of this study was to explore weight control practices in those students enrolled in weight loss programs.

METHOD: 404 college students (Mage = 22±4 years; MBMI=29±2.8 kg/m2; 70% female) from four urban universities in California were recruited to a theory-based intervention utilizing web, mobile phone and social media to promote healthy eating and physical activity for weight loss. Participants completed a survey of their weight control practices prior to the beginning of the intervention.

RESULT(S): Twenty-nine percent reported engaging in at least one unhealthy weight loss practice (e.g., fasted, took diet pills, purged, took laxatives or diuretics, skipped meals, smoked cigarettes) over the past 30 days. Skipping meals (18.6%) and “eating very little” (18.8%) were reported as most common. There was no association between having an unhealthy weight loss practice and weight status or demographic characteristics. However, those who reported not doing physical activity “enough to work up a sweat, get the heart thumping, or get out of breath” and weighing themselves frequently had greater odds for engaging in an unhealthy weight loss behavior than those exercising enough to sweat or weighing themselves less frequently (Odds Ratio, OR = 1.72, 95% Confidence Interval, CI 1.10-2.92; OR = 1.34 [CI 1.13-1.60, respectively]).

CONCLUSION(S): Engagement in unhealthy weight loss practices was modest, particularly among those who frequently monitored their weight and did not perform vigorous physical activity.

FUND SOURCING: NIH, NHLBI
Who are the Super-Users on a weight-gain prevention website for college students?

Lytle LA, Laska M, Baker WL

PURPOSE: Young adults are at high risk for obesity. There are few randomized controlled trials evaluating strategies that might help young adults maintain a healthy weight and there is an interest in evaluating how innovative strategies such as websites and virtual social networking may work. The purpose of the CHOICES study is to develop and evaluate strategies to help 2-year college students maintain a healthy weight. This presentation will examine level of engagement in the social networking website during the first 13 months of a 24 month web-supported weight-gain prevention program.

METHOD: The sample includes 441 students from three 2-year community and technical colleges in Minnesota. The sample is 67% female, 27% non-white, and 66% had incomes less than $12,000. The intervention channels include a 1 credit class on weight-related health promotion and a website designed to have students track their weight, behaviors and to offer information and social support.

RESULT(S): In the first 13 months there were 7175 log-ins to the website with an average of 32 log-ins per participant or approximately 2 log-ins per month per participant. Closer inspection of the data shows that 75% of the participants logged in less than once a month. In addition, 25% of the sample was responsible for 90% of all log-ins. This presentation will describe the characteristics of these “super-users” including demographic characteristics, baseline weight, weight-related behaviors and psychosocial factors.

CONCLUSION(S): To better understand the utility and potential of web-based health promotion interventions, attention to the characteristics of users and non-users is important.

FUND SOURCING: National Heart, Lung, and Blood Institute, National Institutes of Health
Optimizing implementation of (worksite) health promotion programs: lessons learned

Chair: Wierenga Debbie
Body@Work, Research Centre on Physical Activity, Work and Health, TNO-VUmc, Amsterdam, the Netherlands

PURPOSE: This symposium will provide insight in facilitating and hampering factors at all stages of the implementation process of workplace health promotion programs aimed at healthy lifestyles.

RATIONALE: Interventions aimed to increase physical activity and improve healthy eating are increasingly being developed and studied on their effectiveness. However, as researchers we experience difficulties with participation and implementation. This symposium aims to discuss factors influencing the implementation process, and reaching and retaining participants.

OBJECTIVE(S): The symposium will be a forum to discuss research and to share ideas and experiences regarding implementation. The concluding discussion will be used to share experiences with participants on problems and successes in implementation in order to draw joint conclusions and consequences for future implementation of lifestyle interventions at the worksite. After attending the symposium researcher will have practical knowledge on how they can optimize implementation.

SUMMARY: First, D. Wierenga MSc will present the results of her systematic review on the identification of barriers and facilitators for the implementation of worksite lifestyle interventions. Her presentation includes the quality and set-up of included process evaluation. Secondly, Dr. Estabrooks will share his expertise on “reach” as a key construct in the RE-AIM framework. His presentation will describe a process to assess proportional reach and representativeness of worksite programs and determine the degree to which modest monetary incentives influence reach. Thirdly, A. Rongen MSc. will provide insight into which factors facilitate and hamper employees’ intention to participate and the actual participation in health promotion programs. She will also provide information on the role that preferences play in this process. Fourth, Dr. Linnan will present findings from two large worksite-based weight loss studies in which information will be presented about who joins a weight loss program and the retention of employees over a 12 month period. She will also elaborate on individual and organizational factors that may predict successful weight loss.
S29.1 Identification of barriers and facilitators for the implementation of worksite lifestyle interventions: a systematic review of literature
Wierenga D, Engbers LL, van Empelen P, Hildebrandt VH, van Mechelen WW

PURPOSE: No published review today aimed to search the literature on implementation evaluations in the field of worksite lifestyle interventions. Therefore the purpose of this review is to identify barriers and facilitators affecting implementation of such interventions and to gain insight into which, and to what extent, relevant process components have been addressed in the selected studies.

METHOD: A literature search was conducted in four databases for peer-reviewed manuscripts published in English from 2000 to July 2012. Pairs of manuscripts were included that reported on the effectiveness of a worksite lifestyle intervention and additionally reported a process evaluation of the same study. Studies were scored on methodological quality.

RESULT(S): Of the 361 retrieved manuscripts, 22 effectiveness studies paired with a process evaluation and were included in this review. Preliminary results show that eight out 22 studies based their process evaluation on a theoretical framework. Only nine process evaluations had good methodological quality. Most frequently reported process components were dose delivered and dose received, indicating that the focus was merely on participation. So far, 97 different implementation determinants have been identified, with the majority reported once. Frequently reported implementation facilitators were strong management support and good intervention alignment with the organizational culture, whereas lack of time of implementers was reported as implementation barrier.

CONCLUSION(S): Based on the preliminary results, process evaluations are not systematically performed alongside worksite lifestyle interventions and mostly of poor to average quality. Definitions in measured process components vary and implementation determinants have not been measured systematically, and were not systematically measured.

FUND SOURCING: The Netherlands Organization for Health Research and Development (ZonMw, project number 50-51405-98-019)

S29.2 Assessing reach in worksite weight loss programs

PURPOSE: The impact of worksite weight loss programs can be determined by assessing reach and effectiveness. Yet, data on reach is rare in the literature. This presentation will describe a process to assess proportional reach and representativeness of worksite programs and determine the degree to which modest monetary incentives influence reach.

METHOD: Twenty-eight worksites participated. Prior to the initiation of the weight loss study
approximately 70% of all employees across sites completed a brief health survey that included self-reported height, weight, and demographics. Worksites were then randomly assigned to receive one of two minimal weight-loss interventions—one with a modest monetary incentive (i.e., $1-$5 per month) and one without.

RESULT(S): Based on the results of the brief health survey, 6204 employees were eligible and, of those 1806 participated. The participation rate was significantly different between the two conditions (17% versus 26%; p<.01) with the monetary incentives resulting in higher reach. Neither intervention reached a representative population based on race and gender (p’s<.05), but the disparity in enrollment was reduced by the use of the incentives (p’s<.05). Further, the program with no incentives was less likely to recruit lower income and education employees, while the incentive-based program was representative of the employee population on these factors (p’s<0.5).

CONCLUSION(S): We concluded that a simple process of brief surveying of the employee population was sufficient to identify the potential target population as well as the demographic characteristics of the employee population and that modest monetary incentives increase participation rates while also reducing disparities in enrollment.

FUND SOURCING: This study is supported by a grant from the National Institute for Diabetes and Digestive and Kidney Diseases: 5R01DK071664-04 (Estabrooks, PI)

S29.3 Determinants of intention and participation in health promotion programs among employees: preferences, barriers and facilitators
Rongen A, Robroek S, Burdorf A

PURPOSE: To identify determinants of intention to participate and actual participation in health promotion programs aimed at healthy lifestyles among employees.

METHOD: Employees from two companies were invited to participate in a longitudinal study with questionnaires at baseline and six-month follow-up (n=636, response: 36%). Intention to participate in a health promotion program was measured at baseline and actual participation either at work or in another setting at six months follow-up. The following potential determinants were assessed: fruit and vegetable intake, physical activity, self-perceived health, organizational justice, theory of planned behavior concepts, preferences, and perceived barriers and facilitators. Descriptive statistics and logistic regression analyses were used to analyze the relation between the potential determinants and intention and participation in health promotion programs.

RESULT(S): Preliminary results show that a high intention to participate in health promotion programs predicts participation (OR: 3.34, 95% CI 2.04-5.46). Furthermore, feeling unhealthy, being obese, believing that participation is expected by colleagues and supervisor, and finding participation important facilitated intention and actual participation in a health promotion program. Particular preferences for a health promotion program, such as an
educational component or multiple sessions, were associated with a higher intention; however these preferences did not predict actual participation.

CONCLUSION(S): Based on the preliminary findings, intention to participate is a strong determinant for actual participation in a health promotion program six months later. Factors related to the individual (being obese and unhealthy) and related to health promotion (finding it important, thinking it is expected) increased intention and likelihood of participation.

FUND SOURCING: This study was supported by a grant from the Netherlands Organization for Health Research and Development (ZonMw project number 50-51405-98-010).

S29.4 Study retention in weight loss studies: results from two large worksite-based RCTs
Linnan L, Naseer C, Li J, Finkelstein E, Tate DF, Bangdiwhala K

PURPOSE: Obesity is at epidemic levels. Worksite-based intervention studies can reach large numbers of adults with effective weight loss programming. This paper will examine factors which predict employee retention in two large worksite-based weight loss studies.

METHOD: Enrolled overweight employees from two large randomized trials funded by CDC (n=1004) and NHLBI (n=1011) were combined into one data set (n=2015). We assessed study retention at 3, 6, 12 month follow-ups for all employees using multiple logistic regression analyses. Both individual (age, gender, obesity status, MD consent, intervention arm, job status) and organizational factors (size, history of wellness programming, presence of employee wellness committee) were considered as independent attrition predictors.

RESULT(S): Retention in these worksite-based weight loss studies was 76.7% (n=1546) at 3 months, 77.2% (n=1556) at 6 months, and 77.2% (n=1556) at 12 months. At three months, the following factors significantly increased the odds of attrition: assignment to usual care/control arm or web-based program only, and faculty (vs. staff) status. At six months, the odds of attrition were significantly higher among usual care/control and web-based intervention arms, and, among males (vs. females). At 12 months, attrition odds were significantly higher among participants in usual care/control and web-based intervention arms, faculty, and among participants categorized as Class I or II Obese (vs. overweight). No relationship between attrition and key organizational factors were observed.

CONCLUSION(S): Overall retention was good to excellent compared to commercial weight loss programs. These results provide information to target efforts that will minimize participant attrition over time, and maximize program effectiveness.

FUND SOURCING: NHLBI: HL080656-01A1; CDC: RFA-CD-04-02
S30 The IPEN Adolescent Study: results on the associations of neighborhood income and walkability on physical activity and sedentary behaviors

Chair: Van Dyck Delfien  
*Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium*

Discussant: Giles-Corti Billie  
*McCaughey VicHealth Centre for Mental Health and Community Wellbeing, Melbourne School of Population Health, The University of Melbourne, Melbourne, Victoria, Australia*

**PURPOSE:** A first purpose is to present the first results of the IPEN Adolescent Study, an international study to examine the relationship between the neighborhood environment and health behaviors in adolescents. This symposium is innovative because results of international studies using the same protocol will be presented, making it possible to compare findings across countries/continents. A second purpose is to formulate some policy-related guidelines in order to create neighborhoods that are optimally designed for active lifestyles. Results from the USA, Hong Kong and Belgium will be presented.

**RATIONALE:** In adults, convincing evidence exists that neighborhood walkability and neighborhood income are important environmental correlates of physical activity (and to a lesser degree of sedentary behaviors). However, since next to adults, also adolescents live in the same neighborhoods, it is important to find out if the neighborhood environment is similarly related to physical activity in adolescents as in adults. Limited evidence on the importance of neighborhood walkability and income on health behaviors in adolescents exists, so with this symposium we want to clarify these associations and formulate some guidelines for policies. This symposium is important, since it is not yet known how an ‘optimal’ neighborhood for different age groups can be created.

**OBJECTIVE(S):** 1. To present the protocol and methods of the IPEN adolescent study  
2. To present the results of three comparable IPEN studies on the associations of neighborhood walkability and income with physical activity and sedentary behaviors  
3. To elaborate on the importance of ecological models in research, by including psychosocial mediators and moderators in the studies  
4. To formulate first guidelines for policies during the discussion of the symposium

**SUMMARY:** First, the chair will give a general introduction on the IPEN Adolescent study and the current state of the art on research examining built environment correlates of health behaviors in adolescents. Then, the three presentations will be given by presenters of the USA, Hong Kong and Belgium. Finally, the discussant will talk about policy-related implications of the studies and of the overall IPEN Adolescent project.
S30.1  Do psychosocial factors moderate the association between neighborhood walkability and adolescents’ physical activity?
De Meester F, Van Dyck DD, De Bourdeaudhuij I, Cardon G

PURPOSE: Ecological models emphasize the interaction between individuals and their environment. Furthermore, they posit that environmental variables influence physical activity (PA) not only directly but also indirectly through their interaction with other factors. This study explores if the association between neighborhood walkability and adolescents’ PA is moderated by psychosocial factors using data from the Belgian Environmental PA Study in Youth (BEPAS-Y).

METHOD: BEPAS-Y recruited adolescents from 32 neighborhoods differing in objectively determined neighborhood walkability and income. Between 2008 and 2009, 637 adolescents (13-15 years; 49.4% boys) completed a survey measuring socio-demographic and psychosocial factors and wore an accelerometer for seven days.

RESULT(S): Multilevel-regression analyses revealed that for adolescents living in low-income neighborhoods, the association between neighborhood walkability and PA was moderated by perceived barriers and perceived benefits towards PA. Neighborhood walkability was positively associated with PA among adolescents, living in low-income neighborhoods, who perceived many barriers and few benefits, while for adolescents who perceived few barriers and many benefits, the PA level was high, irrespective of neighborhood walkability. For adolescents, living in high-income neighborhoods, none of the psychosocial attributes moderated the association between neighborhood walkability and PA.

CONCLUSION(S): The findings provide some support for the predicted interactions posited by ecological models. Improving neighborhood walkability might increase PA-levels of adolescents living in low-income neighborhoods, with less positive psychosocial profiles, or in other words; those who are most difficult to reach through PA interventions. However, in order to increase PA in large populations, interventions focusing solely on improving neighborhood walkability may not have the desired effect.

S30.2  How socio-economic status affects physical activity participation in Hong Kong adolescents
Cerin E, Lee L-CJ, Macfarlane D

PURPOSE: There is evidence that socio-economic status (SES) is associated with physical activity (PA) participation. Lower SES is predictive of lower levels of leisure-time PA. However, most of this research has been conducted in the West and on adults. SES inequalities in PA among youth and Asian populations remain are underexplored. Thus, this study examined SES differences in PA among Hong Kong adolescents and explored environmental and psychosocial mediators of the relationships between SES indicators and PA participation.

METHOD: A sample of 181 adolescents (12-18) was recruited from 32 Hong Kong
neighborhoods varying in SES (median household income) and objectively-measured walkability (dwelling density and street connectivity). Moderate-to-vigorous PA (MVPA) was measured using accelerometers (N=88) and a questionnaire (N=181). Individual-level SES was measured using household income as reported by parents, while area-level SES was defined as the Census-based median household income in a neighborhood. PA-related environmental characteristics of schools and neighborhoods were assessed via self-report and Geographic Information Systems.

RESULT(S): Area-level SES was positively related to social support from family and total sports/recreational facilities within the school neighborhood. These two factors were in turn independently associated with self-reported MVPA and, thus, acted as cross-sectional mediators. While a positive association between individual-level SES and objectively-measured MVPA was found, no significant mediators of this relationship were identified.

CONCLUSION(S): The provision of sports/recreational facilities near schools and strategies aimed at enhancing family support for PA may be important factors to reduce SES differentials in MVPA among Hong Kong adolescents.

FUND SOURCING: Grant General Research Fund # HKU748309H awarded to Macfarlane (PI) and Cerin (Co-I).

S30.3 Neighborhood walkability in relation to multiple outcomes in US adolescents
Sallis JF, Conway TL, Kerr J, Saelens B, Cain K, Glanz K

PURPOSE: Neighborhood walkability has been frequently studied as a correlate of adolescent physical activity, but less studied in relation to sedentary time and BMI. This presentation examines all of these outcomes among US adolescents.

METHOD: N = 928 youth (460 boys; 468 girls; 12-17y) were recruited from high/low walkable and high/low income neighborhoods. Physical activity was assessed by accelerometer monitoring and self-reported leisure-time walking and active commuting to school. Youth reported time spent on school days in 6 sedentary activities. Sedentary tems were examined separately and summed for total minutes per day. Accelerometers measured average sedentary minutes per day (<100 counts/min). Self-reported height and weight were used to compute BMI z-scores/percentiles. Mixed models and logistic regressions examined outcomes in relation to neighborhood walkability and income, adjusting for demographic covariates and clustering within neighborhoods.

RESULT(S): Neighborhood walkability was positively related to all three physical activity measures (p’s<.005). Although accelerometer-measured sedentary time was not related to neighborhood walkability, total self-reported sedentary time was negatively related to walkability (p=.051). Time spent watching television was the only significant individual sedentary behavior related to walkability (p=.007). There were no significant walkability differences for BMI or obesity status (≥95th percentile).
CONCLUSION(S): Walkability was consistently related to objective and self-reported physical activity. Adolescents living in walkable neighborhoods reported less total sedentary time and television time, possibly because of more opportunities for physical activity. Walkability was not related to objectively measured sedentary time or reported BMI or obesity. Present results emphasize the specificity of associations between neighborhood walkability and adolescent health outcomes.
Challenges and perspectives on school-based obesity prevention programmes in low- and middle-income countries

Chair: Verstraeten Roos
Department of Food Safety and Food Quality, Ghent University, Ghent, Belgium
Discussant: Holdsworth Michelle
Section of Public Health, SchARR, University of Sheffield, Sheffield, United Kingdom

PURPOSE: This symposium aims to increase our understanding of the impact of obesity prevention interventions targeted at changing both diet and physical activity among school-going adolescents in low- and middle-income countries (LMICs). We want to particularly address methodological and implementation challenges that researchers face when conducting such interventions. Moreover, we aim to conclude with future recommendations to create methodologically sound, high quality programmes in LMICs.

RATIONALE: A staggering increase in unhealthy body weight has been observed in children and adolescents in LMICs across all levels of socio-economic status. As childhood obesity is associated with a range of chronic conditions in adulthood and high treatment costs, prevention is of utmost importance. School-based interventions targeting physical activity and dietary intake have emerged increasingly as an important strategy in obesity prevention. However, recent evidence from LMICs indicates that such studies are confronted with challenges in designing and implementing interventions. In order to formulate evidence-based policies to tackle obesity, well-conducted evaluation studies are needed that unequivocally attribute their impact to the intervention.

OBJECTIVE(S): The objective of this symposium is to explore a series of school-based obesity prevention experiences in different LMICs. Firstly, we will provide an overview of the current evidence on challenges in implementing and evaluating such complex programmes in LMICs. Secondly, we will present different experiences from LMICs. Finally, we will reflect in an interactive manner on the successes and failures of such interventions to recommend future sustainable, evidence-based interventions.

SUMMARY: This session will start with a brief introduction to the challenges and perspectives of school-based interventions. We will present the findings of a systematic review on the effectiveness of school-based interventions targeting dietary and physical activity behaviour in LMICs, eliciting challenges in development and reporting of such interventions. The subsequent presentations will present individual case studies from school-based intervention experiences in Ecuador, South-Africa and Brazil. The session will end with an interactive discussion drawing on experiences of implementation challenges.
**S31.1**  Do school-based obesity interventions work in low- and middle-income countries? A systematic review
Verstraeten R, Holdsworth M, Maes L, Kolsteren P

PURPOSE: We systematically reviewed the evidence on the effectiveness of school-based primary obesity prevention interventions in children and adolescents (6 to 18 years) targeting dietary behaviour and/or physical activity in low- and middle-income countries.

METHOD: We searched the MEDLINE, EMBASE, Web of Science, CENTRAL, ERIC, The Cochrane Library and the Centre for Reviews and Dissemination databases for peer-reviewed controlled studies published in English, Spanish, French, German or Dutch between January 1990 and July 2011. Quality of the included papers was appraised independently by two authors using the Effective Public Health Practice Project tool.

RESULT(S): From a total of 7,218 unique references we retained 22 studies. The majority of the interventions (82%) had a positive effect on dietary behaviour and physical activity behaviour (effect size ranged from -0.48 to 1.61). BMI decreased in 8 studies (effect size ranged from -0.7 to 0.0). The most effective interventions targeted both diet and physical activity, included multiple stakeholders and integrated educational activities in the school curriculum. The absence of process evaluation, not measuring intermediary behavioural variables, and inappropriate analyses were the most important challenges in developing and reporting interventions.

CONCLUSION(S): We conclude that school-based interventions have the potential to improve dietary and physical activity behaviour and to prevent unhealthy weights in low- and middle-income countries. In order to reach their full potential, however, interventions should conduct process evaluations to document programme implementation. The impact and the pathways through which the interventions have this impact need to be better documented through rigorous evaluation studies.

**S31.2**  A school-based health promotion intervention in Ecuadorian adolescents: a process evaluation
Ochoa A, Van Royen K, Verstraeten R

PURPOSE: Effective health promotion interventions are required to tackle the increasing obesity epidemic in low- and middle-income countries. We evaluated the implementation components of the first year of a school-based health promotion intervention in Ecuador.

METHOD: A process evaluation was conducted of a pair matched cluster randomized controlled intervention designed to improve physical activity (PA) and dietary behaviour among school-going adolescents. The intervention comprised workshops with parents and nutrition and PA classes for adolescents. The ‘reach and dose’ of these intervention components were assessed using questionnaires, observations, attendance rates and recruitment method.
RESULT(S): Even though initially 73.3% of school teachers agreed to participate, only 58.6% of teachers held classes. Only 23% of parents attended the workshops. In contrast, the reach was high among adolescents (95%), as classes were provided during school hours. The intervention ‘dose’ was high, as 84% of all planned classes were provided and 100% of workshops. Engaging adolescents in classes depended on teachers’ discipline and enthusiasm and sometimes distracting factors were reported. However, adolescents were attentive and engaged. Moreover, adolescents rated these classes highly (Mean 7.7/10) and according to teachers, 95% of adolescents enjoyed classes. Parents rated the workshops equally positively (Mean 7.8/10).

CONCLUSION(S): These findings suggest that this intervention encountered recruitment problems, as the reach among teachers and parents was low. However, intervention components appear to be successfully implemented based on a high dose. Recruitment methods should be revised when implementing the second year of the intervention.

FUND SOURCING: This study was funded by the VLIR-IUC and Nutrition Third World.

S31.3 Development and implementation of a novel nutrition intervention programme for primary school children (6 to 12 years) in South Africa to address childhood obesity: the musical play
Smit K, Harris M, Wright HH, Kruger A

PURPOSE: This study evaluated the impact of a novel nutrition intervention programme- a musical play- based on the South African Food Based Dietary Guidelines (SAFBDG) on changing nutritional knowledge and attitudes, motivations and barriers towards change and dietary- and physical activity behaviour.

METHOD: The musical play was piloted on children 6-12 years (n=282) of various ethnic groups. Children were randomly assigned to a control group (n=99: exposed to school nutrition curriculum) and to an experimental group (n=104: also exposed to musical play) with short communications (SAFBDG) over a three month period. At baseline, demographic data were obtained. Anthropometrical measurements, a validated nutritional knowledge questionnaire, a 24 hour recall and focus group discussions were completed before and after the intervention.

RESULT(S): Overall, nutritional knowledge of children exposed to the musical play increased with statistical and practical significance (p < 0.05; d > 0.05). Diet quality of children remained low. Mothers were identified as the main motivators for healthy dietary behaviour. Taste and smell of food were found as motivators/barriers for healthy and unhealthy eating. Children showed positive attitudes towards physical activity with parents being the biggest motivators for partaking in it.

CONCLUSION(S): The musical play improved overall nutritional knowledge, but this was not the only factor influencing diet quality. Motivators and barriers towards dietary and physical
activity behaviour could make valuable contributions to combat childhood obesity. If factors besides nutritional knowledge are also addressed, the musical play might prevent obesity through changing dietary- and physical activity behaviour of primary school children.

FUND SOURCING: This study was funded by the North-West University, Potchefstroom

S31.4 Effectiveness of a randomized school-based intervention involving families and teachers to prevent excessive weight gain in Brazil
Sichieri R, Cunha DB, Pereira RA

PURPOSE: We evaluated the effectiveness of a school-based intervention, involving families and teachers, which aimed to promote healthy eating habits in adolescents.

METHOD: A cluster randomized school-based trial was conducted with a sample of fifth graders in twenty schools. The intervention consisted of 9 nutritional education sessions of about 50 minutes. Parents/guardians and teachers received information on the same subjects. The main outcome measurements were changes in BMI and percentage of body fat.

RESULT(S): There were no differences between the control and intervention groups at baseline for age, ethnicity, and gender. However, there was a higher prevalence of overweight and obesity among participants in the control group. Intention-to-treat analysis showed that changes in BMI were not significantly different between the 2 groups (p = 0.61). There was a major reduction in the consumption of sugar-sweetened beverages and cookies in the intervention group; students in this group also increased the consumption of fruits. Parents’ motivation to change eating habits increased over time with the proportion of parents who reported that they had successfully changed their diets increasing by 30%.

CONCLUSION(S): Encouraging the adoption of healthy eating habits promoted important changes in the adolescent diet, but this did not lead to a reduction in BMI gain. Strategies based exclusively on the quality of diet may not reduce weight gain among adolescents.

FUND SOURCING: Foundation of Support of Research of the State of Rio de Janeiro - FAPERJ (E261029422008); National Counsel of Technological and Scientific Development - CNPQ (474288/2009-9); Pan American Health and Education Foundation - PAHEF.
S32  Updating the evidence of physical activity in preschoolers

Chair: Okely Tony

*Interdisciplinary Educational Research Institute, University of Wollongong, Wollongong, Australia*

PURPOSE: To increase insights into prevalence, measurement and factors influencing physical activity among preschool children.

RATIONALE: The preschool development period (3-5 years of age) is a critical time in the establishment of physical activity. In recognition of the influential role of physical activity during early childhood on current and future development and health, a number of countries have recently developed Physical Activity Recommendations for Children 0-5 years. Although these prescriptive recommendations are helpful in guiding researchers, health professional and early childhood educators a number of research gaps still exist. For example: (1) there is some evidence internationally to suggest low habitual and within-childcare physical activity levels among preschool children, however prevalence of objectively measured physical activity remains unknown for a number of countries; (2) accurately measuring objective physical activity among preschool children remains difficult and the most appropriate cut-points to use for young children remains unresolved and (3) the childcare factors that influence physical activity levels have not been identified. To advance the current knowledge base, more research is needed in these areas. This symposium will contribute to the current knowledge base by addressing these research gaps.

OBJECTIVE(S): 1. To determine Finnish and Dutch 3-year-old preschool children’s physical activity levels and how levels vary across locations, time of day and social contexts. 2. To evaluate the predictive validity of the ActivPAL energy expenditure equation, and develop and test the classification accuracy of ActivPAL physical activity intensity cut-point in preschoolers. 3. To explore the association between child physical activity and childcare practices.

SUMMARY: Utilizing a behavioral epidemiological framework, this symposium will present new data in the field of physical activity in preschool children. The first presentation will report on the prevalence of physical activity among a Finnish cohort and a Dutch cohort of preschool children. The second presentation will provide new insights into measuring physical activity objectively in preschool children. The third presentation will explore the association between child physical activity and childcare practices and discuss specific practices to be targeted to increase physical activity of children in childcare settings. Finally, the discussant will provide a brief overview of the main issues of the presentations and will facilitate a general discussion on interventions for increasing physical activity in preschoolers.
S32.1  Observed physical activity levels among Finnish and Dutch 3-year-old children during childcare attendance – An international comparison

PURPOSE: The aim of the research was to determine Finnish and Dutch 3-year-old preschool children’s physical activity (PA) levels and how levels vary across locations, time of day and social contexts.

METHOD: Design: The study was designed to employ a direct observation measurement system to describe the PA levels and patterns of children attending childcare centers in Finland and the Netherlands. Participants: 90 children (46 boys) in Finland and 97 Dutch children (46 boys) were observed. Measures: A modified version of the Observational System for Recording Physical Activity in Children-Preschool (OSRAC-P; Brown et al., 2006) was used to measure children’s PA levels. Two trained researchers in each country observed PA and contextual factors using a procedure in which a period of 15 seconds observation was followed by 30 seconds for recording the observation. Analyses: Multilevel linear regression was used to assess differences between the countries.

RESULT(S): There were significant differences in mean activity level between Finnish and Dutch 3-year-olds (activity intensity 2.30 vs. 2.60, respectively; p < .001). Dutch children’s mean activity levels were higher than Finnish children’s, indoors (p < .001) as well as outdoors (p < .001), both in the morning (p < .001) and in the afternoon (p < .001). Children were mostly not prompted to increase their activity by either teachers or peers (no prompts 90%).

CONCLUSION(S): Dutch children’s PA levels were higher than Finnish children’s activity levels. Children were rarely prompted to increase PA during observations.

S32.2  Calibration and validation of the ActivPAL for measuring physical activity intensity and energy expenditure in preschool children
Janssen X, Okely T

PURPOSE: The purpose of this study was to: 1) evaluate the predictive validity of the ActivPAL energy expenditure (EE) equation; and 2) develop and test the classification accuracy of ActivPAL physical activity (PA) intensity cut-points, in preschoolers.

METHOD: Children aged 4-6yr (5.3±1.0yr) completed a ~150-min room calorimeter protocol involving age-appropriate sedentary (SED), light (LPA) and moderate-to-vigorous (MVPA) intensity physical activities (e.g. watching TV, drawing, and running). The participants were randomly allocated into two groups to develop and cross-validate PA cut-points. EE was measured by room calorimetry and, in conjunction with direct observation, used as the criterion measure. Predicted EE was calculated using the ActivPAL equation provided by the
manufacturer. Receiver operating characteristic curve analysis were used to determine PA intensity cut-points for SED and MVPA. SED, LPA and MVPA were classified using the cut-points developed in this study. Predictive validity was evaluated using dependent-samples t-tests. Classification accuracy was evaluated using linear weighted Kappa statistics, sensitivity, specificity, and area under the receiver operating characteristic curve (ROC-AUC).

RESULT(S): The ActivPAL EE equation significantly overestimated METs during SED and significantly underestimated METs for LPA and MVPA (all P<0.001). The developed cut-points resulted in excellent classification accuracy for SED (ROC-AUC=0.93) and MVPA (ROC-AUC=0.92). Classification accuracy for LPA was fair (ROC-AUC=0.79). Overall, the cut-points exhibited substantial agreement (κ=0.74).

CONCLUSION(S): The current ActivPAL EE equation requires further development before it can be used to accurately estimate EE in young children. The developed cut-points exhibited acceptable classification accuracy; however studies cross-validating these cut points in free-living preschool-aged children are recommended.

S32.3 Factors at child care associated with physical activity for children during time at these centers
Ward DS, Hales DP, McWilliams CP, Mazzucca S, Vaughn AE

PURPOSE: Researchers have observed low levels of physical activity (PA) in children during their time in child care settings. This presentation will explore the association between child PA and child care practices.

METHOD: Data were collected from children (n = 500) enrolled in 50 childcare centers in North Carolina. Children’s activity was measured over 4 child care days using the GT1M accelerometer, programmed with a 15s epochs. Age-specific cutpoints were applied to calculate minutes of moderate-to-vigorous PA (MVPA) using SAS v9.3. Adherence to best practice guidelines were assessed with the Environment and Policy Assessment and Observation instrument. Children’s PA levels were examined across centers based on level of adherence to the following best practices: amount of free time for active play, structured teacher-led activities, amount of outdoor time, amount of quiet activity time, staff training, and written PA policies.

RESULT(S): PA (% time in MVPA) was greater in centers allocating more time for active play (6% vs. 15%), while sedentary time was lower (45% vs. 65%). Teacher-led activities were associated with greater MVPA (<1/day: 42min MVPA; 1-1.9/day: 45 min MVPA; ≥2/day: 62 min MVPA). PA increased with number of outdoor opportunities (0 times/day vs. ≥3 times/day: 40% increase in min. MVPA). Teacher training and written policies were positively associated with PA.

CONCLUSION(S): Prior research estimates that > 50% of variation in children’s PA is attributed to child care characteristics. This study identified specific practices to be targeted to increase PA of children in child care settings.

FUND SOURCING: Supported by a Robert Wood Johnson Healthy Eating Research Grant
S33 Improving fruit and vegetable intakes in children – Translating research into practice

Chair: Evans Charlotte EL
Nutritional Epidemiology Group, Centre for Epidemiology and Biostatistics, University of Leeds, Leeds, United Kingdom

PURPOSE: This symposium aims to provide insight into how the school and home environments affect children’s fruit and vegetable consumption. These studies identify important behaviours and determinants of children’s fruit and vegetable consumption that provide valuable insight for future intervention designs and methodologies. This symposium will also describe the results from some of the latest intervention work conducted to increase children’s fruit and vegetable intake. Describing the effects of a garden intervention and cooking intervention on primary children’s consumption and a school based intervention to improve adolescent consumption.

RATIONALE: Fruit and vegetables are a fundamental component of a healthy diet. Currently, children’s consumption of fruit and vegetables is low in the United States of America, Australia and most European countries. Epidemiological evidence indicates that a diet rich in fruit and vegetables can decrease the risk of developing cardiovascular disease, stroke, hypertension, type 2 diabetes mellitus, obesity and several forms of cancer. A diet low in fruit and vegetable intake is one of the top ten risk factors for global mortality. Research has also revealed that dietary habits are developed in childhood and persist throughout life; therefore it is vital that children from a young age consume adequate levels of fruit and vegetables.

OBJECTIVE(S): • To determine if SEP indicators moderate associations of personal and environmental predictors with children’s fruit and vegetable intake. • To describe the findings from a large randomised control trial evaluation of a school gardening study. • To examine behaviours that mediate and moderate impact on fruit and vegetable (FV) related behaviours of 4th graders enrolled in a school-based cooking experience. • To determine the effectiveness of a multi-component programme to improve fruit and vegetable intake in adolescents.

SUMMARY: In summary, providing children with educational based learning activities such as cooking or gardening at school, providing free fruit at school and encouraging families to have a meal together could have an important effect on children’s fruit and vegetable consumption. Future work needs to be done to tailor interventions to address the importance of both the home and the school environment and encourage higher fruit and vegetable consumption in the whole family. Interventions that only target the school or home may only have a limited impact on children’s diets.
S33.1 Does socioeconomic position moderate associations of predictors with fruit and vegetable intake in children?  
Zarnowiecki DM, Parletta N, Dollman J

PURPOSE: Children, particularly those of low socioeconomic position (SEP), consume insufficient fruit and vegetables, but drivers for improving intake remain unclear. Socioeconomic differences in predictors suggest that different factors may be associated with fruit and vegetable intake in children of differing SEP. The aim of this study was to determine if three SEP indicators moderated associations of personal and environmental predictors with children’s fruit and vegetable intake.

METHOD: N=395 children aged 9-13 years and parents were recruited in Adelaide, South Australia. Intrapersonal and environmental predictors of children’s diet were measured using child-completed online questionnaires and telephone interviews with parents. Fruit and vegetable intake was measured using a semi-quantitative FFQ. Predictors of fruit and vegetable intake were determined using correlated component regressions, and subsequently tested for moderation by four SEP indicators using Partial Least Squares Structural Equation Modelling.

RESULT(S): Fruit and vegetable intakes were predicted by child self-efficacy, attitudes, and a supportive home environment. None of the predictors of girls’ fruit and vegetable intake were moderated by any of the socioeconomic indicators. For boys, mother’s employment status (β=0.11, p=0.04) moderated the relationship between supportive family environment and fruit intake, and income (β=0.11; p=0.04) moderated the relationship between attitudes and vegetable intake.

CONCLUSION(S): Increasing fruit and vegetable intake among children may be more successfully achieved by tailoring health promotion policies and interventions to the differing needs of children of different socioeconomic groups, as well as differences between boys and girls.

FUND SOURCING: ARC Linkage Grant with SA Health (#LP0883949)

S33.2 Relationship of the eating environment and fruit and vegetable consumption in UK children  

PURPOSE: There is limited knowledge on the eating environment and food consumption in children. This study assessed the associations between four eating context factors and fruit and vegetable (FV) consumption in UK children.

METHOD: Using 4 d unweighed food diaries, data were collected for 642 children aged 1.5-10y in the UK National Diet and Nutrition Survey (2008-2010). Food and drinks consumed at each eating occasion was recorded, alongside with 1) where the food was consumed, 2) with whom, 3) whether the TV was on, and 4) if eaten at a table. Mixed logistic regression and
mixed multinomial logistic regression were used.

RESULT(S): Over 70% of EOs took place at home. Frequency of eating alone and with friends increased with age. Compared to eating at home, school children were more likely to consume fruit at school; all children were less likely to eat vegetables in other places. Compared to eating with parents only, children aged 1.5-6y were more likely to consume vegetables with parents and siblings, and with adult friends and relatives; all children were less likely to consume vegetables when eating alone. All children were more likely to eat vegetables when the TV was off than on and at a table than not at table.

CONCLUSION(S): Fruit consumption is associated with physical settings such as school, while vegetable consumption is more related to social contexts; as well as TV off and eating at the table. The findings shed light on the possible impact of school food standards and programmes.

FUND SOURCING: MRC Project No. MC_US_A090_0039

S33.3 Can a school gardening intervention improve children’s fruit and vegetable intake?
Christian MS, Evans CEL, Cade J

PURPOSE: This study is two parallel randomised controlled trials (RCT) devised to evaluate the school gardening programme of the Royal Horticultural Society (RHS) Campaign for School Gardening, to determine if it has an effect on children’s fruit and vegetable intake. These are the first RCTs of a school gardening intervention in the United Kingdom.

METHOD: Trial One consisted of 26 schools; these schools were randomised into two groups, one to receive the RHS led intervention and the other to receive the Teacher Led intervention. Trial Two consisted of 32 schools; these schools were randomised into either the Teacher Led or a comparison group with delayed intervention. Baseline data collection was conducted in September 2009 using a 24-hour food diary (CADET) to collect data on dietary intake and a questionnaire exploring children’s knowledge and attitudes towards fruit and vegetables. Follow-up collection was conducted in December 2011.

RESULT(S): 663 children completed trial one and 959 completed trial two, with a mean age of 9.7 years (SD: 0.6). Clustered regression analysis revealed the intervention had no impact on change in intake of fruit and vegetables for trial one (16g, 95% confidence interval -10 to 43g; p=0.23) or for trial two (22g, 95% confidence intervals -82 to 38g; p=0.4) after adjusting for gender, ethnicity and Index of Multiple Deprivation Score.

CONCLUSION(S): Whilst a school garden can be a positive teaching tool in primary schools, a more comprehensive focus on changing fruit and vegetables consumption is required to increase children’s intake.
FUND SOURCING: National Institute for Health Research Public Health Research (NIHR PHR) programme (project number 09/3001/19)

S33.4 Child cooking experience, gender and their parent eating behaviors as mediators and moderators of fruit and vegetable-related responses to a school-based cooking program

Lohse BA, Cunningham-Sabo L

PURPOSE: Examine behaviors that mediate and moderate impact on fruit and vegetable (FV) related behaviors of 4th graders enrolled in a school-based cooking experience.

METHOD: Changes in (FV) attitudes, self-efficacy and preference were examined in 2 cohorts of elementary school children following a year-long cooking and tasting program (Cooking with Kids) in 11 public schools in low-income neighborhoods in southwestern US. Parent eating competence (EC), self-efficacy, outcome expectancies and behaviors toward cooking and eating, with an emphasis on FV, were examined near the end of the school year and compared to their child’s outcomes using general linear modeling and cluster analysis.

RESULT(S): Students (n=961) were 50% female, 84% Hispanic with 92% in 4th grade. Parents (n=339) were 50% female, 78% Hispanic with mean age of 37.2 ± 7.7 y. Cooking with Kids positively impacted FV preference with greatest gains in males and those without prior cooking experience. Parent FV self-efficacy was positively associated with child pre-intervention cooking experience. Parent modeling of FV-related practices and self-efficacy was associated with child self-efficacy and FV preference; these associations were stronger for children without prior cooking experience. In-home FV availability was associated with child self-efficacy. EC was a moderator of parent modeling behavior toward meals and FV, in-home FV availability, and parent self-efficacy toward FV. Two clusters of parent food and meal-related behaviors were identified and differentiated by EC status.

CONCLUSION(S): Parent FV related behaviors and EC mediated and moderated elementary school-age learner outcomes from a school-based, yearlong cooking intervention.

FUND SOURCING: Supported by the National Research Initiative of the USDA National Institute for Food and Agriculture, Grant no. 2007-05062 and the Agriculture and Food Research Initiative Grant no. 2011-67001-30117 from the USDA National Institute of Food and Agriculture Childhood Obesity Prevention Challenge Area.

S33.5 Promoting fruit and vegetable intake among teenagers: first year results from the multicomponent cluster-randomised Boost trial

Krølner R, Thygesen LC, Ellegaard JS, Aarestrup AK, Suldrup JT, Due P

PURPOSE: Intake of fruit and vegetables (FV) decreases from age 11 to 15, but few
interventions have targeted teenagers. This study evaluated effects of the Boost intervention on 13-year-olds’ FV intake at the end of intervention (first follow-up).

METHOD: The intervention combined curricular activities, free daily provision of FV at school, and newsletters to parents, sports- and youth clubs. It was tested in a cluster-randomised trial among 2,289 year 7 pupils from 40 randomly selected Danish schools (20 intervention- and 20 control schools). Total daily FV intake was assessed by 24-hour recall questionnaires completed before the intervention (August 2010) and immediately after the intervention (May/June 2011). The analyses included 1,540 pupils with complete baseline and first follow-up data. Over-reporters were excluded. Intervention effects on fruit-, vegetable- and FV intake were analysed by multilevel linear regression analyses with baseline intake of FV, parental occupational social class, and sex as covariates.

RESULT(S): The intervention had significant effects on intake of FV and fruit, but not on vegetable intake. Pupils at intervention schools ate 75.8 gram (SE: 22.8) more FV per day at first follow-up compared to pupils at control schools.

CONCLUSION(S): The preliminary available case analyses indicated that the Boost intervention was effective in increasing 13-year-olds’ FV intake, but mainly fruit intake, at the end of intervention. Intention-to-treat analyses will be conducted imputing missing values at first follow-up by multiple imputation. Second follow-up data will reveal if effects can be maintained. Effective strategies to promote teenagers’ vegetable intake need to be developed.

FUND SOURCING: TrygFonden; University of Southern Denmark
Involvement of parents in multicomponent school-based interventions targeting energy balance related behaviours among children and adolescents: Lessons learned from process evaluation

Chair: Krølner Rikke
Centre for Intervention Research in Health Promotion and Disease Prevention, National Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark
Discussant: Maes Lea
Unit Health Promotion and Education, Department of Public Health, Ghent University, Ghent, Belgium

PURPOSE: Previous research has suggested that the effectiveness of school-based interventions can be improved by parental involvement, but process evaluation of this component is seldom reported. Data from process evaluation can be used to interpret intervention effects and to inform the development of effective parental components. The purpose of this symposium is therefore to present quantitative and qualitative studies of implementation of parental components in interventions targeting energy balance related behaviours among children and adolescents and to bring together researchers to discuss successful strategies to involve parents. The symposium will report findings from Europe, US and Australia.

RATIONALE: Eating habits and physical activity patterns in childhood and adolescence are greatly influenced by parents and the home environment. Parental involvement is therefore often emphasized as important for school-based interventions. Many school-based interventions face challenges in reaching and involving parents, especially low income parents. A recent review of school-based obesity prevention programs showed that most studies which included a parental component did not provide sufficient, descriptive information regarding strategies, focus, content, and level of parental participation. Thus, there is a need for thorough process evaluation studies to explore the kind of parental involvement that may contribute to positive program outcomes.

OBJECTIVE(S): 1) To present findings from quantitative and qualitative process evaluation of parental components addressing different behaviours in multiple country settings 2) To provide examples of intervention strategies to involve parents 3) To stimulate discussion about effective ways to involve parents in school-based health promotion 4) To stimulate discussion about methodological issues of conducting process evaluation of parental components

SUMMARY: The chairperson will introduce the topic briefly. Three presentations will be given, providing examples of process evaluation of parental components in interventions targeting sedentary behavior and fruit and vegetable intake among children and adolescents. The parental components in these three intervention studies consist mainly of parental newsletters and homework tasks for the child to complete with their parents. The fourth presentation will present a different model for parental involvement in health activities at
the school level. This model incorporates health into an existing organizational structure, Parent Teacher Associations. A moderator will facilitate a general discussion of the topic by the audience and presenters.

S34.1 Process evaluation of the parental component in the Boost study - a school-randomized trial targeting fruit and vegetable intake among Danish adolescents
Ellegaard JS, Suldrup JT, Aarestrup AK, Due P, Krølner R

PURPOSE: School-based dietary interventions often include a parental component, but the degree of implementation is seldom reported. This study evaluated the implementation of six parental newsletters in the Boost study, a multicomponent school-randomized controlled trial targeting fruit and vegetable intake among year 7th graders (~13-year-olds) in school year 2010/11.

METHOD: Post-intervention questionnaire data from parents and teachers at 20 intervention schools were analysed descriptively. Process measures: Dose delivered: number of newsletters uploaded by teachers to the school’s website. Dose received: if parents had seen and read the newsletters. Appreciation: perceived usefulness of newsletters. Reach: dose received stratified by gender and parental occupational social class (OSC).

RESULT(S): Questionnaires were completed by parents of 58.7% of the students (N=658) and by teachers at 18 out of 20 intervention schools. Dose delivered: 11 teachers (61.1%) uploaded all newsletters. Dose received: 65.5% of the parents had seen the newsletters; 49.2% had read at least one. Appreciation: 39.2% found the newsletters useful. Reach by OSC and gender: Among parents, 56.1% of high OSC, 46.8% of medium OSC, and 40.0% of low OSC had read at least one newsletter; 30.6% of mothers and 18.0% of fathers had read at least one newsletter.

CONCLUSION(S): Parental involvement was challenged by the fact that all newsletters were not uploaded. Newsletters were read by only half of the parents, especially fathers and low OSC parents were difficult to reach. The findings may be subject to selection bias due to parent non-response. Strategies to improve parents’ participation in school-based interventions and surveys should be developed.

FUND SOURCING: TrygFonden, University of Southern Denmark

S34.2 Parents’ engagement in an Australian school- and home-based group RCT to reduce children’s sitting time and promote physical activity: Transform-Us!
PURPOSE: Transform-Us! was a 3-year group RCT aiming to determine the effectiveness of strategies to reduce 8-year old Australian children’s sedentary behaviour (SB) or promote their physical activity (PA), or both (PA+SB) compared with usual practice (C) at school and home.

METHOD: Process evaluation data were collected at post-intervention (T3) Nov/Dec 2011. Nine newsletters per year were sent to parents’ homes in the first two years (18 in total) that focused on potential mediating factors. Children were also given homework tasks by their teacher to complete with their parent/s.

RESULT(S): A total of 366 parents completed a survey at T3; with 75% of intervention parents reporting having heard of the Transform-Us! program compared with 57% of C parents. 80% of parents in the PA and SB arms and 69% of parents in the PA+SB arm reported receiving the newsletters (55-78% received 3 or more). Most (63-78%) parents reported them to be useful. Fewer parents in the SB group reported following the activities in the newsletters with their child compared with parents in the PA and combined groups. Parents reported favourably on the active homework and 64-80% of parents reported they would be happy to continue with the Transform-Us! program.

CONCLUSION(S): Parents in the SB group reported lower awareness and engagement in the program than the PA groups. The newsletters had reasonable reach with parents and the active homework was popular. More research is needed to help parents understand the importance of reducing children’s SB and how this might be achieved.

FUND SOURCING: National Health and Medical Research Council of Australia; Diabetes Australia Research Trust

S34.3 Reaching home and creating parent-child interactions through NEWS in a cross-European school-based intervention targeting sitting time of 10-12 year olds. The UP4FUN intervention

Bjelland M, Maes L, Manios Y, Kovács É, Bere E, Willhöft C, Brug J, Lien N

PURPOSE: Many behaviours targeted in school-based interventions are strongly influenced by the home environment. Intervention strategies should therefore successfully reach the parents. The aim of the study was to assess whether the strategies used in the UP4FUN intervention had reached the parents and created parent-child interactions.

METHOD: A six weeks intervention targeting sitting time was implemented in two grade levels (10-12 year olds) in 31 convenient schools in Belgium, Germany, Greece, Hungary and Norway. Weekly NEWS were brought home by the children and included personal messages, facts, suggestions for parents and children and tasks. Post-intervention process evaluation data were collected by questionnaires from 1605 children and 1224 parents. The preliminary results are based on descriptive statistics.
RESULT(S): Over the six weeks, parents reporting to have partly/completely read the NEWS declined from 70% to 45%. Most parents found the NEWS easy to read, believed in the content and thought the amount of text was about right. However, the proportion finding the suggestions very useful differed by country with a high of 50% in Greece and a low of 16% in Germany. Also the proportion of parents talking to others about the content in the NEWS ranged from 57% in Greece to 16% in Belgium. Substantial proportions of the pupils did not do or share their personal messages with the family and this was reflected in the parents’ reports.

CONCLUSION(S): The reach of the parents declined during the intervention and the family interaction about the project was low.

FUND SOURCING: Seventh Framework Programme (CORDIS FP7) of the European Commission
S35 Implementation knowledge is the key to correct conclusions on effectiveness of physical activity promoting interventions

Chair: Samdal Oddrun¹
Discussant: Samdal Oddrun¹
¹Department of Health Promotion and Development, University of Bergen, Bergen, Norway

PURPOSE: The symposium aims to discuss which type of implementation knowledge is the key to draw correct conclusions on program effectiveness both in pilot evaluation of programs and when scaling up programs for population based implementation. A comprehensive model (RE-AIM) to capture implementation activities and a wide scale of approaches to identify implementation knowledge are discussed.

RATIONALE: Intervention effectiveness is dependent on implementation fidelity. Without knowledge on the concrete implementation of program components erroneous conclusion of non-effectiveness or effectiveness can be taken, when in reality, implementation deviations make the difference.

OBJECTIVE(S): 1. Identify implementation fidelity in both pilot and large-scale implementation of physical activity interventions 2. Identify implementation fidelity measures 3. Contribute to specificity implementation research by distinguishing between local adaptation not compromising program effectiveness and implementation components central to achieving program effectiveness

SUMMARY: The symposium will start out by highlighting research needs within implementation research for public health interventions. The four paper presentations aim to fill identified gaps and discuss needs for further developments. The two first paper presentations report on a French and a Norwegian pilot implementation of a coach education program developed in the UK. Use of a systematic model and observation studies are presented to identify their usefulness in establishing implementation fidelity. The two last presentations report on nation-wide implementation of previously tested pilots, identifying key implementation factors for program effectiveness when scaling up the intervention. The findings from the four papers will be discussed with the aim to better understand where there might be scope for adaptations of program components without compromising effectiveness and which components and implementation actions that need to be implemented with fidelity to achieve program effectiveness.

S35.1 Implementation fidelity – Exploring delivery of the Empowering Coaching program through the use of an observation grid
Søvik ML, Larsen TMB, Tjomsland HE, Samdal O

PURPOSE: The Empowering Coaching program, developed by University of Birmingham, is an intervention focusing on youth motivation for physical activity through football. The program builds on the principles of self-determination theory (SDT), aiming at preventing
The purpose of this study is to qualitatively evaluate the fidelity of the implementation of the Empowering Coaching program in Norway through observation studies to inform the evaluation of the effectiveness of the program, and to contribute to improved understanding of fidelity.

METHOD: A case study design has been employed for the process evaluation of this fidelity study. Seven coach educators (CE) have been videotaped when delivering the workshops to participating grassroots coaches. The workshops have been transcribed before coding the data through the use of an observation grid.

RESULT(S): There seem to be differences among the CEs’ program fidelity, especially regarding the quality of delivery of core themes in the SDT, like quantity and quality of motivation, autonomy, belonging and different aspects of competence.

CONCLUSION(S): The use of observation through analysis of video tapes of the implementation is innovative to the field of fidelity studies. It identified key differences between the CEs in their implementation fidelity. An important next step is to identify whether these differences impact on the effectiveness of the program to better understand whether variations in fidelity compromises effectiveness or can be seen as productive local adaptations.

FUND SOURCING: EU, FP7; University of Bergen, Faculty of Psychology

S35.2 RE-AIM evaluation of the Promoting Adolescent Physical Activity project in France
Van Hoye A, Heuzé J-P, Sarrazin P

PURPOSE: To encounter the difficulty of measuring interventions and report results and process, the RE-AIM framework was recently designed. Comprising five dimensions (Reach, Effectiveness, Adoption, Implementation, and Maintenance), this set of criteria allowed us to calculate a percentage score for each dimension of the PAPA project in France. The goal of this project was to maximize an optimal sport participation of young football players through an educational workshop delivered to their grassroots coaches by trained expert coaches. The pyramidal process of this project is characterised by three levels: (1) training of expert coaches, (2) club involvement, and (3) individual impact for the grassroots coach and their players.

METHOD: To appreciate at which level of the pyramidal process are the program (in-) effectiveness situated, operational qualitative and quantitative indicators were designed for each dimension.

RESULT(S): Results indicated high scores for expert coach training. At the club level, low scores for Reach and Effectiveness, moderate score for Implementation, and good scores for Adoption and Maintenance were found. At the individual level, low scores were noted for Reach, Effectiveness and Maintenance, whereas Adoption scores are moderate.
CONCLUSION(S): Implementation suggests that modifications like more time allowed, field practice and a closer follow-up are needed. These findings suggested that the training of expert coaches was effective, giving the opportunity for research program to be better rooted in the community. At the two other levels, suggestions for improvement and moderators of the intervention were identified through this process analysis.

FUND SOURCING: EU, FP7

S35.3 Implementation of the national exercise referral scheme in Wales
Moore L, Moore G, Murphy S

PURPOSE: Despite a recognised need for effective public health interventions encouraging sedentary people with a medical condition to become more active, there are few rigorous evaluations of their effectiveness. The national exercise referral scheme in Wales was implemented within the context of a pragmatic randomised controlled trial.

METHOD: The randomised controlled trial, with nested economic and process evaluations, recruited 2,104 inactive men and women aged 16+ with coronary heart disease (CHD) risk factors and/or mild to moderate depression, anxiety or stress. Consenting participants were randomised to either a 16 week tailored exercise programme run by qualified exercise professionals at community sports centres (intervention), or received an information booklet on physical activity (control). The scheme had a logic model which included a number of key components, including goal setting, motivational interviewing, group activity sessions, follow up and relapse prevention strategies. The process evaluation explored factors determining the effectiveness of the scheme, including observation of sessions, interviews with managers, exercise professionals and participants.

RESULT(S): Overall, the scheme was effective in increasing physical activity among participants. However, a minority of key components were implemented consistently and in accordance with the specified scheme. Goal setting, motivational interviewing, and follow-ups were not implemented consistently with variation at practitioner and area level.

CONCLUSION(S): Recommendations to improve the implementation of the scheme have been made as a result of this study and are currently being taken forward to improve the reach, consistency and sustainability of participant benefits.

S35.4 Implementation failure and success: examples from evaluations of population-level physical activity programs in Australia
Bauman A

PURPOSE: Many interventions studies have high internal validity but generate evidence that is not translated at the population level.
METHOD: Two examples of physical activity interventions are presented that illustrated effective and ineffective research translation.

RESULT(S): Example 1: Five stair use signage interventions, based on point-of-choice decision theory, have been reported in Australia. They demonstrated significant effects in influencing stair use; the absolute effect size was a 4-5% increase, similar to that observed in 37 studies published internationally. However, no efforts were made to identify community barriers to their wide-scale adoption, and they have not been implemented as public health strategies to increase incidental physical activity. Reasons for this implementation failure are discussed. Example 2: in New South Wales, the State-wide ‘Get Healthy’ program (2010-present) scaled up evidence-based telephone lifestyle interventions, offering 10 counselling sessions to the whole population at no cost, accessed through a 1-800 telephone number. Behavioural measures were self-report, but PA was validated against accelerometry in a subsample [n=40]. The Get Healthy program was more likely to be utilized by adults resident in socially disadvantaged and in remote rural regions. Of 1400 people completing the program, median increases of 1 session of walking / week, and 0.5 sessions of moderate and vigorous physical activity/week were noted [all p<0.001], and the prevalence of ‘health-enhancing physical activity’ meeting recommendations increased from 35% to 56.5% [p<0.01]. This project demonstrated effective up-scaling of evidence based interventions, and wide population reach.

CONCLUSION(S): The two projects presented here show contrasting degrees of implementation into population settings.
The relationships between the physical environment and physical activity in older adults: results from four different continents

Chair: Van Holle Veerle
Department of Movement and Sport Sciences, Ghent University, Ghent, Belgium
Discussant: De Bourdeaudhuij Ilse
Department of Movement and Sport Sciences, Ghent University, Ghent, Belgium

PURPOSE: This symposium provides an overview of studies investigating physical environmental correlates of physical activity behavior in older adults. Studies were conducted across four different geographic areas, so results can be compared cross-continentally.

RATIONALE: According to ecological models, the physical environment plays a crucial role as a correlate of specific PA behavior. The physical environment–PA relationship has been investigated in different age groups. However, current knowledge on these relationships in older adults is scarce and inconsistent.

OBJECTIVE(S): This symposium aims to: (1) present studies that have addressed associations between neighbourhood environmental features and physical activity behavior in older adults across 4 different continents (2) provide a forum to discuss differences in results between these studies and to share experiences (3) discuss implications for further research and practice based on the findings.

SUMMARY: The presentation sequence will be: 1) Is physical activity associated with objective neighborhood walkability and SES in older adults? Findings from the Belgian Environmental Physical Activity Study (BEPAS) in Seniors (Van Holle V, Belgium). This study investigated whether objective neighborhood walkability was related to physical activity behavior, and the moderating effect of neighborhood SES. 2) Neighbourhood destination and route attributes associated with regular walking among older Australian men and women (Sugiyama T, Australia). This study examined perceived destination and route attributes associated with regular walking in older men and women using the Australian Diabetes, Obesity and Lifestyle (AusDiab) study. 3) Neighborhood Environments, Physical Activity, and Function Among US Older Adults: Findings from the Senior Neighborhood Quality of Life Study (SNQLS) (Sallis J, US). SNQLS was designed to evaluate an ecological model of physical activity and physical function among older adults. This presentation summarizes multiple analyses concerning the role of neighborhood environments in older adults’ PA. 4) Recreational destinations and leisure-time physical activity in Chinese urban elders (Cerin E, Hong Kong). The built environment may impact on elders’ ability to engage in leisure-time physical activity. This study aimed at investigating relationships between recreational facilities and self-reported leisure-time physical activity in older adults living in an ultra-dense city. Furthermore, the study examined whether these associations depend on other environmental factors.
S36.1  Is physical activity associated with objective neighborhood walkability and SES in older adults? Findings from the Belgian Environmental Physical Activity Study (BEPAS) in seniors
Van Holle V, Van Cauwenberg J, Deforche B, De Bourdeaudhuij I

PURPOSE: The current study aimed to determine relationships between GIS-based neighborhood walkability and physical activity behavior in community-dwelling Belgian older adults. Furthermore, moderating effects of neighborhood SES were investigated.

METHOD: The Belgian Environmental Physical Activity Study for Seniors is a large-scale cross-sectional study in older adults (=65y) and was conducted between October 2010 and September 2012. In total, 504 seniors living in 20 neighborhoods participated in the study. Stratification of selected neighborhoods was based upon objective walkability and socioeconomic status. Self-reported levels of moderate-to-vigorous physical activity (MVPA), transportation walking/cycling and recreational walking/cycling was assessed using the International Physical Activity Questionnaire (long, last 7 days version) adapted for the elderly.

RESULT(S): Our findings indicate that residents of high walkable neighborhoods walked more for transportation than people living in low walkability neighborhoods, and these differences were more pronounced in low SES areas (p=0.04). On the other hand, older adults living in high walkable neighborhoods reported lower levels of recreational cycling (p=0.01) and total MVPA (p=0.03) than those living in low walkable environments, independent of SES. No significant relationships were observed between older adults’ objective living environments and transportation cycling.

CONCLUSION(S): Our findings on relationships between walkability and older adults’ transportation walking are in accordance with the BEPAS conducted in adults (18-65y), but for the elderly, targeting different SES groups is also relevant. On the other hand, results on total MVPA and recreational cycling contrast with the BEPAS Adults findings and might indicate an age-specific relationship between the environment and physical activity.

FUND SOURCING: This study was supported by the Fund for Scientific Research Flanders (FWO)

S36.2  Neighbourhood destination and route attributes associated with regular walking among older Australian men and women
Sugiyama T, Oka K, Shibata A, Salmon J, Owen N

PURPOSE: This study examined perceived destination and route attributes associated with regular walking by older men and women using the Australian Diabetes, Obesity and Lifestyle (AusDiab) study.

METHOD: AusDiab is a population-based study on diabetes and its risk factors in adults. We
used the data on older adults (aged over 65 years) collected in 2004-2005 (N=1676, 48% men, mean age 73 years). The outcome of the study was self-reported frequency of walking in the last week. The exposure variables were nine perceived attributes of neighbourhood destinations and routes. Multilevel logistic regression analyses examined environmental attributes associated with regular walking (5 times/week or more), separately for men and women, adjusting for socio-demographic variables.

RESULT(S): The proportion of participants who reported regular walking was 44% in men and 36% in women. In men, one destination attribute (shops within walking distance) and two route attributes (many alternative routes, bicycle or walkway tracks nearby) were significantly associated with regular walking. In women, two destination attributes (shops within walking distance, parks nearby) and four route attributes (many alternative routes, bicycle or walkway tracks nearby, the presence of footpaths, feeling safe to walk during the day) were associated with regular walking.

CONCLUSION(S): Having utilitarian destinations, many route choices to reach them, and routes that can be used for recreational walking in one’s neighbourhood seems conducive to older adults’ regular walking. Older women’s walking may be influenced by additional environmental factors, including the presence of recreational destinations and route-related attributes (availability of footpaths and perceived safety).

FUND SOURCING: The AusDiab study is funded by the Federal Government through a National Health and Medical Research Council grant, as well as support from State governments, academic and industry partners.

S36.3 Neighborhood environments, physical activity, and function among us older adults: findings from the Senior Neighborhood Quality of Life Study (SNQLS)
Sallis JF, Adams MA, Carlson JA, Frank LD, Cain K, Conway TL, Kerr J, King AC

PURPOSE: SNQLS was designed to evaluate an ecological model of physical activity (PA) and physical function among older adults. This presentation summarizes multiple analyses concerning the role of neighborhood environments in older adults’ PA.

METHOD: SNQLS was a cross-sectional study of two U.S. regional samples of community dwelling older adults living in neighborhoods differing in objectively measured walkability and income. Participants were 719 adults ages 66 years and older. Measurements included reported walking for errands and outdoor recreation activities measured by CHAMPS; accelerometry-based moderate-to-vigorous PA (MVPA); reported BMI; reported Late-Life Function and Disability Instrument; reported neighborhood environment on the NEWS; and psychosocial surveys of social support, barriers, etc.

RESULT(S): Across regions and neighborhood income, older adults living in more walkable neighborhoods had more walking for errands and MVPA and lower BMI relative to those living in less walkable neighborhoods. It appeared walkable neighborhoods allowed even
mobility-impaired adults to continue high levels of walking for transport. Latent profile analysis was used to create neighborhood profiles based on NEWS scales. The 11-variable profiles were associated with larger differences in MVPA and walking for errands than the 4-component walkability index. Analyses of interactions between environmental and psychosocial variables indicated that supportive environments were more strongly related to PA outcomes when psychosocial variables were more favorable.

CONCLUSION(S): Neighborhood built environments are related to PA and BMI outcomes in older adults, new conceptualization of environments may improve explanatory power, and environments interact with psychosocial variables in explaining PA of older adults.

FUND SOURCING: The Neighborhood Quality of Life Study in Seniors (SNQLS) project is funded by the National Institutes of Health, US.

S36.4 Recreational destinations and leisure-time physical activity in Chinese urban elders
Cerin E, Lee K-Y, Barnett A, Sit CHP, Cheung MC, Chan WM

PURPOSE: The built environment may impact on elders’ ability to engage in leisure-time physical activity (LTPA). Environmental correlates of LTPA in Chinese older residents of ultra-dense cities are unknown. The main aim of this study was to examine associations of objectively-measured recreational facilities in the neighborhood with LTPA (walking and other forms of activity) in Chinese elders residing in an ultra-dense city. We also examined whether these associations depend on other environmental factors.

METHOD: This study was conducted in Hong Kong in 2007-2008. We investigated relationships of neighborhood environmental attributes (measured using environmental audits) with LTPA (interviewer-administered questionnaire) in 484 elderly able to walk unassisted and living in 32 neighborhoods stratified by socio-economic status and walkability.

RESULT(S): Recreational walking was positively related to availability of parks, availability of public facilities, indoor/covered places for walking, and environmental aesthetics. It was negatively related to pollution, littering, and signs of crime/disorder. The odds of non-participation in other LTPA (OLTPA) were related to availability of recreational facilities (ORs from 0.96 to 0.99) and infrastructure, aesthetics, and safety aspects of the neighborhood. These aspects also moderated the relationships of recreational facilities with non-participation in OLTPA, these being negative only in safe, aesthetically-pleasing locations with good infrastructure.

CONCLUSION(S): Safe, aesthetically-pleasing, low-pollution neighborhoods with easy access to recreational and public facilities may facilitate engagement in LTPA in Chinese urban elders able to walk unassisted.

FUND SOURCING: This work was supported by grant no. 04060671 by the Health and Health Service Research Fund (Food and Health Bureau, Hong Kong SAR).
S37  Novel methods in the study of behavioural nutrition

Chair: Mikkelsen Bent Egberg  
Research Group for Meal Science & Public Health Nutrition (MENU), Department of Development and Planning, Aalborg University, Ballerup, Denmark

PURPOSE: The purpose of this symposium is to shed light on recent and innovative lab-based methods increasingly being used in modern research on behavioural nutrition.

RATIONALE: Human behaviour has always been hard to measure in a valid and reliable way. Past research in behavioural nutrition has focused on reported data from participants themselves, either using questionnaires or via interviews. Such research is prone to bias and often very time and resource consuming. Food laboratories studying food choice have gained ground in more recent time and these novel approaches to measure behavioural nutrition needs to be further investigated. ISBNPA 2013 should prioritise some of these new methodologies in behavioural nutrition and let researchers around the world exchange knowledge and know-how on behavioural nutrition research.

OBJECTIVE(S): The objectives of this symposium are to (i) explore the potential of using food laboratories in the measure of human behaviour. (ii) Create a basis for sharing the newest research and exchange of knowledge in the field of food lab-based behavioural nutrition research. (iii) Shed light on new theories on human nutrition behaviour and human behaviour change.

SUMMARY: Chair Prof. Bent Mikkelsen will introduce the symposium with a 5 minute presentation of the speakers. Prof. Armando Perez-Cueto will then give a presentation on the new Foodscape Lab that Aalborg University has started, introducing some of the potentials that the lab gives. Prof. Tamara Bucher will then give an insight in their interesting study on the fake food buffets study. Rene de Wijk will end the keynote presentations with insight and results from their top-of-the-line food lab in Wagening, Netherlands. The chair will ensure that the time frame of 20 minutes per person is complied with. The chair will also lead a 30 minute panel discussion at the end, with special focus on the opportunities and limitations of these methods.

S37.1  The role of choice architecture in public health nutrition

Perez-Cueto AFJ, Skov LR

PURPOSE: As the obesity epidemic expands worldwide, most of the responsibility of the fight against obesity and the consequent chronic diseases has been given to individual choice, hence recommendations and policies have been designed with this particular approach in mind. However, it is clear for the scientific community that the determinants of food intake and physical activity go beyond the rational choice made by individuals. Therefore, such approach has overlooked many of the other determinants of food intake and physical activity, and particularly the role that the foodscapes and the society as a whole can play as
whole. The main question is whether it is possible, at this point, to respect the individual right to choose while at the same time making the healthier food choices the default choices? The implications from a public health nutrition perspective include answering the question of ethics in the struggle between common welfare and individual rights to choose; assessing the role of synergies between public and private sectors in the common agenda in favour of a healthier lifestyle (including diet an physical activity); launching interventions that are more likely to succeed in their goals at population level.

METHOD: Furthermore, recent research at laboratory scale has shown promising pathways for future interventions, research and forecasts new interdisciplinary scopes for the field

FUND SOURCING: Internal research grant at Aalborg University

S37.2 The fake food buffet – An experimental method to investigate children’s food choices
Bucher T, Siegrist M

PURPOSE: Snacks play an important role in a child’s nutrition as they cover a large proportion of the child’s daily energy requirement. At school age, children make their first independent food choices. Investigating whether school-aged children are able to choose nutritious snacks is therefore of major interest. However, investigating children’s food choices is challenging due to ethical considerations or external environmental influences. To overcome these limitations, we use a fake food buffet in a controlled laboratory setting

METHOD: The fake food buffet is a validated method that uses replica foods for behavioural nutrition research. One hundred children aged between seven and ten were invited to select either a healthy snack or a preferred snack from a buffet with foods suitable for an afternoon snack

RESULT(S): Children were able to distinguish between healthy snacks and unhealthy snacks. Children who were asked to choose a healthy snack mostly chose fruits. Children who were asked to select a preferred snack mostly chose either fruits or sweet items such as chocolates, biscuits, cake or pastries. Interestingly, milk products, whole grain bread or vegetables were rarely chosen as healthy snacks, although these are nutritious

CONCLUSION(S): Children seem to be able to identify unhealthy items to a certain extent and recognize fruits as healthy. Children rarely chose other nutritious foods such as vegetables, dairy products or whole grain bread. Campaigns to improve children’s nutrition should focus more on promoting these neglected healthy foods rather than on promoting fruits only.
S37.3  Real-life observation of consumer behaviour in an instrument lunch restaurant in the Netherlands
Kremer S, de Wijk R

PURPOSE: Most of the food choices and food intake behaviour are the result of sub-conscious rather than conscious processing. Sub-conscious processes cannot be accessed reliably by introspection and self-report. Hence, consumer food choice and intake can be best studied in a natural environment using objective methods.

METHOD: For this purpose, an instrumented lunch restaurant was founded in Wageningen, the Netherlands. The so-called “Restaurant of the Future” is equipped with ceiling-mounted video-cameras, build-in weighing scales, an automatic consumer-tracking system, and automated cash registers.

RESULT(S): More than 800 registered visitors, all employees of Wageningen University Research Centre, visit the restaurant regularly, and sometimes daily. During their visits, food choices of each identified visitor are recorded automatically and related to characteristics e.g. nutritional content, portion size, and type of product.

CONCLUSION(S): These results provides insight in the composition of lunches and in determinants of repeated lunch selections of individual consumers, allowing answers to questions: are repeated selections based on energy, or preference for specific types of products, or other variables such as price and weight? Other methods are used to achieve more in-depth insight in consumer processes at the point of food choice. The cameras and tracking systems monitor the routing of the consumers between the various buffets providing information on the frequency with which inspection of a buffet result in purchases. Cameras built into the buffets provide additional information regarding gazing behaviour of visitors. Finally, selected visitors can be equipped with eye tracking systems and physiological sensors to provide information on intentional processes and product emotions.
Evaluating child care centers: a practical guide for getting started and moving forward

Chair: Sisson Susan B
Discussant: Sisson Susan B

1Behavioral Nutrition and Physical Activity Laboratory, Department of Nutritional Sciences, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, United States

PURPOSE: The purpose of this symposium will be to address the practical and process-related issues pertaining to evaluation of the obesogenic environment, particularly physical activity, of child care centers. Based on the concentric circles of the social-ecological model, role of the teacher, physical environment, and policy will be discussed as they are increasingly distal from the child, but all with distinct contributions to physical activity.

RATIONALE: While an update of the science is necessary, our overall goal is to involve the scientific audience in the discussion of these issues to provide tangible and practical direction for future research.

OBJECTIVE(S): 1. Discuss the state of the science and relevant process-related issues regarding the role of the teacher in obesogenic behaviors of children. 2. Discuss instruments and methods to evaluate the physical child care environment and practical considerations of these methodologies. 3. Summarize the role of policy in developing health-enhancing child care centers as well as issues relevant to selection of different assessment methods and pragmatic issues. 4. Lead a forum discussion involving the panel and scientific audience to discuss process-related considerations of researching in the child care center.

SUMMARY: Session 1: Kristen Copeland, MD Dr. Copeland will discuss the evidence supporting the importance of the teacher in the child care center environment and physical activity behaviors of young children. The process of measuring child care teachers’ behaviors and attitudes related to children’s physical activity will be discussed, with implications for future studies. Session 2: Catherine Draper, PhD Dr. Draper will introduce the importance of the physical element of the child care center environment. Different measurement tools as well as the appropriateness of use of these instruments in various cultures and countries will be discussed. Practical measurement and process-related questions and issues will be raised for discussion with the panel and audience. Session 3: Marlene Schwartz, PhD Dr. Schwartz will provide an update on the science pertaining to the impact of policy, state, local and site, on the obesogenic behaviors of children. She will discuss measurement issues and considerations as well as practical considerations for different assessments. Session 4: Susan B. Sisson, PhD Dr. Sisson will lead participatory discussion of relevant interest points pertaining to the three prior presentations. A focus will be on the practical, take-home lessons learned and where to move forward for researchers interested in evaluating this environmental impact on children’s health.
S38.1 The role of the teacher in promoting physical activity in child-care settings
Copeland K

PURPOSE: Dr. Copeland will review the scientific evidence regarding the role of teachers in promoting children’s physical activity and creating active opportunities for children in child-care settings. Key findings from both the qualitative and quantitative literature will be reviewed.

METHOD: The extent to which teachers may act as gatekeepers to the playground—and to physical-activity-promoting equipment such as balls, tricycles, and jump ropes—will be discussed. Dr. Copeland will review child-care providers’ attitudes towards children’s physical activity, their perceptions of its benefits and barriers, and the extent to which these attitudes are linked to children’s objectively-measured physical activity. She will also discuss findings related to child-care providers’ personal physical activity habits, body habitus, self-efficacy, and self-image, and how these relate to children’s physical activity. Lastly, she will discuss how teachers’ attitudes about the weather (e.g., not being a “cold-weather person” or concern that a child may become ill if exposed to cold air) may curtail children’s physical activity under certain conditions.

RESULT(S): In addition to research findings, Dr. Copeland will review existing instruments for measuring teachers’ attitudes and behaviors towards physical activity, and the practical limitations of these tools to measure relevant constructs.

CONCLUSION(S): The methodological issues of modeling teachers’ influences, given that children in child care may be exposed to multiple teachers over the course of the day, and modeling their gatekeeping behaviors, given that teachers have different roles (lead vs. assistant teacher) and different proclivities (daily classroom chores vs. organizing new activities), will be discussed, with suggestions made for future research.

S38.2 Assessing the child care environment: what works and what is appropriate?
Draper CE

PURPOSE: This presentation will briefly outline the key findings of studies that have evaluated the role of the child care environment in promoting physical activity, including a discussion of the main instruments and methods used.

METHOD: These studies have typically collected data via self-report (by child care practitioners) or by direct observation (by a researcher), and the constructs generally assessed are: opportunities for physical activity, and equipment and facilities available for physical activity. Physical activity opportunities account for both structured and free play activities, and time spent in indoor and outdoor activities. Equipment refers to fixed and portable equipment, and the type, quality, and accessibility of available equipment are assessed. Facilities can be indoor and outdoor, and an assessment is made of the size, type
and quality of available facilities.

RESULT(S): The majority of studies that will be presented are from the USA, Europe and Australia. Although many of these have been conducted in low-income communities, very few have been carried out in low- and middle-income countries (LMICs). This presentation will address the extent to which the lack of resources in LMICs could significantly limit the availability of suitable equipment and facilities for physical activity and play, as well as staff who are qualified to and capable of promoting physical activity. Furthermore, social norms and cultural perceptions of child care may affect opportunities for physical activity in child care environments.

CONCLUSION(S): Suggestions will be made regarding appropriate instruments and methods (including the adaption of existing instruments) to evaluate the child care environment in LMICs.

S38.3 Policy and policy assessment in child care centers: relation with obesogenic practices
Schwartz MB

PURPOSE: Dr. Schwartz will review published, standardized measures that have been developed to quantitatively assess child care nutrition and physical education policies at the state, agency, and individual site levels.

METHOD: She will review the empirical support for the use of different measurement methods (observation, interview, survey, and policy review) to answer specific research questions. She will also illustrate the process of coding policies using the Wellness Child Care Assessment Tool (WellCCAT) and present psychometric data on the reliability and validity of this measure.

RESULT(S): To illustrate how researchers can use information about policies, she will present two studies that used the WellCCAT: a statewide study of 94 Connecticut child care centers participating in the Child and Adult Care Food Program, and a study of the policies of one large American national child care company. She will focus her discussion on the impact and challenges of implementing policies that require: (a) serving fruits and vegetables at every meal, (b) serving only low-fat milk, (c) providing continuous access to water, (d) providing adequate time for physical activity and time outdoors (e) restricting the quantity of juice served and (e) restricting in-center screen time.

CONCLUSION(S): The information provided in this session will help researchers make decisions about optimal measurement methods when studying child care policies and the child care environment.
S38.4 Practice and process: what we’ve learned and steps for moving forward with child care center-based research
Sisson SB

PURPOSE: The purpose of this segment of this symposium will be to lead a discussion of relevant interest points pertaining to the three prior presentations about the teachers, physical environment and policies related to child care center obesogenic environments.

METHOD: It is the aim of this discussion to pose key questions to the panel and involve the scientific audience in discussion regarding to practical issues related to research in child care centers.

RESULT(S): Some of the questions to be posed to the panel and audience include:
• Where have some of the biggest struggles occurred and how were those addressed?
• When diet and physical activity data are being collected, what would be sacrifices made to collect the primary outcome?
• What is the future direction of research regarding involvement of child care center teachers?
• How do we adapt existing or develop new environmental assessment tools for different cultures and countries?
• Should research and practice focus on the site, local or state child care center policy?
• What would be the best approach to begin an intervention in child care centers?
• How should we, as researchers, interact with the child care centers we are assessing if we hope to develop interventions?
• How do we prevent the process of evaluation from impacting the obesogenic practices and policies at child care centers?

CONCLUSION(S): Discussion between audience and presenters will yield helpful insights into real-world data collection in child care center.
S39  Sedentary behaviour at the workplace: prevalence, correlates, and intervention strategies

Chair: De Cocker Katrien  
Department of Movement and Sport Sciences, Ghent University, Ghent, Belgium
Discussant: Gorely Trish  
School of Sport, University of Stirling, Stirling, United Kingdom

PURPOSE: The purpose of this symposium is to provide insight into the patterns, prevalence and correlates of sitting in the workplace, as well as discussing intervention strategies to reduce workplace sitting. The data supporting the outcomes of this symposium were collected using accelerometers, telephone interviews, focus groups, and an online survey; as such the symposium will present novel outcomes.

RATIONALE: In today’s modern society, sedentary behaviours occur in a variety of settings, including transportation, household/leisure time, and the occupational environment. Little is known about workplace sitting, yet millions of people spend their entire day sitting at work. The public health relevance of workplace sitting cannot be underestimated, especially given the ever growing evidence-base that links poor health outcomes to prolonged sitting, independent of activity levels. Technical innovations have increased sitting levels in the workplace for white and blue collar workers, therefore the workplace is a key setting in which interventions are needed to reduce sitting. However, little is known about sitting time (patterns and prevalence) of employed individuals, influencing factors of sitting time at work or strategies to change this behaviour.

OBJECTIVE(S): 1. To increase knowledge on prevalence, patterns and correlates related to sitting at work. 2. To identify successful intervention strategies to decrease sitting at work. 3. To promote more research to be undertaken in this area, so that successful interventions to reduce sitting time at work can be developed and evaluated.

SUMMARY: Four studies that have collected data, using a mix of methods, on sitting time at the workplace will be presented and discussed. Different aspects such as patterns of objectively measured sitting in office workers, characteristics of employees with high levels of (self-reported) occupational sitting, influencing factors of occupational sitting in employers and employees and intervention strategies to reduce or break up sitting at work will be addressed. The symposium aims to be informative, inspirational and motivational in terms of encouraging researchers to develop and evaluate innovative workplace interventions to reduce occupational sitting.
S39.1  Objectively measured sedentary time during and outside working hours in UK office workers  
Clemes S, O'Connell S, Griffiths PL, Edwardson CL

PURPOSE: To objectively measure sedentary behavior (SB) accumulated during and outside working hours in UK office workers.

METHOD: 90 participants (64% female) wore an ActiGraph GT1M accelerometer throughout waking hours for 7-days. SB and moderate-vigorous intensity physical activity (PA) were calculated as <100 and >1952 counts/minute respectively. The proportions of time spent sedentary, and in PA, were calculated for weekdays (including during and after working hours) and weekend days, controlling for accelerometer wear time. Participants were grouped into tertiles based on the proportion of SB accumulated during working hours. Time spent sedentary and in PA after work and on weekend days were compared between groups using ANOVA’s and Bonferroni-corrected post-hoc tests.

RESULT(S): Participants spent 514±52 mins/day in SB on weekdays, with 68% (347 mins/day) of total sedentary time accumulated during working hours. Time in SB decreased to 460±105 mins/day on weekend days (p<0.01). Participants within the three tertiles for working hours SB did not differ in terms of time spent in PA or SB after work (p>0.05). Those in the lowest tertile accumulated significantly less sedentary time, and more time in light-intensity PA on weekend days than those in the middle and highest tertiles (all p<0.02).

CONCLUSION(S): Office workers who are sedentary for a large proportion of their working day do not compensate by increasing their PA after work, or on weekends. These individuals were more likely to have increased SB on weekend days. Interventions should focus on reducing both workplace and leisure-time SB in adults employed within sedentary occupations.

FUND SOURCING: no external funding supported this work; the research was conducted using existing resources within the School of Sport, Exercise and Health Sciences at Loughborough University.

S39.2  Associations of sitting time according to occupational type, role and roster  
Vandelanotte C, Duncan MJ, Di Milia L

PURPOSE: Little is known about how different occupational indicators influence sitting time. Therefore, the aim of this study was to examine associations between occupational indicators and total, occupational and leisure sitting time.

METHOD: Cross-sectional self-report data were obtained using telephone interviews in 1194 adults living in Central Queensland, Australia. Standard demographic factors and occupational indicators were collected. Sitting time was measured using the validated Adapted Workforce Sitting Questionnaire. High sitting time was defined as sitting more than
8 hours a day. Multivariate logistic regression was used to identify associations between sitting time and occupational indicators. The analyses were adjusted for gender, age, education, BMI and physical activity levels (measured using IPAQ).

RESULT(S): Participants with a full-time, white collar, non-shift work or low physical demanding job had significantly higher total and occupational sitting times, whereas no significant differences were observed for leisure-time sitting. Job type and physical demand were significantly associated with total sitting and occupational sitting: participants having a blue collar job (total sitting: OR= 0.57; occupational sitting OR=0.31) or a job with a high physical demand (total sitting: OR=0.43; occupational sitting OR=0.27) were less likely to have a high sitting level. Working more than 8hrs/day was the only indicator significantly associated with a high sitting level during leisure-time (OR=0.47).

CONCLUSION(S): This study indicates that occupational indicators do influence overall sitting time, though primarily at work and only to a small extend during leisure time. Surprisingly, indicators such as shift and full-time work had a smaller than expected influence.

FUND SOURCING: dr Vandelanotte is NHF & NHMRC Research Fellow

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S39.3 Reducing sedentary behavior at the workplace: exploring employers’ and employees’ perceptions about intervention strategies through focus group interviews
Veldeman C, De Cocker K, De Bacquer D, Braeckman L, Cardon G, De Bourdeaudhuij I

PURPOSE: Occupational sitting is likely to be the largest contributor to overall daily sedentary time in white-collar workers. As sitting has adverse health effects in adults, interventions are needed to reduce or break up these continuous occupational sedentary behaviors. Therefore, the present aim was to collect qualitative data of employers’ and employees’ perceptions of sitting time and their opinion on possible intervention strategies to reduce total sitting time and to break up prolonged periods of sitting at work. Outcomes may help in developing future interventions targeting occupational sitting.

METHOD: Seven focus groups (three among employers, n=21; four among employees, n=34) were conducted in a convenience sample of three different companies, using a semi-structured questioning route. The audiotaped interviews were verbatim transcribed, followed by a thematic analysis.

RESULT(S): In general employers and employees are aware of their detrimental sitting time. However, most of them believe that they sufficiently break up their occupational sitting. Interventions targeting sedentary behavior are considered useful and a joint responsibility of employers and employees. Intervention strategies addressed were inter alia: standing/stretching at your desk, standing desks and standing during meetings. Although none of the strategies appeared feasible to both employers and employees, they are more likely to be applied when easily implementable, efficient, coherent and supported by
employer and colleagues.

CONCLUSION(S): Interventions targeting occupational sitting can probably not be approached as a one-size-fits-all. Focus groups suggest that business culture must be taken into account for successful and sustainable implementation.

FUND SOURCING: Government of Flanders : Welfare, Health and Family

S39.4 An ecological understanding of workplace sedentary behaviour
Sudholz B, Mussap A, Salmon J

PURPOSE: There is evidence that sedentary behaviour – typically in the form of sitting – is a health risk factor independent of physical activity. We examined the psychological, social and environmental correlates of sedentary behaviour and breaks from sedentary behaviour in Desk-based workers.

METHOD: An online questionnaire was completed by 253 Desk-based workers and 129 Desk-based managers in Melbourne, Australia.

RESULT(S): Desk-based workers indicated that physical activity during leisure was more valuable to health than physical activity and breaks from sitting at work. Although, multiple regression models revealed that these health beliefs were not significantly associated with actual activity levels during leisure-time or while at work, moderation analyses revealed that perceived barriers to taking breaks from sitting combined with low self-efficacy in relation to breaks were associated with reduced frequency of taking breaks and increased habitual sedentary behaviour at work. Managers’ responses to the questionnaire indicated that they significantly underestimate their employees’ self-efficacy and overestimate their perceived barriers to taking breaks.

CONCLUSION(S): Desk-based workers believe that the presence of leisure-time physical activity attenuates the detrimental health effects of sedentary behaviour at work. Although changing these beliefs is unlikely to be sufficient to improve workplace behaviour, increasing workers’ self-efficacy and reducing their perceived barriers to taking breaks at work may yield beneficial outcomes. However, future interventions of this sort will need to contend with managers’ beliefs about their employees’ perceived barriers and self-efficacy for reducing sitting in the workplace.

FUND SOURCING: Deakin university – Doctor of psychology program
The role of physical activity interventions to help people quit smoking and prevent weight gain

Chair: Maddison Ralph  
National Institute for Health Innovation, University of Auckland, Auckland, New Zealand  
Discussant: Prapavessis Harry HP  
Department of Health Sciences, School of Kinesiology, The University of Western Ontario, London, Ontario, Canada

PURPOSE: Four projects will be presented to illustrate the role physical activity interventions have for improving health outcomes for people who smoke. The discussant will integrate these findings and future research.

RATIONALE: Regular physical activity has been proposed as a potential aid to smoking cessation, because it is thought to ameliorate many of the negative effects associated with trying to quit. A recent systematic review and meta-analysis examining the effect of exercise on urges to smoke found that exercise significantly reduced the magnitude of urges to smoke compare to control conditions; however the long-term effects of exercise interventions on improving quit rates is less clear. This symposium addresses both acute and long-term effects of physical activity, and involves investigators from around the world (New Zealand, Canada and the United Kingdom).

OBJECTIVE(S): 1. The acute effects of physical activity on tobacco withdrawal symptoms will be reported from meta-analysis and a recent trial that systematically varied intensity of activity. 2. Findings from a large RCT, which examined the effect of a telephone counseling physical activity intervention on quit rates will be reported. 3. A review of evidence on the effects of physical activity (PA) interventions for preventing weight gain among smokers who quit. Data from an experimental study on the acute effects of PA on cravings and attentional bias for smoking and snacking will also be presented. 4. How physical activity interventions can be used to improve outcomes for pregnant smokers will be reported. Baseline data from the LEAP trial, recruitment strategies and qualitative data regarding acceptability and preferences will be discussed.

SUMMARY: Four presenters will present diverse aspects of research on physical activity interventions to improve health outcomes for people who smoke. One will present the acute effects of activity on tobacco withdrawal symptoms; a second will discuss the long-term effects on smoking cessation; a third will review the role physical activity has to mitigate weight gain in smokers trying to quit, and the fourth will illustrate the role of physical activity to enhance health outcomes for pregnant smokers. The discussant will integrate these findings and future research.
S40.1  Physical activity and cigarette cravings: What are the mechanisms of action?
Roberts V, Maddison R, Bullen C, Gant N, Sollers J, Jiang Y

PURPOSE: Exercise has been shown to attenuate cigarette cravings during temporary smoking abstinence; however, the most effective intensity of exercise to reduce TWS, and the mechanisms of action are not clearly understood. This study sought to determine the most appropriate intensity of exercise to relieve TWS and possible mediators.

METHOD: Following overnight abstinence, participants (n=40) attended three separate sessions and performed light, moderate, or vigorous intensity exercise for 15mins on a cycle ergometer, in a randomised cross-over design. Ratings of cigarette cravings were self-reported pre and post-exercise, and heart rate variability was measured throughout. Cortisol, adrenaline, and noradrenaline were measured in a sub-sample of eight participants.

RESULT(S): A total of 40 participants (25 males, mean age=38±12 years) completed all sessions. Repeated measures mixed models revealed no time x condition interaction effects for cravings, but there were statistically significant treatment effects for strength of desire to smoke (F[2,98]=5.51,p=.0054), and desire to smoke (F[2,91]=7.94,p=.0007). Reductions in cravings were greatest immediately following vigorous exercise. Mixed models also revealed time x condition interaction effects for heart rate variability. There was a statistically significant time x condition interaction effect for noradrenaline (F[8,72]=2.23,p=.03), with a difference observed between light and vigorous conditions (LSM difference[SE]=2850ng/ml[592], p=.0007) at five minutes post exercise. There were no statistically significant interaction effects or treatment effects for plasma cortisol, salivary cortisol, and adrenaline.

CONCLUSION(S): Findings support the use of vigorous exercise to reduce cravings. Implications for the development of future exercise based smoking cessation interventions will be discussed.

FUND SOURCING: University of Auckland Performance Based Research Funding

S40.2  Physical activity to enhance smoking cessation outcomes: Results from the Fit2Quit trial
Maddison R, Roberts V, McRobbie H, Bullen C, Prapavessis HHP, Jiang Y, Glover M

PURPOSE: The Fit2Quit study aimed to determine the effects of a telephone counseling physical activity intervention on smoking abstinence at six months when used as an adjunct to usual care (telephone smoking-cessation counseling and nicotine replacement therapy, NRT).

METHOD: A pragmatic parallel two-arm randomized controlled trial (RCT) was conducted in Auckland, New Zealand. Participants (n = 906) were randomised to a structured telephone
counselling physical activity programme plus usual care (Quitline-based behavioural counselling and NRT, n=455) or to usual-care alone (n=451). Outcomes included seven-day point prevalence of smoking abstinence at 6 months (primary outcome); 6 months continuous abstinence; physical activity levels.

RESULT(S): No statistically significant differences between groups in smoking cessation rates (7-day point prevalence or continuous abstinence) were found at 6 months. For 7-day point prevalence, the relative risk (RR) for smoking was 0.98 (95% CI 0.92-1.05; p= 0.63) and for continuous abstinence, the RR for smoking 1.01 (95% CI 0.95-1.07; p= 0.81). Leisure time physical activity increased by 526 (SE 69.18) MET-minutes/week from baseline in the intervention group, compared to an increase of 307 (SE 66.11) MET-minutes/week in the control group (difference 219.11; 95% CI 52.65-385.58; p=0.01).

CONCLUSION(S): A community-based exercise programme as an adjunct to Quitline care did not improve abstinence rates in adult smokers trying to quit compared to usual Quitline care alone.

FUND SOURCING: Health Research Council and National Heart Foundation

S40.3  Exercise as an aid for weight gain prevention after smoking cessation

Taylor AH, Oh H

PURPOSE: Smokers gain c.5 kg in the year after quitting, with 7% gaining = 10 kg. Fear of such changes may prevent quitting or cause relapse. Restrained snacking may increase cravings during quitting causing relapse, whereas physical activity (PA) reduces cravings and may prevent weight gain. This study examined the acute effects of PA on cravings and attentional bias (AB) for snack food and cigarettes.

METHOD: Abstinent smokers (and snackers) (N=23) randomly did 15 mins of moderate and vigorous intensity cycling and a passive control in a cross-over design. Using eye tracking technology visual initial AB (IAB) and maintained AB (MAB) were assessed pre and post-treatment while watching paired snacking/neutral or smoking/neutral video clips. Desire to snack and smoke were assessed throughout.

RESULT(S): Fully-repeated ANOVAs revealed a condition x time interaction for desire to smoke, F(3.31, 72.75)=12.62, and snack F(4.34, 95.52)=9.51, p<0.001. Cravings were lower after moderate and vigorous exercise, compared with control. ANOVAs revealed significant condition x time interactions for initial and maintained AB for smoking (IAB: F(1.58, 34.75) = 3.58, MAB: F(2, 44) = 4.52, p<0.05) and snacking (IAB: F(2, 44) = 8.13, MAB: F(2, 44) = 5.08, p<0.01). IAB for both smoking and snacking were lower after moderate and vigorous exercise than control. MAB was lower only after vigorous exercise.

CONCLUSION(S): Exercise acutely reduces both cravings and AB for cigarettes and snacks which suggests that short bouts of PA may be useful to aid self-regulation of smoking and snacking. Vigorous exercise was only more advantageous for reducing MAB.
A physical activity intervention to aid smoking cessation during pregnancy

Ussher M

PURPOSE: Many women try to stop smoking in pregnancy but fail. There is insufficient evidence that medications for smoking cessation are effective and safe in pregnancy and thus many women avoid these. The London Exercise And Pregnant smokers (LEAP) trial is investigating whether a physical intervention (PA) is effective for smoking cessation among pregnant women, and will be the largest exercise for smoking cessation trial to date. The main aim of this presentation is to describe the study protocol. Data will be presented on the baseline characteristics of participants.

METHOD: The LEAP study is a pragmatic, multi-center, two-arm, randomized controlled trial targeting pregnant women smoking at least one cigarette a day (and >5 cigarettes a day before pregnancy) and 10-24 weeks pregnant. Volunteers are randomized to either usual care (i.e., behavioral support for smoking cessation) or usual care plus a PA intervention (supervised exercise on a treadmill plus PA consultations). The primary outcome is self-reported and biochemically validated smoking abstinence at the end of pregnancy.

RESULT(S): Besides presenting the protocol, this presentation will report the baseline characteristics of the 785 women recruited, covering demographics, smoking and PA assessments, psychological measures and recruitment methods.

CONCLUSION(S): This study addresses many of the limitations highlighted in previous research by being adequately powered and by including both supervised exercise and PA consultations. PA could be an important alternative or adjunct treatment for smoking cessation during pregnancy, particularly for women who prefer non-pharmacological interventions.

FUND SOURCING: National Institute of Health Research (UK) Health Technology Assessment Programme
The built environment and its association with physical activity in children and adolescents: how to measure the environment?

Chair: Sallis James F  
*Family and Preventive Medicine, University of California, San Diego, California, United States*

Discussant: Salmon Jo  
*Centre for Physical Activity and Nutrition Research, School of Exercise and Nutrition Sciences, Deakin University, Burwood, Victoria, Australia*

**PURPOSE:** The purpose of this symposium is to report findings on different studies across the world (Europe, South-America and New Zealand) on the relationship between the built environment and physical activity in children and adolescents. More specifically, the presentations will focus on different measurement methods to measure the environment (self-report, GIS, GPS, observations), their (dis)advantages and their specific associations with physical activity.

**RATIONALE:** In adults, strong evidence exists concerning the associations between the built environment and physical activity. However, in children and adolescents the evidence is less consistent and it remains unclear which environmental attributes are related to physical activity. Consequently, more research in these age groups are needed in order to develop guidelines for policy makers and for neighborhood development planning. Furthermore, it remains unclear which measurement method is most optimal to measure the environment and whether objective or perceived environmental factors are most strongly related to physical activity. Therefore, the different presentations of this symposium will focus on the measurement of the built environment and the specific associations with physical activity, in order to give more concrete guidelines on how to measure the environment.

**OBJECTIVE(S):** 1. To give an overview of different measurement methods to assess the built environment: GIS, GPS/Google Earth, questionnaires, audits 2. To present results of studies conducted across the world on the relationship between the built environment and physical activity in children and adolescents 3. To discuss the (dis)advantages of different measurement methods to assess the built environment 4. To formulate guidelines on how to measure the environment

**SUMMARY:** The session will start with a general introduction of the chair; he will situate the studies within the research context on the built environment and physical activity in different population groups and he will give an overview of possible methods to measure the built environment. Then, four presentations will be given by presenters from Denmark, Portugal, New Zealand and Brazil. The session will end by a general discussion, led by Prof Jo Salmon.
S41.1  Objectively measured built environment and physical activity in adolescents in Denmark
Schipperijn J, Christiansen LB, Toftager M, Klinker C, Troelsen J

PURPOSE: Assessing if objectively measured built environment measures thought to be associated with physical activity can predict objectively measured physical activity among 10-16yr old Danish adolescents.

METHOD: In two Danish research projects, the SPACE for physical activity project and the When Cities Move Children project, 1971 adolescents enrolled at 18 schools, in settings ranging from inner city to rural, were asked to wear an accelerometer (ActiGraph GT3X) for seven consecutive days. Participants were included in the analyses if they had at least 4 days of at least 10hrs of accelerometer data. Using a Geographic Information System, all respondent addresses were geocoded and individual network buffers were created. Within each buffer residential density, intersection density, land use mix, density of daily destinations, and share of recreational facility area were calculated. The distance to school was calculated for each participant. In an E-survey data about the participants’ background, behavior and well-being was collected. Multilevel mixed-effects linear regression models will be used to test the association between environmental predictors and physical activity.

RESULT(S): 1509 participants were included in the analyses (77%). Descriptive analyses of the environmental correlates showed a considerable variation ranging from inner-city areas, to rural settings. Results of the multilevel analyses will be presented.

CONCLUSION(S): In Denmark high quality GIS data is available even in more rural areas. This provides an excellent basis for further analyses of the geocoded accelerometer data since data were collected in very different local areas, and thus represent the variation of the built environment in Denmark.

S41.2  Social and perceived environmental neighborhood attributes associated with physical activity in adolescents from Curitiba, Brazil
Reis R, Hino AS, Fermino RC, Rech CR, Reis MS, Anez CRR

PURPOSE: There is compelling evidence on the association between social and environmental factors and adolescent’s physical activity patterns. However, the majority of this evidence is from developed countries. This study examined the association of social and environmental perceived factors with adolescent’s physical activity from Curitiba, Brazil.

METHOD: A cross-sectional study was conducted with a representative sample (n=1,518, 59.2% females) of students aged between 14 and 18 years, enrolled in the public school system of the city of Curitiba, Southern Brazil, in 2006. Physical activity practice was self-reported and classified according to the number of days per week performing moderate to vigorous physical activities. Covariates were 20 social and environmental attributes including
social norm indicators, safety from traffic and from crime, streets and sidewalks amenities and access to several recreational facilities. Associations were test through logistic regression models stratified by gender.

RESULT(S): After controlling for potential confounders the associations that remained significant for boys were “having places that I like” (OR=2.2; 95%CI=1.3-3.6), “seeing people at my age” (OR=1.9; 95%CI=1.1-3.4) and distance from home to health clubs (pOR=0.8; 95%CI=0.7-0.9) and sports courts (OR=0.7; 95%CI=0.5-0.9). Among girls the remaining associated variables were “having interesting things to see” (OR=1.8; 95%CI=1.1-3.0) and distance from home to health clubs (OR=0.7; 95%CI=0.6-0.9).

CONCLUSION(S): These results indicate that boys are more likely to be active when social and environmental positive factors are reported than girls. The findings partially support studies from high-income countries and provide valuable information for designing interventions aiming to increase physical activity among adolescents.

S41.3 Objectively assessed physical activity and distance to urban green spaces. An exploratory study among Portuguese adolescents
Santos P, Autran R, Pina S, Mota J

PURPOSE: Physical activity benefits have been linked to type of land use available for recreational and functional purposes, especially the availability of green space. Research on green space and physical activity has mainly considered adults, and it is likely that adolescents’ use of neighborhood environments differs from adults. The aim of this study is to investigate the associations between objectively measured physical activity (PA) and distance to Urban Green Space (UGS) among Portuguese adolescents.

METHOD: Data were obtained from 350 adolescents (64.5% girls) aged from 14 to 18-years-old attending public schools from high and low socioeconomic areas in Porto (Portugal). PA was measured using accelerometers (Actigraph GT1M). Adolescents’ home addresses were geocoded using Google Earth and 27 UGS within Porto municipality were geocoded using a portable Global Position System (GPS) equipment (Garmin Oregon 550t). Euclidean distance was measured from each participant’s residence to the nearest UGS. Body weight and height were assessed and adolescents were categorized as normal weight and overweight/obesity according to IOTF cut-points. Perceptions of distance to UGS were measured with NEWS-Y survey.

RESULT(S): No direct association was found between the objectively measured distance to UGS and adolescents’ perceptions of distance to UGS. A significant negative association (r=-0.03; p>0.05) was found between the objectively measured distance to UGS and moderate physical activity but no associations were found to MVPA.

CONCLUSION(S): UGS proximity could promote moderate physical activity among Portuguese adolescents. More accurate measures may be needed to provide evidence on
environmental correlates of MVPA in this specific population.

FUND SOURCING: Fundação para a Ciência e Tecnologia (FCT): PTDC/DES/111807/2009

S41.4 Local neighborhoods and moderate-vigorous physical activity in NZ children: the URBAN study  
Mcgrath L, Hinckson EA, Hopkins WG, Mavoa S

PURPOSE: To examine the effect of specific built-environment elements on children’s moderate-vigorous physical activity (MVPA).

METHOD: Children (n=227; age 8.9 ± 2.6 y, mean ± SD) from households in 48 low and high walkability neighborhoods within four New Zealand cities wore accelerometers for seven consecutive days (2008-2010). Access to destinations, street connectivity, dwelling density and access to destinations were calculated using GIS. The local environment was audited using SPACES. Neighborhoods were ranked from high to low for each built environmental item for analysis. Proportions of accelerometer minutes in MVPA were determined. Generalized linear mixed modeling, realized with Proc Glimmix, was used for analyses. The periods of investigation represented segments in the day (0800-0859, 1500-1559 and 1600-1759) where children are likely to be active in the local neighborhood during school days.

RESULT(S): During the school commute hours, there was a likely chance to engage in more MVPA in neighborhoods with: highest access to recreation (e.g. green space), fewer number of street lanes, some presence of personal safety elements (e.g. surveillance), and low quality walking infrastructure (e.g. path material). In the afternoon, MVPA chances were higher in the most aesthetically pleasing neighborhoods, neighborhoods equipped with some traffic control devices (e.g. pedestrian crossing) and neighborhood with lowest access to food outlets.

CONCLUSION(S): There are specific urban infrastructure elements associated with children’s moderate-vigorous physical activity.
Promoting optimal motivation and physical activity: intervention studies grounded in self-determination theory

Chair: Aelterman Nathalie  
*Department of Developmental, Personality and Social Psychology, Ghent University, Ghent, Belgium*

Discussant: Patrick Heather  
*Division of Cancer Control and Population Sciences National Cancer Institute, Rockville, Maryland, United States*

PURPOSE: To present effective prevention and intervention strategies to promote physical activity (PA) based on the tenets of Self-Determination Theory (SDT; Deci & Ryan, 2000).

RATIONALE: It is widely recognized that participation in PA is an essential component of a healthy lifestyle (e.g. Biddle et al., 2004) and good quality of life (QoL). Despite this recognition, considerable proportions of adults and adolescents do not meet the international PA guideline of 60 minutes for moderate to vigorous physical activity (MVPA) daily. From a health-based perspective, there is a strong need for effective strategies to promote PA among these age groups. Self-Determination Theory (SDT; Deci & Ryan, 2000) provides an empirically validated framework to understand how motivation toward PA can be fostered.

OBJECTIVE(S): The present symposium aims to (a) demonstrate the validity of SDT in designing and implementing effective interventions on PA promotion, (b) to present new insights in how optimal motivation, psychological need satisfaction and PA can be fostered in different populations and age groups, and (c) to discuss how social-contextual factors can help to contribute to this goal.

SUMMARY: Starting from Self-Determination Theory (SDT) as the theoretical framework, each presenter in this symposium provides evidence on effective intervention strategies to promote optimal motivation toward PA. In the first and third presentation, the focus is on PA promotion in specific clinical samples, that is adult obese patients (P. Teixeira) and patients suffering from rheumatoid arthritis (P. Rouse), respectively. Both presentations provide support for the link between autonomous motivation and (different forms of) PA and well-being. The second and fourth presentation deal with the specific context of secondary school-based physical education (PE). The second presenter (M. Slingerland) demonstrates how the application of a single-gender group strategy can effectively increase adolescent girls’ perceived competence and PA. In the final presentation empirical support is presented on the teachability of a need-supportive teaching style and its effect on students’ perceptions of teaching behavior. The practical implications of the current findings will be discussed in light of SDT.
S42.1 Promoting different forms of physical activity in the PESO trial: 3-year results  
Teixeira PJ

PURPOSE: To analyze the main effects of an obesity treatment intervention based on Self-Determination Theory (SDT) on different forms of physical activity (PA) and their motivational antecedents.

METHOD: RCT consisting of a 1-year intervention and a 2-year follow-up with 221 women (age=37.6±7y, BMI=31.6±4.1kg/m2). The intervention was designed to enhance autonomy, perceived competence, and intrinsic motivation for different forms of PA. Main effects on PA and motivational variables and a mediation model were explored, including experimentally-manipulated contextual need support, perceived need satisfaction, and motivational regulations as mediators of short- and long-term exercise adherence.

RESULT(S): Compared to controls, the intervention group showed adequate levels of moderate plus vigorous PA (MVPA, 234±221min/wk (p=0.009) and Lifestyle PA (LPA, effect size=0.58). Mediation analysis showed that at intervention-end (1 year) MVPA was predicted by intrinsic motivation (p<.001) whereas LPA was not predicted by motivational regulations. However, long-term associations between autonomous motivation and LPA (partial r =.59, p<.001) and weight change (partial r =.54, p<.001) indicated that treatment had significant effects on autonomous regulations and 3-year PA, fully mediated by the tested paths (effect ratio=0.10–0.61).

CONCLUSION(S): Theory-based intervention research furthers theory development and helps identify true causal mechanisms of behavior change. This application of SDT to PA and weight management was successful in affecting theory-driven mediators and long-term adherence. Putative causal paths for long-term outcomes were supported, providing evidence for a link between experimentally-increased autonomous motivation and different forms of PA, including lifestyle (or “non-sedentary”) activities.

S42.2 Applying a single-gender grouping strategy to increase perceived competence and physical activity in adolescent girls during coeducational physical education  
Slingerland M, Haerens L, Borghouts L

PURPOSE: Autonomous motivation for physical education has been associated with multiple adaptive outcomes such as better concentration, effort and higher physical activity levels during lessons. The need to feel competent (i.e. to feel effective in dealing with important challenges) is an important conditionality in PE for students to feel autonomously motivated. However, creating environments in physical education that foster perceived competence is challenging, especially in adolescent girls during gender-mixed game play lessons. This study aimed to increase perceived competence and in-class physical activity in girls by applying a single-gender grouping strategy within coeducational classes.
METHOD: A sample of 216 students (90 girls: 42%) within 13 classes in grades 7-9 (age 11 - 15) played basketball in mixed-gender and in single-gender teams. Effects on perceived competence and MVPA were assessed using questionnaires and heart rate monitors respectively.

RESULT(S): Although overall girls had lower levels of perceived competence than boys (2.57 vs. 2.87, p <.001), girls’ perceived competence increased from 2.51 (SE = 0.05) in the mixed-gender gameplay condition to 2.65 (SE = 0.05) within the single-gender gameplay condition (χ² = 10.59, df = 1, p <.01). Time spent in MVPA was high during both gameplay conditions, although overall boys were more active (74.38% vs. 63.88%, p <.001). Playing in single gender teams did not increase time spent in MVPA in girls.

CONCLUSION(S): Playing invasion games in gender-specific groups could be a useful strategy for PE teachers to implement into their lessons in order to improve girls’ perceived competence during invasion games.

S42.3 Supporting autonomous physical activity and well-being in Rheumatoid Arthritis patients
Rouse P, Duda JL

PURPOSE: Rheumatoid arthritis (RA) is a chronic inflammatory disease that causes joint pain, swelling and stiffness with eventual structural damage leading to physical dysfunction. People with RA tend to experience fatigue, psychological distress, and are at risk for CVD. Regular physical activity (PA) can attenuate such disease-related symptoms and improve function and QOL in RA patients. The purpose is to examine whether a Self-determination Theory-based (SDT) intervention fosters basic need satisfaction, autonomous motivation PA, engagement and well-being (i.e., reduced fatigue and subjective vitality) in patients with RA following a 3 month exercise programme.

METHOD: A RCT compared two 3 month exercise programmes. Patients in the experimental arm also received a psychological intervention aiming to foster basic need satisfaction and autonomous regulations for PA through contacts with a SDT trained PA advisor. All measures were assessed via validated questionnaires.

RESULT(S): Preliminary analyses (N = 41 patients; Mage = 55.4 yrs) indicated that intervention arm patients reported significantly greater competence need satisfaction [F(1,39) 6.9, p = .01] than the control arm. Results also suggested trends regarding enhanced leisure-time PA and subjective vitality and lower levels of fatigue favouring the patients in the intervention condition.

CONCLUSION(S): Present findings suggest that a SDT-grounded PA intervention promotes adaptive motivational processes, participation in PA, and feelings of mental and physical energy in RA patients. Subsequent work will examine follow-up effects at 6 and 12 months.
Can teachers learn to become more need-supportive in their teaching? Multi-informant effects of an intervention study in physical education
Aelterman N, Vansteenkiste M, Van den Berghe L, Haerens L

PURPOSE: As optimal motivation toward physical education (PE) is related to positive outcomes, such as higher physical activity levels and engagement, a critical question is what PE teachers can do to have a meaningful influence on students’ course-related motivation. In this quasi-experimental study we investigated whether PE teachers can learn to become need-supportive in their teaching.

METHOD: Participants were 39 PE teachers (31 men, Mage=38.51 ± 10.44 years) and 676 students (428 boys, Mage=15.49 ± 10.65 years) that were randomly assigned to an intervention (n=15) or control group (n=24). The intervention consisted of a one-day training based on Self-Determination Theory. Teachers’ need-support was objectively assessed based on videotapes rated by external observers and both teachers and students filled out questionnaires at the end of the lesson.

RESULT(S): Multilevel regressions indicated that students of teachers in the intervention group experienced more autonomy-support from pretest to posttest (β=.16, SE=.08, χ²(1)=4.09, p<.05) compared to those in the control group. With respect to structure, no significant intervention effect was found (β=.06, SE=.08, χ²(1)=.45, ns). As for teachers’ self-report, teachers in the intervention group tended to report both more autonomy-support (F(1,37)=2.41, p=.13, η²=.06) and more structure (F(1,37)=2.97, p=.09, η²=.07) relative to teachers in the control group. Analyses of external ratings of need-support are currently in progress and results will be available at the conference.

CONCLUSION(S): PE teachers can learn to become more autonomy-supportive and students notice these changes in teachers’ teaching behavior.
**S43 Improving physical activity and nutrition in child care**

Chair: Cardon Greet  
*Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium*  
Discussant: Ward Dianne S  
*Department of Nutrition, University of North Carolina, Chapel Hill, North Carolina, United States*

PURPOSE: To increase insights into possible strategies to promote healthy eating and physical activity in preschoolers at child care.

RATIONALE: Experts agree that healthy eating and physical activity are critical to preschooler’s health and development. Recent evidence highlights that obesity-promoting dietary habits and low levels of physical activity are already present in many preschoolers. The widespread and increasing use of child care settings have led to the acknowledgement that these settings are suitable for healthy eating and physical activity promotion. Building on these findings, researchers have begun to explore the influence of out-of-home care characteristics on dietary behaviors and physical activity in preschoolers. To advance the current knowledge base, more research is needed in this area. Furthermore, interventions at the out-of-home care setting are still in their infancy and require further research.

OBJECTIVE(S): 1. To examine the view of Dutch childcare workers and parents on the role of childcare with regard to physical activity and healthy nutrition at childcare. 2. To conduct a pilot translational study of an innovative, evidence-based program that has been successful in increasing physical activity and motor development among preschool children. 3. To evaluate the effect of a one-year child care intervention on preschool children’s physical activity, both at day care center and at home. 4. To examine if lowering playground density during recess is feasible and effective in improving preschoolers’ activity levels.

SUMMARY: This symposium will present new data in the field of possible strategies to increase physical activity and improve dietary behaviors in preschoolers. The first presentation will report directions for future interventions targeted at physical activity and healthy nutrition at child-care centers. The second presentation will report on the efficacy and external validity of their pilot translational study. The third presentation will report on the findings of a quasi-experimental trial in child care to improve physical activity in preschoolers. A fourth presentation will report on the efficacy and feasibility of a playground-based intervention to improve physical activity in preschool children. Finally, the discussant will briefly overview the main issues of the presentations and facilitate a general discussion.
S43.1 Directions for future interventions targeted at physical activity and healthy nutrition at child-care centers: the view of Dutch childcare workers and parents
Gubbels JS, Raaijmakers L, Wilke S, Opdenakker C, Mulder S, Kremers SPJ

PURPOSE: The purpose of this study was to examine the view of Dutch childcare workers and parents on the role of childcare with regard to physical activity and healthy nutrition at childcare.

METHOD: A total of 25 childcare workers from different organizations throughout the Netherlands, as well as 11 parents of children using childcare, were individually interviewed, using a phenomenology approach. The transcripts were analyzed using N-Vivo.

RESULT(S): Childcare workers as well as parents thought children were sufficiently active at childcare and they paid little attention to physical activity. Communication between parents and childcare with regard to both physical activity and nutrition was limited, although most childcare centers made use of logbooks to register children’s dietary intake at childcare. There was little attention for healthy drinks. Barriers to physical activity at childcare included safety concerns, a lack of time and skills of the childcare workers, and a lack of clear policies. Both parents and childcare workers said the responsibility for physical activity and nutrition lies with the parents, although they also both thought that childcare could play an important role in various ways. Most important, childcare workers should be healthy role models for children as well as parents.

CONCLUSION(S): Future interventions should aim at decreasing childcare workers’ barriers to physical activity and healthy nutrition at childcare. An example is that physical activity and nutrition should be incorporated in childcare policies. Furthermore, more time should be created for communication and attunement with parents, especially regarding physical activity.

FUND SOURCING: NUTRIM School for Nutrition, Toxicology and Metabolism and the Faculty of Health, Medicine and Life Sciences, Maastricht University.

S43.2 A pilot translational trial: Efficacy of a physical activity program for preschool children
Jones R, Okely T, Hinkley T, Batterham M

PURPOSE: The aim of this study was to conduct a pilot translational study, in settings administered by our industry partner, of an innovative, evidence-based program that has been successful in increasing physical activity and motor development among 3-5 year-old children. Our primary hypothesis was that children in services randomised to the intervention program would increase their physical activity and motor development compared with a control group. Additional aims relating to the external validity were also examined.
METHOD: A 6-month, 2-arm parallel cluster randomised pilot translational trial was conducted in four services (n=170). Services were randomly assigned to an intervention or control group. The intervention comprised structured and unstructured lessons (20 min, 3 per week) for children and 4, 30 min professional development sessions for Educators. Primary outcomes were motor development and objectively measured physical activity.

RESULT(S): Eight Educators were successfully trained to deliver the program. The program was delivered with high fidelity: 100% and 98% of the structure lessons were facilitated in the intervention services, respectively. Key stakeholders found the program highly acceptable. Educators suggested that the length of the structured lessons, the number of activities in each structured lessons and the equipment required to be (highly) appropriate. Changes in motor skill proficiency and objectively measured physical activity during the preschool day are currently being analysed: initial results are promising.

CONCLUSION(S): This study demonstrates that a physical activity program administered by an industry partner has high external validity and has the potential to change motor skill proficiency and physical activity levels of preschoolers.

S43.3 The effect of an intervention on day care and home physical activity with 4-5 year old children

PURPOSE: The aim of the research was to evaluate the effect of a one-year intervention on 4-5-year-old children’s physical activity (PA), both at day care center (weekday) and home (weekend).

METHOD: Design: Longitudinal, quasi-experimental. Participants: Baseline (2010) and post intervention (2012) data were gathered from 40 (20 intervention) children (year of birth 2007) in the late summer. Children participated from intervention (7) and control (7) day care centers. Measures: The PA of the children was measured for five consecutive days using ActiGraph accelerometers. A one-year-intervention was implemented in day care centers from August 2011. The Intervention was low intensity and easy to implement by early years educators. Baseline PA measurements were utilized in shared discussions with the early years educators. Every month, a health-related behavior theme was presented to the day care centers and homes. Families and early years educators received monthly letters, PA tips, and training. Analyses: General linear model was used to assess differences between the measurements.

RESULT(S): Light PA on weekdays increased significantly (P=.035) in the intervention group. There weren’t significant differences during the weekend days or any other PA parameters between the intervention and control group.

CONCLUSION(S): The findings indicate that the intervention increased light PA in the day care children. The foundation of motor ability is created in childhood; balance and the
majority of movement skills are learned before school age. The increase in PA, even at a light intensity level, may have beneficial effects on the development of these motor skills.

FUND SOURCING: Ministry of Education and Culture and Ministry of Social and Health.

S43.4 Promoting physical activity at the preschool playground: efficacy and feasibility of lowering playground density
Van Cauwenberghe E, De Bourdeaudhuij I, Maes L, Cardon G

PURPOSE: This pilot study examined if lowering playground density is feasible and effective in improving preschoolers’ activity and sedentary levels during recess.

METHOD: Between November and December 2011, a within-subject design was used to study preschoolers’ activity via accelerometry during recesses in the usual conditions (baseline) and with lower playground density (intervention). During the intervention, preschools scheduled extra recesses so that the number of classes usually sharing the playground was halved. Effects were investigated, using two-level linear regression models, in 128 4- to 6-year-old children (69 boys) from 4 preschools in Ghent, Belgium. The four preschool principals filled in a feasibility questionnaire after the intervention.

RESULT(S): At baseline, available play space was on average 7.4 (SD=1.7) m²/child; during the intervention this increased to 16.7 (SD=5.1) m²/child. The intervention was effective in decreasing sedentary time (-1 min; -5.1%) and increasing light-to-vigorous (+1 min; +5.1%) and moderate-to-vigorous physical activity (+0.8 min; +4.8%) during recess. None of the four principals found it difficult to implement the intervention. All agreed it was possible to use this strategy in the future. All principals also agreed that the intervention was well-received by the supervising teachers.

CONCLUSION(S): Although it was feasible to implement this intervention, improvements in preschoolers’ activity levels were small. This intervention could especially be important for preschools with higher playground density.

FUND SOURCING: Eveline Van Cauwenberghe is a recipient of a PhD-scholarship from the Research Foundation — Flanders (FWO B/10525/01).
S44 Behavioural nutrition and physical activity in the prevention and management of cancer – An understudied area

Chair: Buffart Lien
Discussant: Buffart Lien

Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium

PURPOSE: Behavioural nutrition and physical activity (PA) are important for cancer prevention and management. Currently, one out of three persons will develop cancer at some point during their lives. Together with improved survival rates, many patients have to live with the consequences of cancer and its treatment reducing their quality of life (QoL). Strategies for optimal prevention and management of cancer need to be developed.

RATIONALE: Both optimal prevention and management of cancer is of great importance for public health. Cancer prevention recommendations emphasize achieving and maintaining a healthy weight, encouraging regular physical activity, eating a diet rich in vegetables, fruit, and whole grains, and limiting meat and alcohol consumption. Regular PA and a healthy diet have also been associated with improved QoL and survival after a cancer diagnosis. More research is needed to develop more specific PA and nutrition guidelines for cancer prevention and management. Little is known about the optimal mode, intensity and frequency of exercise or dietary modifications to prevent and manage cancer, nor on cancer patients’ needs for advice on PA and diet, their preferences regarding content, timing and delivery of lifestyle programs, as well as barriers to pursue healthy lifestyles.

OBJECTIVE(S): This symposium aims to provide an overview of current knowledge regarding behavioural nutrition and PA for the prevention and management of cancer. To be able to move from one-size-fits all guidelines and interventions towards personalized care, several knowledge gaps need to be addressed. This symposium consist of several presentations from three different countries (Australia, United Kingdom and the Netherlands) addressing relevant knowledge gaps, including dietary intake regarding the prevention of cancer, development and implementation of a state of the art intervention targeting multiple lifestyles, discussions about the optimal content, timing and delivery mode and preferences regarding lifestyle interventions, as well as barriers to and facilitators of PA and adherence to PA and exercise programs among cancer survivors during and after cancer treatment.

SUMMARY: This symposium starts with a short overview of current knowledge and knowledge gaps. The first presenter will address relevant topics regarding lifestyle and cancer prevention. The second presenter discusses the development and implementation of a multimodal lifestyle intervention. The last two presentations address preferences regarding content, timing, and delivery modes of, barriers to and facilitators of lifestyle interventions. The symposium ends with concluding remarks and discussions regarding current and future research.
**S44.1**  
**Breast cancer screening – an opportunity to support active living and well being (ActWell) - Feasibility trial to reduce breast cancer risk factors**  
Anderson AS, Mutrie N, Wyke S

PURPOSE: Breast cancer is the most commonly diagnosed cancer and the second cause of cancer deaths amongst women in Scotland. It is estimated that around 42% of the disease in post-menopausal women could be prevented by increased physical activity and reductions in alcohol and body fatness. The study will finalise a protocol for a minimal contact, weight management intervention initiated within the breast cancer screening setting, to inform the design of a definitive randomised control trial (RCT).

METHOD: Phase one will involve focus group discussions and interviews with the target population, screening and cancer charity staff to explore acceptability and development of the prototype intervention to provide an evidence based study protocol. Phase two (feasibility trial) will assess recruitment, early retention and indicative outcomes of the ActWELL intervention.

RESULT(S): Formative work undertaken prior to successful funding indicated that the following topics should be addressed with the target population in phase 1: - knowledge and beliefs about lifestyle and breast cancer risk - the concepts of modest weight loss/avoidance of weight gain - the screening setting as an opportunity for advice on lifestyle - the importance of endorsement of by NHS staff and breast cancer charities - culturally sensitive approaches to body weight - recruitment, delivery and content of the programme - randomisation concepts and exit strategies

CONCLUSION(S): Phase one work will be complete by March 2013 and enable promising strategies to support recruitment and uptake to the weight management intervention to be identified, discussed and presented.

FUND SOURCING: Chief Scientist Office, Scottish Government

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**S44.2**  
**How to develop, implement, and evaluate a theory-based nutrition and physical activity program for cancer survivors and carers: the ENRICH (exercise and nutrition routine improving cancer health) program example**  
Stacey F, James E, Chapman K, Lubans D, Asprey G, Boyes A, Girgis A

PURPOSE: After completion of cancer treatment, there is a gap in services to assist cancer survivors to optimise their health. The ENRICH program was designed for survivors of any type of cancer and their carers, and consists of a home walking program, resistance training (RT) program using an elastic tubing device (GymstickTM), and healthy eating knowledge and skill development. The aim is to describe the development and evaluation of the theory-based ENRICH lifestyle program, and how this translates to behaviour change.

METHOD: The ENRICH program was a 6 session (2 hour/session) face-to-face group program,
co-facilitated by a dietitian and exercise specialist, over 8 weeks. Evaluation was via randomised controlled trial with a wait-list control group. Participants completed a self-report survey and 7 days of pedometry at baseline, 8 weeks, and 20 weeks. The ENRICH trial was based on social cognitive theory (SCT) with an emphasis on realistic and sustainable behaviour change.

RESULT(S): Trial recruitment resulted in 181 consenting cancer survivors and carers, with a retention rate of 75%. ENRICH operationalised SCT constructs to enhance behaviour change, and examples of this included learning how to set and self-monitor goals to increase self-efficacy. Preliminary results indicate increased walking (mean=166 minutes/week), RT (mean=60 minutes/week), fruit (mean=0.5 serves/day), and vegetables (mean=1.9 serves/day) at 20 weeks.

CONCLUSION(S): Results demonstrate that theoretically-based lifestyle programs can result in changes that are sustained, at least over the short–term. The program offers insight for researchers in implementing and evaluating theory-based lifestyle interventions.

FUND SOURCING: The ENRICH study was supported by funding from the Australian Better Health Initiative: A joint Australian, State and Territory government initiative with additional funding and infrastructure support provided by the Cancer Council NSW and Hunter Medical Research Institute.

S44.3 Content, timing and delivery mode preferences for lifestyle programs: what do survivors want?

James E, Boyes A, Eakin E, Girgis A, Paras L, Reeves MM, Stacey F, Zucca A

PURPOSE: Despite the known benefits of healthy lifestyle behaviours, there is no clear consensus on the method of delivery, timing or preferred content for lifestyle interventions targeting cancer survivors. What is evident is that for lifestyle interventions to succeed they must meet the needs of the target group. Most social cognitive models of human behaviour suggest that allowing individuals to choose their behaviour based on preferences is likely to optimize motivation and possibly psychological outcomes, so designing lifestyle interventions according to participant preferences may optimise adherence and outcomes.

METHOD: Participants are survivors of breast, colorectal and prostate cancers recruited through the Cancer Survival Study, a longitudinal study of a population based sample of cancer survivors, recruited through two state-based cancer registries. Participants completed a computer assisted telephone interview that assessed current lifestyle-related behaviours (diet, physical activity, smoking), receipt of provider advice regarding lifestyle changes since they were diagnosed, and preferences for the content, timing and delivery mode (face-to-face, telephone, mailed, computer, DVD) of lifestyle interventions.

RESULT(S): A third of participants recalled being advised to make lifestyle changes in relation to their cancer diagnosis. There was high interest in lifestyle programs. Participants suggested programs be offered at diagnosis (30%) and upon completion of treatment (51%).
There was large variation in preference for delivery mode with the most popular being written materials (36%). Gender differences in delivery preference were evident.

CONCLUSION(S): These results will help inform future health promotion efforts to deliver health behaviour interventions to the growing number of cancer survivors.

FUND SOURCING: The Cancer Survival Study is funded by the National Health and Medical Research Council (Australia), The Cancer Council NSW, The Honda Foundation, and Hunter Medical Research Institute. The sub study reported here was funded by the University of Newcastle.

S44.4 Factors associated with physical activity intervention adherence and maintenance in cancer survivors during and after treatment: a systematic review
Kampshoff CS, Chin A Paw MJM, Jansen F, May A, Steins Bisschop CN, van Mechelen WW, Brug J, Buffart L

PURPOSE: Beneficial effects of physical activity (PA) and exercise among in cancer survivors depends on intervention adherence and maintenance. The associated factors need to be identified to further improve and personalize interventions. We aimed to systematically review factors associated with PA adherence and maintenance in cancer survivors.

METHOD: Studies were identified by searching PubMed, Embase, PsycINFO and SPORTDiscus from inception to April 2012. We included full-text articles that: 1) were performed in adult cancer survivors; 2) quantitatively assessed (a) PA intervention adherence and maintenance, and (b) potentially associated factors; 3) were published in English. The methodological quality of the selected studies was examined. A best evidence synthesis was applied providing summary scores for associations evaluated in three or more studies.

RESULT(S): Nineteen studies were included and generally had high methodological quality (67-92% of maximum score). They investigated associations of 73 personal and 6 environmental factors with adherence, and 68 personal and 4 environmental factors with maintenance. Only few summary scores could be calculated. Socio-demographic (age, marital status, education and employment) and clinical factors (disease stage, time since diagnosis, and treatment regime) were not associated with PA adherence. Patients in higher stage of change had higher PA adherence. Higher age, instrumental attitude and PA levels after diagnosis were associated with higher PA maintenance.

CONCLUSION(S): Evidence on factors influencing intervention adherence and maintenance in cancer survivors is limited but indicate that personal and environmental factors may play a role. Additional research is needed to understand and act on barriers to improve PA.

FUND SOURCING: Alpe d’HuZes/KWF fund
The ‘PAPA’ project on promoting sustained and healthy youth sport participation: methodological advancements and preliminary findings

Chair: Duda Joan L  
School of Sport and Exercise Sciences, University of Birmingham, Birmingham, United Kingdom

PURPOSE: This symposium will present the rationale for and theoretical background to, multi-methods employed in, measurement development and initial findings stemming from the European Commission FP7 Health funded ‘Promoting Adolescent Physical Activity’ (PAPA) project (www.projectpapa.org).

RATIONALE: PAPA emphasizes the role of recreational youth sport as an important, under-developed health promotion context for young people. Past research clearly indicates that the quality of the youth sport experience determines whether young people maintain and optimize their sport engagement. Significant others, such as the coach, create the social psychological environment or ‘climate’ which impacts whether or not participation in youth sport is likely to be enjoyable and engaging, health conducive and sustained. The PAPA trial, which has involved more than 7000 children and 1000 grassroots coaches across 5 European countries, addresses the repeated calls within the field for theory-grounded interventions and evaluation strategies as well as the need for evidence-based practice in enhancing physical activity patterns and well-being of our youth.

OBJECTIVE(S): In this symposium we will provide (1) a rich description of what young athletes perceive to be the essential ingredients to positive sport experiences, which reinforces the need for coaches to receive systematic, scientifically-based training on why and how to optimise the motivational environment they create on their teams, (2) tied to the theoretical bases of the intervention delivered in PAPA (i.e., the Empowering CoachingTM programme), information on the development of and initial findings emanating from objective and subjective (questionnaire) assessments of the motivational climate operating in youth sport, (3) an illustration of how we are testing cross-country equivalence in the social psychological measures employed and invariance in the theoretically-grounded process models underlying the project, and (4) results on the levels of objectively and subjectively assessed MVPA and sedentary time exhibited by youth footballers as well as the social psychological and health related correlates of these physical activity patterns.

SUMMARY: The Chairperson will describe the rationale for and aims of the PAPA project. This will be followed by four presentations, representing project-related work conducted in Norway, the UK, Spain and Greece, respectively. These presentations will illustrate measurement development efforts and the differential research questions addressed and methods employed in PAPA as well as initial project results. The Chairperson will then preside over a discussion/question and answer exchange between the audience and symposium participants.
S45.1  Enjoyment in youth football: the importance of team-mates, coaches, challenge and choice
Tjomsland HE, Larsen TMB, Holsen I, Wold B

PURPOSE: The purpose of this study was to conduct an in-depth qualitative analysis of Norwegian children’s experiences in grass roots football teams.

METHOD: The informants in the study were recruited from 12 teams of Norwegian 11-14 year-olds involved in the PAPA intervention study (the PAPA project (www.papaproject.com)). In total, thirty-nine girls and thirty-four boys participated. Two teams were coached by female coaches, while ten teams were coached by male coaches. The data were collected during fall 2011 through focus group interviews with six girls’ teams and six boys’ teams. The qualitative data analysis software package QSR N9 (http://www.qsrinternational.com) was used to code and analyze the data.

RESULT(S): The findings revealed that a central component in young footballers’ experiences in grassroots teams is enjoyment. All the young football players signaled high levels of enjoyment on their team, and they described enjoyment through portrayals of fun, flow, happiness and feelings of mastery. The results further suggest that the footballers’ perceptions of enjoyment were linked to feeling supported and connected to their team mates, having a coach who secured them and treated them equally, being challenged by team mates and the coach, as well as having a choice with regard to their enrolment in grass roots football.

CONCLUSION(S): The study imply that a coach who facilitates practices that balance challenge with mastery is likely to ensure continued enjoyment and flow experiences amongst the young players.

FUND SOURCING: "PAPA was funded by the European Commission FP7 Health"

S45.2  Conceptualization and measurement of an empowering climate in youth sport
Quested EJ, Appleton P, Smith N, Ntoumanis N, Duda JL

PURPOSE: To understand and influence the key features of the coach-created environment, a clear and theoretically informed understanding of what is constitutes a “motivational climate” is essential. For many years, researchers and practitioners have tended to draw from one theoretical perspective to understand how (i.e., what coaches say and do) and why (i.e., the social-psychological mechanisms) coaches create adaptive and/or maladaptive climates. Moving beyond this status quo, this presentation points to the importance of adopting a multi-theoretical approach to conceptualizing the motivational climate in sport using data generated by new measurement tools created within the PAPA project.

METHOD: Young British athletes participating in team sports completed a questionnaire tapping their perceptions of the motivational climate created by the coach. Items were selected from previously validated measures tapping the dimensions of the social-
environment understood to contribute to empowering and disempowering youth sport settings. Coaches of a subsample of players were filmed in action at training and matches. Footage was coded according to the theoretically derived environmental dimensions.

RESULT(S): Findings from a series of studies illustrate that the motivational climate in youth sport is multidimensional and complex. There is a lack of congruence between perceived and observed coach behaviors and coach behaviors vary across training and match days.

CONCLUSION(S): In subsequent work examining the influence of social environmental factors on motivational processes and associated outcomes, it is important to employ a multi-theoretical and multi-dimensional approach and triangulate assessment by including perceptions of the athlete, the coach and also an objective assessment.

FUND SOURCING: "PAPA was funded by the European Commission FP7 Health"

**S45.3 Cross-country invariance in the relationships between the coach climate, players’ motivation, and well-being**

Castillo I, Gonzalez L, Fabra P, Garcia-Merita M, Quested EJ, Appleton P, Duda JL, Balaguer I

PURPOSE: One principal interest of the PAPA project is to conduct cross-cultural tests of the motivational theories relevant to the promotion of well-being and engagement in youth sport. Self-determination Theory (SDT, Deci and Ryan, 2000) postulates that when the social environment created by the coach is autonomy supportive, autonomous motivation will be promoted, and this facilitates well-being and optimal functioning. The major purpose of this study was to examine whether these interrelationships are invariant across young soccer players from two of the PAPA countries, namely, Spain and the UK. Specifically, we test: (1) whether the cross-country equivalence in the social psychological measures employed were parallel across the two countries; (2) the hypothesized model structure on each data set (for each country) independently; (3) for equivalence in the hypothesized structural model between both countries.

METHOD: 1522 Spanish boys and 115 girls (Mean age = 11.44; SD = 1.16) and 1161 British boys and 187 girls (Mean age = 11.41; SD = 1.56) grassroots footballers completed a questionnaire assessing their perceptions of the coach created environment, motivational regulations and indicators of well-being.

RESULT(S): Overall, measures of the key constructs were parallel across the two countries. The hypothesized model structure on each data set (for each country) was supported and the hypothesized structural model was equivalent between both countries.

CONCLUSION(S): Results supported the tested SDT-based model within a youth sport setting, not only in a specific cultural context, but in terms of young athletes who live and play football in different cultures.

FUND SOURCING: "PAPA was funded by the European Commission FP7 Health"
**S45.4**  
Moderate-to-vigorous physical activity and sedentary time in Greek grassroots footballers and their correlates  
Kromidas C, Papaioannou A, Zourbanos N

**PURPOSE:** Children who engage in less moderate to vigorous activity (MVPA) have a higher probability of becoming obese while active children are more likely to have a healthy weight and report greater well-being. Past work has revealed US children who participate in youth sport to exhibit greater MVPA. Thus, youth sport holds promise as a relevant context in which young people’s physical activity levels and mental health/psychosocial development can be enhanced. The major purposes of this study were to determine the levels of MVPA and sedentary time exhibited in a sample of youth footballers from Greece based on objective and self-report measures and report some key social environmental and health related correlates of their physical activity patterns.

**METHOD:** 1439 male and 68 female grassroots footballers (Mean age = 11.7, SD = 1.48) completed a multi-section questionnaire assessing targeted variables. Measures of height and weight (BMI) were taken and players were asked to wear the GT3X (Actigraph) for 7 days.

**RESULT(S):** Findings indicate that the large majority of youth footballers in Greece meet the guidelines for daily PA levels for children. Objectively assessed MVPA was inversely related to BMI and sedentary time. Self-reported PA positively corresponded to indicators of children’s well-being (e.g., self esteem and life satisfaction) and dimensions of a more empowering environment.

**CONCLUSION(S):** Youth sport engagement is linked to greater MVPA in children and more active Greek children are marked by more positive physical and mental health. Differences in the correlates of objective and subjective PA were noted.

**FUND SOURCING:** "PAPA was funded by the European Commission FP7 Health"
Reducing sedentary behaviour in adults: epidemiology and intervention

Chair: Chau Josephine Y
Prevention Research Collaboration, School of Public Health, University of Sydney, Sydney, Australia

PURPOSE: The aim is to improve understanding of the epidemiology of sedentary behaviour in adults and of interventions to reduce sitting time.

RATIONALE: Sedentary behaviour is defined as any waking behaviour involving little or no energy expenditure (1-1.5 METs) while in a sitting or reclining posture. Adults can be both physically active and sedentary simultaneously; that is they can meet the WHO physical activity guidelines of 150 min/week of at least moderate intensity, but sit for most of the rest of the day. In such cases, adults may gain health benefits from meeting the physical activity recommendations; however, there may also be independent adverse health effects due to their prolonged sitting. The prevalence of sitting and sedentary behaviour in adults is high. Accelerometry data from the US, England, Sweden and Canada suggest that 55-70% of waking hours is spent sedentary. The current evidence suggests that high levels of sitting are associated with increased risk of chronic diseases as well as mortality from all causes and cardiovascular diseases. Therefore it is important to start developing strategies that reduce sedentary behaviour and address prolonged sitting in adults. Adults, especially those with full-time office-based jobs, spend long periods of time sitting each day and are an important target group for interventions to reduce sitting time.

OBJECTIVE(S): 1. To update understanding of the current epidemiological evidence relating to sitting and identify target groups for intervention. 2. To review the current literature about the impact of sit-stand interventions. 3. To present findings from studies of novel sitting reduction strategies and explore the lessons learned.

SUMMARY: This symposium brings together researchers from Australia, the Netherlands, US, and UK to examine the current epidemiological evidence about sitting, and about intervention studies in adults. The chairperson, Josephine Chau, will introduce the session and outline the proceedings. Wendy Brown will present on the behavioural epidemiology of sitting and identify who to target for interventions. Nico Pronk will review the evidence about sit-stand interventions, and their impact on health and productivity. Hidde van der Ploeg and Stuart Biddle will describe the results of intervention studies to reduce sitting in working adults and young adults, respectively. The presentations will be followed by a general Q&A session, facilitated by the chairperson.
S46.1  Sedentary behaviour in adults: an update of the evidence
Brown WJ

PURPOSE: The purpose is to provide an overview of the rapid development of research into sedentary behaviour in adults in the last 13 years, and to use established criteria to assess the strength of relationships between sitting and health outcomes.

METHOD: Review of papers published from 1999 to present time, including the terms sedentary behaviour, sitting and adults. Thematic analysis based on the behavioural epidemiology framework, with critical review of the strength of the evidence for causation.

RESULT(S): The volume of research in this field has increased exponentially during this period, from two papers published in 1999 to at least 65 in 2012. The topics covered are diverse, ranging from descriptive studies of correlations, patterns and the development of measures, to findings from large cohort studies with a wide range of health outcomes. There is also emerging experimental (intervention) research targeting specific populations, such as adults in desk-based jobs.

CONCLUSION(S): Much of the evidence supports a relationship between sitting and adverse health outcomes, but there remains a need to establish the temporal relationships between sitting and health, and the moderating, mediating or confounding effects of BMI, weight gain and physical activity.

FUND SOURCING: Australian National Health and Medical Research Council Program Grant (569940)

S46.2  Protecting and promoting worker health through sit-stand interventions
Pronk NP

PURPOSE: To provide an overview of sit-stand workstation interventions specifically designed to reduce prolonged sitting time and their impact on health- and productivity-related outcomes.

METHOD: Based on a literature review, intervention studies that at a minimum include a comparison group and pre- post assessments were compared on experimental design, measurement methods deployed, impact on sitting time, and health and productivity outcomes generated.

RESULT(S): Across three studies identified to date, experimental designs included quasi-experimental designs, pre-post comparisons, interrupted time series, and a randomized controlled trial. Two studies combined with office ergonomics and a worksite health promotion program. Measurement methods of sitting behavior and duration throughout the day differed among all three studies; one used activity monitors, one used direct observation as part of the experimental protocol, and one used experience sampling methods complemented with surveys. Measurements of reductions in sitting duration
ranged between 60 min/day and 143 min/day. Health outcomes varied by study and included blood lipid profiles, musculoskeletal discomfort, visual discomfort, behaviors, work performance, and mood states. Significant improvements differed by study but included reduced visual strain and upper neck and back pain, improved high-density lipoprotein, and improved mood states. No negative results were reported.

CONCLUSION(S): To date, few interventions have been conducted to reduce sitting time and assess health outcomes among workers. Trials that have been conducted indicate positive results and present a promising research base upon which additional, more rigorously designed investigations should be designed.

S46.3 Reducing sedentary behaviour in the workplace: Evaluating the feasibility and effectiveness of sit-stand workstations
Chau JY, van der Ploeg HHP, Daley M, Dunn S, Srinivasan A, Bauman A

PURPOSE: To determine the feasibility and effectiveness of using a sit-stand workstation in the workplace in order to reduce sedentary behaviour.

METHOD: A randomized controlled trial with a cross over design was used. Participants in the intervention group (n=41) used a sit-stand workstation (Ergotron WorkFit-S) for four weeks. The control group (n=37) received nothing during this period and crossed over to the intervention group after 5 weeks. Participants were desk-based office workers recruited from a workplace in Sydney, Australia between 2011 and 2012. Sedentary behaviour and physical activity were assessed at baseline and after using the workstations for three weeks by questionnaire and objectively. Focus groups in week 5 were used to gather qualitative data on sit-stand workstations usage.

RESULT(S): Participants were mostly women (86%; mean age 38), completed university (79%), and were working in an open plan area (86%). Participants in the intervention group significantly reduced their sitting time by 25% during work hours from 6 hr/d at baseline to 4.5 hr/d at follow up. Total sitting on a workday was reduced from 11.5 hr/d to 9 hr/d, which was attributed to sit-stand workstation usage. Results from the focus group interviews suggested that workstation usage was generally considered to be feasible.

CONCLUSION(S): The results of this study are encouraging for the feasibility and effectiveness of using sit-stand workstations in order to reduce sitting time in sedentary individuals. However, larger scale studies on more representative samples are needed to determine the potential public health impact of sit-stand workstations.

FUND SOURCING: Heart Foundation of Australia (New South Wales); Australian National Health and Medical Research Council Program Grant
S46.4 Sedentary behaviour change in young adults: Lessons learned from Project STAND
Biddle S, Edwardson CL, Davies M, Gorely T, Khunti K, Nimmo M, Yates T

PURPOSE: To explain the rationale behind the Project STAND trial, outline results and lessons learned.

METHOD: Project STAND is a randomised controlled trial aimed at sedentary behaviour reduction in young adults (18-40 years old) at risk of type 2 diabetes. Participants were given theory driven group structured education about reducing sedentary time and were encouraged to self-monitor and self-regulate their behaviour. Outcome measures included accelerometer-assessed sedentary time and physical activity, objectively measured sitting/lying posture using ActivPAL, physiological indicators (e.g., glucose tolerance, lipids, weight, waist circumference), illness perceptions and self-efficacy.

RESULT(S): Preliminary findings at the time of writing suggest little or no behaviour change at 12-month follow-up. Process evaluations are being conducted. Issues include the potency of the intervention, the habitual nature of many sedentary behaviours, the use of self-monitoring devices, including adherence, were key issues influencing trial outcomes.

CONCLUSION(S): Educational approaches may be insufficient for changing sedentary behaviour in young adults at high risk of developing type 2 diabetes. This may be due to the habitual nature of many sedentary behaviours as part of daily living.

FUND SOURCING: Medical Research Council, UK
S47  Assessing the food system environment across multiple settings

Chair: Yaroch Amy L¹
Discussant: Yaroch Amy L¹
¹Gretchen Swanson Center for Nutrition, Omaha, Nebraska, United States

PURPOSE: Explore geographically diverse food systems by using examples from outside the United States (US) as well as various levels within the US (e.g., state, county, city). To increase generalizability of the information, we will present food system assessment results from a broad array of populations, ranging from low-income urban and rural populations in the Midwest US to mainly Hispanics in the urban Southwest US to rural seniors in the Western US, and to grocery store consumers across 8 countries.

RATIONALE: The food system is comprised of many intricately related factors involved in getting food from the farm to the consumer. This system has evolved and has been transformed over the last century to become more globalized, commercial, modernized and complex. Defining the food system at multiple levels is common, given the layered nature, and is necessary in order to understand the interconnectedness of factors. Currently, practitioners and researchers lack the practical understanding of how to assess the food system at multiple levels, varying geographic regions, and among diverse populations. Improved understanding of these food system assessments and factors related to healthy food access and ultimately consumption among specific populations can help make a public health impact.

OBJECTIVE(S): (1) To provide attendees an opportunity to learn about current research and trends on food system assessments across diverse geographic regions, multiple populations, and venues. (2) To understand how to design food system assessments specific to different communities/geographic jurisdictions and populations. (3) To understand how to apply findings from food system assessments to aid in developing effective intervention approaches at multiple levels to improve healthy food access.

SUMMARY: Examination of geographically diverse food systems is critical to better understanding and ultimately improving healthy food access and consumption of more healthful foods and drinks for all populations. This session will present results of food system assessments across various populations (e.g., urban, rural, ethnic minorities, seniors, etc.), at multiple levels (e.g. state, county, city), in different venues (e.g., grocery stores, communities), inside and outside of the US. Measurement issues as well as key results to help inform intervention work will be discussed.

S47.1  Healthy food access across rural and urban settings: challenges and implications
Pinard CA, Chan WM, Cowan E, Yaroch AL

PURPOSE: The purpose of this segment of the symposium will be to discuss rural and urban differences and similarities in healthy food access. These issues will be described by
presenting work done in a food system assessment from urban and rural areas of Nebraska (NE).

METHOD: Key highlights from the NE food system assessment will be presented, including focus groups and surveys with consumers and producers.

RESULT(S): Unique challenges in rural areas with food access include large distances to the nearest store, limited availability of fresh foods, a diminishing consumer base, and lack of consumer knowledge. However, more informal “food safety net” structures exist in rural communities, and a culture of helping one’s neighbor. On the other hand, urban residents have access to more formal programming such as food pantries and soup kitchens. Producers in rural communities struggle with finding the right market for particular products that may be less known (e.g., certain vegetables), while these “specialty” products sell well in urban areas. Quantitative data demonstrates that both urban and rural communities in NE experience challenges with food access that impact the quality of their diets. The qualitative results reveal how unique, yet parallel strategies will be required to address food access in urban and rural environments.

CONCLUSION(S): These findings will be discussed within the context of designing effective environment, policy, and individual level approaches to improve healthy food access and ultimately dietary behaviors across urban and rural settings.

FUND SOURCING: ConAgra Foods Foundation

S47.2 Food environment assessment among rural seniors in the Western United States
Byker CJ, Christenson L

PURPOSE: The purpose of this segment of the symposium will be to describe a food environment assessment for seniors in rural Montana, located in the western United States. We will discuss how the food environment applies to senior food access in rural areas across the United States.

METHOD: Assessment and measurement of the food environment in rural Montana included qualitative focus groups, food outlet mapping, secondary research (i.e., Census and USDA Food Environment Atlas), and self-report surveys.

RESULT(S): Montana has one of the fastest growing senior populations in the nation. In Montana, the number of individuals over the age of 65 doubled between 1940 and 2000 and this growth is on a trajectory to double again by 2030. Much of Montana is classified as a food desert according to USDA standards. For seniors in Montana, cost, food outlet availability, food quality, nutrition knowledge, transportation, social networks, and supplemental nutrition services, and emergency food services all influence the degree of food access. Food outlet maps will be presented. Access to and consumption of fresh foods like produce was very dependent upon personal gardens, social networks, and farm to
consumer outlets

CONCLUSION(S): These findings will be discussed within the context of effectively assessing the food environment for target populations and designing effective environment, policy, and individual level approaches to improve healthy food access and ultimately dietary behaviors for seniors living in rural areas.

FUND SOURCING: AARP Foundation

S47.3 Measuring food system environments of low-income, ethnically diverse communities in the Southwest US
Evans A, Jennings R, Smiley AW, Hussaini A, Basu S

PURPOSE: Many communities in central Texas do not have easy access to healthy foods. In order to test the impact of a community-wide food system intervention on residents’ fruits and vegetables (F&V) intake, a community food system assessment was conducted in 2012 in two low-income, primarily Hispanic communities. The purpose of this presentation is to describe the data collection methodology and baseline results.

METHOD: Assessment of the communities’ food systems included: 1) Randomized door-to-door survey data (n=300 residents), 2) Qualitative interviews (n=33 key stakeholders, community residents, grocery store owners, and school cafeteria personnel), and 3) Observational data in terms of points of food access, availability, and quality.

RESULT(S): Participants of the door-to-door surveys and interviews were mostly Spanish-speaking, Hispanic, low-income, and SNAP participants. While 95% of participants reported that it is important for their family to eat fresh F&V, 35% reported that they are not able to eat as many F&V as they would like. While it is easy to get to a grocery store for most participants, many respondents reported that it was difficult to access quality F&V. In terms of the social environment, 50% said that few neighbors think that eating healthy is important. When asked if their neighbors shop at farmers’ markets or grow their own vegetables, the overwhelming majority answered no.

CONCLUSION(S): These findings will be used by the intervention community to determine the most effective strategies to increase access to high quality, fresh F&V for their community from a tool box of evidence-based strategies.

FUND SOURCING: Michael & Susan Dell Foundation
Food systems within grocery stores: assessing the opportunities to purchase both healthy and unhealthy foods
Thornton L

PURPOSE: Food purchasing decisions are influenced by both the types of stores people have access to but also by numerous within-store factors such as the availability, quality, variety, placement and price of food items. This segment of the symposium will provide an overview of assessments of the food environment within grocery stores.

METHOD: An overview of the strengths and weaknesses of currents tools will be presented with an emphasis and the need to ensure tools consider unhealthy items and are context-specific. This will be supported by our experience in using an audit tool to assess snack food availability in supermarkets across eight countries.

RESULT(S): Traditionally, in-store assessments have focused on the availability and price of items that represent a healthy food basket. Recent work we have undertaken reveals supermarkets are also laden with opportunities to purchase unhealthy foods. Further, sizable cross-national differences in the availability of snack foods between countries were apparent. This highlights both the importance of considering such items when assessing the within-store environment but also ensuring tools are modified to be context-specific. In addition, within-store audit tools need to take into account other issues that may be relevant for a local population including the availability of culturally specific foods, disabled access and food sourcing (use of local products).

CONCLUSION(S): A greater awareness of key within-store factors that are likely to influence food purchasing decisions is required. Audit tools should be modified to assess whether the within-store environment meets the needs of all local community members.

FUND SOURCING: Deakin University Alfred Deakin Postdoctoral Research Fellowship
**Determinants of physical activity in children and adolescents**

**O.001 Early childhood predictors of toddlers’ physical activity**
Hnatiuk J, Salmon J, Campbell KJ, Ridgers ND, Hesketh KD

PURPOSE: Identifying early influences on children’s physical activity is desirable to inform the development of effective intervention strategies to optimise physical activity levels. This study examined early childhood predictors of toddlers’ physical activity across the domains of maternal cognitions and behaviours, infant behaviours and the home environment.

METHOD: Data were obtained from 214 toddlers (53% male) participating in the Melbourne InFANT program. Mothers completed a survey of physical activity predictors when their child was 4- (T1) and 9-months old (T2). Based on Social Cognitive Theory Family Perspective, 9 factors and 11 individual items were identified as potential explanatory variables. The outcome measure was toddlers’ physical activity assessed by ActiGraph accelerometers at 19-months (T3) of age. Data were analysed using linear regression.

RESULT(S): One factor at T1 and one factor and two items at T2 showed some association with physical activity at T3 and were included in multivariate analyses. After adjusting for age the child started walking and maternal education, the time spent with babies of a similar age at 4-months old (β=0.05, 95% CI [0.01, 0.08]) and the time spent being physically active with the mother at 9-months old (β=0.06, 95% CI [0.01, 0.11]) predicted physical activity at 19-months old.

CONCLUSION(S): Early influences on children’s physical activity are challenging to identify. Future research is required to identify other early life predictors of physical activity and to determine whether the time spent with other babies of a similar age or being active with the mother predicts physical activity in other cohorts.

**O.002 Association of parenting practices to encourage or discourage physical activity with Hispanic preschool children’s objectively measured physical activity**
O’Connor TM, Cerin E, Hughes SO, Robles J, Lee RE, Butte NF, Mendoza JA, Baranowski T

PURPOSE: Assess the association of parenting practices (PP) to encourage or discourage physical activity (PA) with Hispanic 3-5 year old children’s objectively measured PA

METHOD: Cross-sectional study of Hispanic parent-child dyads (n= 84) who reported their demographics and frequency of using PP that encourage (structure/encouragement) or discourage (promote inactive transport, promote screen time, psychological control, and safety concerns) child PA using verified scales. Children wore Actigraph GT3X accelerometers recording 15 second epochs for 7 days. Allowing for re-wears, 82 had valid data (≥4 days, ≥1 weekend day, and ≥480 awake min/day). Data were processed using
established cut-points for preschool children. Association of PA PP with child PA was assessed with generalized linear models adjusting for demographic correlates and non-wear time on weekdays and weekends separately.

RESULT(S): Mean child age was 4.4 (±0.8) years (55% boys). On average children spent 369 (±71) min/day sedentary, 247 (±37) min/day in light PA, and 83 (±38) min/day in moderate-to-vigorous PA (MVPA). ‘Promote inactive transport,’ (b=21.9, p<0.05), and ‘Promote screen time’ were positively (b=23.5, p<0.01), while ‘Have outdoor toys’ was negatively (b=−10.1, p<0.05) associated with child sedentary time on weekdays. ‘Promote screen time’ (b=−15.0, p<0.05) and ‘Not register for sports’ (b=−8.8, p<0.05) were negatively associated with light PA on weekends. ‘Have outdoor toys’ (b=1.1, p<0.01) and ‘Not register for sports’ (b=0.9, p<0.05) were positively associated with MVPA on weekends.

CONCLUSION(S): PP can encourage or discourage child PA. Additional validation studies are needed to establish the association of PA PP sub-scales with child PA.

O.003 The effects of individual, family, and environmental factors on physical activity levels in children
Cadogan SL, Keane E, Kearney PM

PURPOSE: Physical activity (PA) plays a fundamental role in maintaining and improving physical and mental health, both during childhood and in later years. This study aims to identify individual, family and environmental factors that determine PA levels in a population sample of Irish children.

METHOD: Cross-sectional analysis of the first wave (2008) of the nationally representative Growing Up in Ireland study (N=8,568). A two-stage clustered sampling method was used where schools served as the primary sampling unit (response rate: 82%) and age eligible children from participating schools were the secondary units (response rate: 57%). Parent reported child PA levels and potential covariates include favourite hobby, cumulative screen time (CST), sports participation (parent and child reported) and child BMI (measured by trained researcher). Univariate and multivariate multinomial logistic regression (forward block entry) examined the association between individual, familial and environmental correlates and PA levels.

RESULT(S): The children were classified as achieving low (25%), moderate (20%) or high (55%) PA levels. In the fully adjusted model, male gender (OR 1.64 [95%CI: 1.34-2.01]), an active favourite hobby (OR 1.65 [95%CI: 1.31-2.08]) and membership of sports/fitness team (OR 1.90 [95%CI: 1.48-2.45]) significantly increased odds of being in the high PA group. Exceeding two hours CST (OR 0.66 [95%CI: 0.52-0.85]), overweight (OR 0.41 [95%CI: 0.27-0.61]; or obesity (OR 0.68 [95%CI: 0.54-0.86]) significantly decreased odds of being in the high PA group.

CONCLUSION(S): Individual factors are the most important correlates of PA. Future initiatives should be multifaceted and encompass a broad range of hobbies/activities which are currently popular among children.
Components of the home environment associated with child physical activity and screen time
Vaughn AE, Hales DP, McWilliams CP, Mazzucca S, Ward DS

PURPOSE: To present a new instrument measuring the home physical activity environment and the associations between the home’s physical characteristics and children’s physical activity (PA) behaviors.

METHOD: A sample of 135 parents of 3-12 yo children were asked to complete the new HomeSTEAD self-administered survey. HomeSTEAD is a comprehensive measure of the home physical and social environment related to child nutrition and PA (active play and sedentary behaviors). Parents completed the survey three times over 12-18 days and allowed an in-home observation. Parents also completed a brief screener about child’s PA (outside playtime, TV watching, and video game use). Reliability and validity of the new instrument were evaluated using common statistics (Kappa, ICC, mean comparisons, limits-of-agreement, correlations). Construct validity was assessed by examining associations between the items and scale scores and children’s PA.

RESULT(S): Reliability evidence was strong for most items (ICC > 0.60). Validity was good for items used to quantify equipment (r>0.50), but items about usability and accessibility had lower estimates (r <0.30). In general, items with lower reliability or validity evidence also had lower variation. Presence of TV and video games were significantly associated with TV time, video game time, and screen time (r= 0.22-0.41). Significant associations were also observed between amount, accessibility, and condition of portable play equipment and child outside play time, TV time, and total screen time (r= 0.20-0.27).

CONCLUSION(S): This comprehensive measure of the home environment will help further our understanding of how the home environment impacts child PA and sedentary behaviors.

Neighbourhood walkability and pedometer-determined physical activity of 6 to 10 year-old children
Stearns JA, Cutumisu N, Ball G, Boule N, Veugelers P, Spence J

PURPOSE: It is unknown whether neighbourhood design influences children’s physical activity on both weekday and weekend days. The study examined the association between neighbourhood walkability and children’s pedometer-determined physical activity.

METHOD: Children aged 6 to 10 years-old (N = 474) were recruited between 2009 and 2011 from a longitudinal cohort study in Edmonton, Alberta. The children wore SC-T2 pedometers for four consecutive days, including three weekdays and one weekend day. A walkability index was derived based on street connectivity, dwelling density, and land mix use within a 400-meter and an 800-meter radius of the child’s home. Linear regressions assessed the relationship between neighbourhood design and average steps taken on weekdays, weekend days, and over the four days. Season, area-level socioeconomic status, gender, age, and BMI were entered as covariates.
RESULT(S): Walkability within a 400-meter buffer was not significantly related to average total steps (β = .07, p = .27), weekday steps (β = .10, p = .11), or weekend day steps (β = -.09, p = .24). Walkability within an 800-meter buffer was significantly related to weekday steps (β = .12, p < .05), but not average total steps (β = .10, p = .09) or weekend day steps (β = -.06, p = .39).

CONCLUSION(S): Living in an area that is conducive to walking appears to influence the amount of steps that children take on weekdays. This finding is likely due to active transportation to school, and suggests that children who live in walkable neighbourhoods are more likely to actively commute.

O.006 Independent mobility and moderate to vigorous physical activity in Portuguese children

PURPOSE: Children’s independent mobility (IM) is defined as the opportunity for children to move freely in their environment, and is considered as an independent correlate of physical activity (PA). Research suggests that, children with greater IM engage in a greater volume of PA. This study further explored the relationship between IM and PA, specifically whether IM is associated with PA levels in children.

METHOD: Participants were 354 pupils, aged 11.63 year-old (44.1% boys) from public schools in Porto (Portugal). IM was assessed using a questionnaire. Categorical principal components analysis (CATPCA) was used to determine the underlying dimensions of the IM items. PA was measured with accelerometers, (Actigraph GT1M). Evenson’s cut-points defined PA intensities. Multinomial logistic regression was used to calculate the odds ratio (OR) of belonging to the different quartiles of moderate to vigorous PA (MVPA) according to IM.

RESULT(S): After adjustment for individual characteristics (age, gender and BMI), the odds of having a higher level of MVPA when children have higher IM increase through the quartiles. The odds of children with higher independent mobility to belong to quartile 3 compared to quartile 1 were 1.483 times more than children with lower IM. The odds of belong to quartile 4 compared to quartile 1 were 1.487 times higher for children with higher IM.

CONCLUSION(S): This study shows that greater IM among children is related to MVPA. Results could guide the development of better interventions that stimulate children’s opportunity for IM.
O.007  The relationship of school physical activity and physical education policies on children’s school-day physical activity behavior
Robinson LE, Wadsworth DD, Webster EK, Gell NM

PURPOSE: Schools have the capability to be ‘active communities’ through the implementation of physical activity policies. The purpose of this study was to investigate the implementation of state and school policies on students’ school day physical activity behaviors.

METHOD: 684 children (343 girls; mean age = 8.2 ± 1.8 years) from five rural elementary schools were the participants for this study. School day physical activity behaviors were assessed by pedometer step count, Systems for Observing Fitness Instruction Time (SOFIT), and System for Observing Play and Leisure Activity in Youth (SOPLAY). Body Mass Index was calculated from measured height and weight.

RESULT(S): Sixteen percent of the children were classified as overweight and 27% as obese. Students accumulated an average of 9.75 and 8.29 steps/min for boys and girls, respectively. SOFIT findings indicate that students spent an average of 23.84+3.91 mins in Physical Education (PE) and 14.32±6.10 mins were spent in moderate to vigorous physical activity. No recess was provided during the school day. Schools did not differ in written school policies, but there were differences for policy implementation. Most schools did meet or exceed the state PE requirements on their school schedule. However, PE was canceled or shortened approximately 22% of the time during the study.

CONCLUSION(S): Despite state mandated policies, implementation of PE as the sole physical activity opportunity does not provide adequate amounts of physical activity during the school day. For schools to be ‘active communities’, they must implement policies that give children opportunities to move throughout the school day.

O.008  The relationship between 4-8-years-old childrens’ and their parents’ physical activity
Laukkanen A, Pesola A, Sääkslahti A, Finni T

PURPOSE: Home environment is considered as a key factor affecting the level of physical activity in young children. Physically active parents may increase the likelihood of active lifestyle in their children. However, studies investigating the topic have been mostly based on the subjective physical activity assessment. Thus, the purpose of this study was to examine the relationship between childrens' and their parents' objectively measured physical activity.

METHOD: Children were 4-6-years old pre-schoolers (n = 48; 19 boys; mean age 5.4 ± 0.5 years) and 7-8-years-old first-graders (n = 27; 10 boys; mean age 7.5 years ± 0.3 years). Parents were full-time workers (n = 94; mean age 39 ± 6 years; 47 fathers;). Physical activity
was measured over 6 days in children and 7 days in parents (at least 1 weekend day in both) using accelerometers. Statistical associations between childrens’ and parents’ counts per minute (CPM) values were examined using Spearman’s correlation.

RESULT(S): Physical activity was recorded for an average of 5.2 days (12.5 ± 1.6 hours/d) in children and 6.3 days (12.5 ± 2.1 hours/d) in parents. There was a significant association between pre-school-boys and their mothers’ physical activity on weekends (r = 0.861, p = 0.001), and between first-grader-girls and their fathers’ physical activity on weekdays (r = 0.829, p = 0.042)

CONCLUSION(S): Based on objectively measured physical activity data, this study revealed associations between childrens’ and their parents’ physical activity. This result supports the hypothesis of parents’ important role for their childrens’ physical activity behavior.

O.009 What do adolescents want in order to become more active?
Corder K, Atkin A, Ekelund U, van Sluijs E

PURPOSE: Few large studies have examined adolescents’ opinion about increasing their physical activity (PA) to inform PA promotion. We aimed to assess preference for activity type and social context of activity promotion and to examine patterns by subgroup.

METHOD: Participants (n=480) (Mean±SD: 14.3±0.3 years; 45.2% male) were asked by questionnaire “What activities would you like to try or do more often?” (yes/no to gym use, dancing, martial arts, team sports, racquet sports) and “I would like to do more PA with my...[friends/family]” (agree/disagree). Anthropometry and demographics were obtained. Logistic regression was used to examine preference by sex, weight status and parental education (SES).

RESULT(S): Most adolescents wanted to increase participation in ≥1 type of physical activity (94.4%). Gym use (e.g. treadmills/weights) (56.7%) and team sports (50.6%) were most popular for increased participation. To increase PA, girls were less likely to choose racquet sports (vs. boys OR;95%CI 0.6;0.4-0.9) but more likely to select dancing (20.5;12.4-33.9). High SES adolescents opted for gym use, team and racquet sports (vs. low OR 1.3-1.5; all p<0.03). More adolescents wanted to increase PA with friends (89.7%) than family (63.3%). Overweight/obese adolescents were less likely to choose participation with friends (vs. normal weight 0.5;0.3-0.9).

CONCLUSION(S): Targeting adolescent PA promotion by subgroup and providing choice of activity type and co-participants appears promising. Adolescents want to do more physical activities more often; interventions could increase opportunities and support to facilitate this.
O.010  The influence of maturation and body size and composition on changes in physical activity in adolescent girls
Fawkner S, Knowles A-M, Nevill AM, Niven A

PURPOSE: During adolescence, the number of girls achieving the recommended levels of physical activity (PA) for health decreases significantly and the temporal alignment of this decline in PA with the onset of maturation warrants investigation. The aim of this study was to adopt a longitudinal design to examine the effect of age, relative and absolute maturation, body size and composition on changes in PA in adolescent girls.

METHOD: 208 girls (11.8±0.4 years) were recruited at baseline. Data were collected at 3 subsequent time points, each 6 months apart. At 18 months, 119 girls remained in the study. At each time point girls completed the Physical Activity Questionnaire for Children, the Pubertal Development Scale (from which both a measure of relative and absolute maturation were defined) and had their body mass, waist circumference and sum of skinfolds assessed.

RESULT(S): Early matures were significantly more active than on time maturers at phase 1 and phase 4. Multilevel modeling for PA indicated a significant negative effect of age, and a significant positive parameter for early maturers. Absolute maturation, body mass, waist circumference and sum of skinfolds did not significantly contribute to the model.

CONCLUSION(S): This data supports the decrease in PA with age that is prevalent in the literature in adolescent girls, and suggests that changes in body size and composition that accompany maturation do not contribute to this drop in activity. However, it also suggests that contrary to common hypotheses, relatively more mature girls may in fact be more active than their less mature peers.
Sedentary behaviors

O.011  **Active and non-active video gaming among Dutch adolescents: who plays and how much?**
Simons M, de Vet E, Brug J, Seidell JC, Chin A Paw MJM

PURPOSE: Playing active video games instead of non-active ones is considered a promising strategy for reducing sedentary behavior in adolescents. To gain insight into the feasibility of this strategy, more insight is needed into who plays active games and how much. Therefore, prevalence and demographic correlates of both active and non-active gaming among adolescents were investigated.

METHOD: A survey assessing game behavior and potential determinants, was conducted among adolescents (12-16 years, n=373), recruited via secondary schools. Multivariable logistic regression analyses were conducted to examine demographic correlates of frequent active gaming (≥1 hour per week) and regular non-active gaming (>7 hours per week).

RESULT(S): Of all participants (n=373), 43% reported playing active games (active gamers), 40% playing exclusively non-active games (non-active gamers) and 17% not playing video games at all. Active gamers played on average 2.5 days a week for 36 minutes on a school day and 42 minutes on a weekend day. Non-active gamers played on average on 4.7 days a week for 65 minutes on a school day and 80 minutes on a weekend day. Adolescents attending lower levels of secondary school were more likely to play active games frequently than adolescents attending high secondary school levels. Boys and older adolescents were more likely to play non-active gaming regularly, than girls or younger adolescents.

CONCLUSION(S): It seems that a large group of adolescents, especially lower educated, can be reached with active games. However, active game interventions aiming for a reduction in sedentary time should emphasize substituting non-active game play by active game play.

O.012  **Longitudinal levels and bouts of sedentary behavior among adolescent girls**
Carson V, Cliff D, Janssen X, Okely A

PURPOSE: Adolescent girls are one of the most sedentary demographic groups. A better understanding of their accumulation of sedentary behavior is needed to inform future interventions. Therefore the purpose was to examine the longitudinal levels and bouts of objectively measured sedentary behavior accumulated during different days of the week and periods of the weekday among a large sample of adolescent girls.

METHOD: The results are based on 655 adolescent girls from the Girls in Sport Intervention and Research Project. Levels and bouts of sedentary behavior were derived from accelerometer data collected in 2009 (baseline) and 2010 (follow-up). Repeated-measures
ANCOVAs were conducted in 2012 to examine sedentary behavior levels and bouts for different days of the week (weekday, weekend) and time periods (during school, after school, evening).

RESULT(S): Cross-sectional analyses revealed that levels and bouts/day of sedentary behavior were higher on weekdays compared to weekend days at baseline. Percentage of wear time spent sedentary and bouts/hr of sedentary behavior were highest in the evening compared to during school and after school time periods at both baseline and follow-up. Longitudinal analyses revealed that levels and bouts of sedentary behavior were higher at follow-up compared to baseline across the different days of the week and periods of the weekday examined, with the biggest increase (15%) occurring in the during school time period.

CONCLUSION(S): Future interventions targeting sedentary behavior among adolescent girls should consider developing strategies to reduce and break up prolonged sedentary behavior during the school day and in the evening.

O.013 Sitting time behavior and working memory
Olson EA, Drollette ES, Raine LB, Hillman C, McAuley E

PURPOSE: Aging is related with declines in certain cognitive functions. Impairments in executive functioning processes may affect individual ability to perform activities of daily living and lead to compromised quality of life. The purpose of this study was to examine associations between sedentary behavior and cognitive function.

METHOD: Generally healthy middle-aged adults (n=60, Mage=61±7.9) completed executive function tests and self-reported sitting time measures. The serial NBack task, with three conditions, measured working memory. In the zero-back condition, participants identified the current shape. Then, participants identified whether the current shape was the same or different from the previous shape (one-back condition) or two shapes ago (two-back condition). Reaction time (RT) and response accuracy were measured.

RESULT(S): Total weekly sitting time was correlated with zero-back RT, [r(54)=.386, p<.005], one-back RT [r(54)=.429, p<.001], but not two-back RT. Sitting time was negatively associated with one-back accuracy [r(54)=-.421, p<.001], two-back accuracy [r(54)=-.332, p<.05], but not zero-back accuracy.

CONCLUSION(S): Although a relationship between physical activity and executive function has been established, the association of sedentary behavior with executive function remains largely unexplored. These preliminary data indicate that sitting time is indeed associated with executive function, specifically working memory. The lack of association between the two-back RT and sitting time is likely due to the high difficulty level. Conversely, participants found the zero-back condition so easy that response accuracy variance was small. Further research is warranted to determine directionality of the relationship and whether disrupting sitting bouts or decreasing total sitting time may lead to improvements in working memory.
O.014 Sitting behavior and obesity evidence from the Whitehall II study

Pulsford RM, Stamatakis E, Britton AR, Brunner EJ, Hillsdon M

PURPOSE: Prospective studies report associations between indicators of time spent sitting and obesity risk. Most studies use a single indicator of sedentary behavior and are unable to clearly identify whether sedentary behavior is a cause or a consequence of obesity. Purpose: To investigate cross-sectional and prospective associations between multiple sitting time indicators and obesity and examine the possibility of reverse causality.

METHOD: Using data from the Whitehall II cohort (an occupational cohort of men and women aged 35-55 at baseline), multiple logistic models were fitted to examine associations between prevalent obesity (BMI≥30) at Phase 5 (1997–1999), and incident obesity between Phases 5 and 7 (2003–2004) across four levels of five sitting exposures (work sitting, TV viewing, non-TV leisure-time sitting, leisure-time sitting, and total sitting). Using obesity data from three prior phases (1985–1988, 1991–1993; and recalled weight at age 25 years), linear regression models were fitted to examine the association between prior obesity and sitting time at Phase 5.

RESULT(S): None of the sitting exposures were associated with obesity either cross-sectionally or prospectively. Obesity at one previous measurement phase was associated with a 2.43-hour/week (95% CI _0.07, 4.78) increase in TV viewing; obesity at three previous phases was associated with a 7.42-hour/week (95% CI_ 2.7, 12.46) increase in TV-viewing hours/week at Phase 5.

CONCLUSION(S): Sitting time was not associated with obesity cross-sectionally or prospectively. Prior obesity was prospectively associated with time spent watching TV per week but not other types of sitting. Reverse and bi-directional causality in the sitting time-adiposity association requires further research attention.

O.015 TV time but not computer time is associated with cardiometabolic risk in Dutch young adults

Altenburg T, de Kroon M, Renders C, Hirasing R, Chin A Paw MJM

PURPOSE: TV time and total sedentary time have been positively related to biomarkers of cardiometabolic risk in adults. We aim to examine the association of TV time and computer time separately with cardiometabolic biomarkers in young adults. Additionally, the mediating role of waist circumference (WC) is studied.

METHOD: Data of 634 Dutch young adults (18-28 years; 39% male) were used. Cardiometabolic biomarkers included indicators of overweight, blood pressure, blood levels of fasting plasma insulin, cholesterol, glucose, triglycerides and a clustered cardiometabolic risk score. Linear regression analyses were used to assess the cross-sectional association of self-reported TV and computer time with cardiometabolic biomarkers, adjusting for demographic and lifestyle factors. Mediation by WC was checked using the product-of-coefficient method.
RESULT(S): TV time, but not computer time, was significantly associated with triglycerides ($B=0.004; CI=[0.001;0.05]$) and insulin ($B=0.10; CI=[0.01;0.20]$). We found no evidence for WC to mediate the association of TV time or computer time with cardiometabolic biomarkers.

CONCLUSION(S): We found a significantly positive association of TV time with cardiometabolic biomarkers. In addition, we found no evidence for WC as a mediator of this association. Our findings suggest a need to distinguish between TV time and computer time within future guidelines for screen time.

O.016 Screen time and cardiometabolic function in Dutch 5 year olds: the ABCD-study
Chin A Paw MJM, Altenburg T, van Eijsden M, Gemke R, Vrijkotte T

PURPOSE: We examined the independent relationship of TV time and PC time with a number of cardiometabolic biomarkers in Dutch 5-6 year old children.

METHOD: Cross-sectional data were derived from a multi-ethnic cohort in the Netherlands (the ABCD study, $n=1,961$). TV and PC time were assessed by parent-report. Body weight, height, waist circumference (WC) and blood pressure were measured using a standard protocol. Fasting plasma glucose, C-peptide, low density lipoprotein cholesterol (LDLC), high density lipoprotein cholesterol (HDLC), and triglycerides were determined in capillary blood. A cardiometabolic function score was computed as the mean of the standardised values of WC, mean of systolic and diastolic blood pressure, glucose, C-peptide, inverted HDLC, LDLC, and triglycerides.

RESULT(S): The median time spent TV viewing was 1 hrs/day and median PC use was 0 hrs/day. The cardiometabolic function score was significantly higher in the least sedentary quartile (median TV time: 0.50 hrs/day) and lowest in the most sedentary quartile (median TV time: 2.29 hrs/day) for TV time. After adjustment for gender, birth weight, height, maternal education, PC time, and PA, the association of TV time with cardiometabolic function score ($b=-0.03, 95\% \ CI: -0.005;0.06$) was borderline significant ($p=0.10$). PC time was not significantly associated with any of the cardiometabolic biomarkers.

CONCLUSION(S): Our findings suggest that excessive TV time, but not PC time, may be adversely associated with cardiometabolic function in apparently healthy 5-6 yr olds. Since TV time and PC use intensify with increasing age further study in prospective cohorts is needed.
O.017 Longitudinal study of sedentary behavior during adolescence
Busschaert C, Cardon G, Maes L, De Bourdeaudhuij I

PURPOSE: This study examined the tracking of sedentary behavior during adolescence and identified predictors of sedentary behavior in different contexts (TV, computer and homework).

METHOD: In this longitudinal study (10-year follow-up), a self-reported questionnaire about sedentary behavior was used. Five hundred ninety-three children of 59 Flemish elementary schools in Belgium were analyzed (53.6% girls, mean age 9.9 (SD 0.43) at baseline). Multiple regression analyses were performed to examine predictors (measured at baseline) of sedentary behavior (at follow-up) and chi-square analyses were used for analyzing the tracking of sedentary behavior.

RESULT(S): Sixty percent of the boys and girls who watched TV for less than 60 minutes/weekday at baseline, continued this behavior at follow-up. Only 20.8% of the girls and 21.4% of the boys who exceeded the recommendations of TV viewing on weekdays (2h/day) at baseline, watched more than 2 hours/day at follow-up (p=0.046, p=0.061; boys and girls respectively). Determinants differed according to gender and type of day. For girls, drinking more soda (p=0.015), eating more chips (p=0.049) and doing no sports (p=0.029) predicted more TV viewing. A higher computer-use was predicted by other predictors, like eating more snacks for boys (p=0.032) and having a higher BMI (p=0.034) for girls. More sitting for homework during weekends was predicted by higher parental education for boys and girls respectively (p=0.007, p=0.001).

CONCLUSION(S): The tracking of sedentary behavior amplified the need of interventions to reduce sedentary behavior at younger ages. The context-specific results highlight the importance of multi-dimensional interventions for minimizing sedentary behavior during adolescence.

O.018 Outcome evaluation of the UP4FUN pilot intervention in 10 – 12 year old children in Europe - The ENERGY project

PURPOSE: The UP4FUN pilot intervention was an evidence and theory-based family involved intervention aiming at reducing and breaking up sitting time at home (with special emphasis on screen time), and breaking up sitting time in school among 10-12 year-olds in Europe. The purpose was to evaluate the effect of the UP4FUN pilot intervention.

METHOD: A total of 3147 pupils from Belgium, Germany, Greece, Hungary and Norway participated in a school-randomized controlled trial with a pre- and post-test design. The intervention included one or two school lessons per week for six weeks, along with tasks for the children and their parents. Screen time and breaking up sitting time were registered by self-report. The effect of the intervention was evaluated by regression analyses on
differences between intervention and control groups on post-test values, adjusted for baseline values and gender.

RESULT(S): No effects were observed for TV/DVD or computer/game console time between the intervention group and the control group. The intervention group reported breaking up continuous sitting time significantly more than the control group, 2.5 vs. 2.2 breaks/hour watching TV/DVD (p=0.03) and 2.2 vs. 2.1 times/hour using computer/game consoles (p=0.02). The intervention group also reported more positive attitudes towards (p<0.001) and preferences/liking for (p=0.002) breaking up sitting time compared to the control group.

CONCLUSION(S): No effect on screen time use between intervention and control group, however small effects were observed on breaking up continuous sitting time in favor of the intervention group. Evidence is scarce on breaking up sedentary time among children, and should be further investigated.

O.019 Recruiting and adherence challenges for an office-based treadmill workstation study
Tudor-Locke C, Hendrick CA, Duet MT, Swift DL, Schuna JM, Martin CK, Johnson WD, Church T

PURPOSE: To report recruiting and adherence challenges encountered during a controlled treadmill workstation trial delivered in a health insurance office-based company promoting a pro-wellness culture.

METHOD: An email invitation linking to a web screening survey was distributed to 728 employees. Follow-up telephone screening confirmed eligibility. Company supervisors then reviewed the list of eligible participants and provided approval for individual’s continued participation; reasons for disapproval were held private. Potential participants attended an orientation session, provided informed consent, attended a separate baseline demographic and anthropometric assessment session, and wore an accelerometer for 7 days. Participants were randomized to a workstation intervention group (preferred walking speed, 45 minutes/session, twice a day) or a usual working (at their own seated desks) group.

RESULT(S): In all, 123 employees completed the web screener and 94 were confirmed as eligible. Ineligibility was primarily due to self-reported exercising habit. Sixty-two were approved by company supervisors and 44 attended the orientation and provided informed consent. Forty-one subsequently provided anthropometric data; 34 of these wore the accelerometer for a minimum of 4 valid days. Ultimately 21 were randomized to intervention and 20 to the usual working condition. After the first 3 months, intervention adherence (% of all possible sessions attended) averaged 56% (range: 3-100%). The most frequently reported reasons for missing sessions included work conflict (35%), out of office (30%), and illness/injury (20%).

CONCLUSION(S): Although previous evidence suggests that treadmill workstations are promising alternatives to sedentary working behaviors, there are numerous challenges to adoption and adherence in a real world office-based workplace.
PURPOSE: This study examined associations of perceived environmental attributes with change in TV viewing time over seven years among older men and women in the Australian Diabetes, Obesity and Lifestyle (AusDiab) study.

METHOD: AusDiab is a population-based study on diabetes and associated risk factors in adults. We used the data on older adults (aged over 60 years at baseline) collected in 2004-2005 and 2011-12 (N=902, 46.2% men, mean age 67.6 years). Change in TV viewing time was examined by modelling follow-up TV viewing time adjusted for baseline TV viewing time. The exposure variables were nine perceived attributes of neighbourhood environments (e.g. shops, alternative routes, footpaths, parks, local traffic). Generalised linear modelling was used to examine correlates of change in TV viewing time, separately for men and women.

RESULT(S): On average, men increased TV viewing from 134 to 140 minutes/day, and women from 125 to 138 minutes/day over the seven years. For both men and women, those who strongly agreed that local traffic along most nearby streets made it difficult/unpleasant to walk increased their TV viewing time by 12.2% (95%CI: 1.02, 1.23) and 11.5% (95%CI: 1.01, 1.24) at follow-up, respectively. Other environmental attributes were not significantly associated with change in TV time.

CONCLUSION(S): TV viewing time, as a common sedentary behaviour of older adults, may be influenced by traffic volume, speed and potentially by other neighbourhood attributes, for which traffic could be a marker. More pleasant neighbourhood outdoor environments may help older adults make alternative lifestyle choices to indoor sedentary activities.
Applying theory to understanding physical activity

O.021 The relationship between basic psychological need satisfaction, motivational regulations and intention to dropout of soccer among Norwegian children and youth
Haug EM, Wold B, Smith OR

PURPOSE: Being physically active in organised sport has been shown to enhance young peoples’ health and well-being. However, many children terminate their participation during adolescent years. Building on the tenets of self-determination theory, the present study examined the association between perceived psychological need satisfaction (competence, relatedness, autonomy) and intention to drop out of soccer and if this was mediated by motivational regulations (intrinsic motivation, introjected regulation, integrated regulation, external regulation and amotivation).

METHOD: This cross-sectional study used baseline data from a sample of 1397 Norwegian soccer players in age group 11-14 years that took part in a cross-national intervention study on empowering coaching (the PAPA project). Data were collected through questionnaires in different regions during spring 2011. Path analyses was used to test the mediation model.

RESULT(S): The results revealed that the association between competence and intention to drop-out was fully mediated by internal motivation, external regulation and amotivation. The effect of autonomy on drop out was fully mediated by external regulation and amotivation. The relationship between relatedness and drop-out was, however, only partially mediated by internal motivation and amotivation.

CONCLUSION(S): The present study provides support for the use of self-termination theory in understanding factors that can influence the intention to drop out of soccer. Focusing on creating a more empowering climate that supports competence, relatedness and autonomy with an impact on young people’s motivation, may have a positive effect on long-lasting participation in organised sport.

O.022 A socio-ecological approach to understanding adolescent girls’ engagement and experiences in the PE environment
Mitchell F, Currie C, Kirby J, Inchley J

PURPOSE: There is a growing body of literature investigating age-related declines in physical activity (PA) participation among young people, especially girls, who typically have lower rates of PA than boys throughout the teenage years. Over the last few decades, research has consistently shown a percentage of girls are not engaging with PE in school, resulting in a number of relatively inactive girls within the PE class. This paper aims to explore the reasons for a sample of girls’ disengagement in PE.
METHOD: Using focus groups and longitudinal interviews, the study explores the experiences of a sample of ‘disengaged girls’ from four case study schools in Scotland. Twelve focus groups (n=41 girls) were carried out during 2008/09 to capture girls’ opinions, perceptions and experiences of PE. Twenty disengaged girls were then selected for individual interviews across the four schools. The theoretical framework is based on Welks (1999) Youth Physical Activity Promotion model (YPAP), a socio-ecological approach which divides the influential correlates of physical activity into 1) individual-level predisposing factors, 2) enabling factors, including personal attributes and environmental variables and 3) reinforcing (social) factors.

RESULT(S): The results indicate that individual predisposing factors, such as perceptions of low competence in the PE class along with aspects of the social environment can contribute to girls’ disengagement in PE.

CONCLUSION(S): This paper presents findings which suggest, for this group of adolescent girls, the wider psychosocial environment in which PE takes place may have a greater impact on levels of enjoyment and participation than the PA itself.

**O.023 Associations between motivation and physical activity among primary school age children: a self-determination theory perspective**

PURPOSE: To investigate associations between four motivation types proposed in self-determination theory and objectively-assessed PA of primary-school children.

METHOD: Cross-sectional data from 462 primary school children (Mean age = 10.02, SD = .57; 43% male), from 20 UK schools were analyzed. Intrinsic (α = .77), identified (α = .71), introjected (α = .59) and external (α = .71) PA motivation were measured using four three-item scales. Moderate-to-vigorous PA was determined from Actigraph accelerometers worn for ≥ 3 days. Data were analyzed using structural equation modeling using maximum likelihood estimation was used. Paths were specified from four latent motivation variables to the observed MVPA variable. Clustered robust standard errors were used to account for the clustering of participants in schools.

RESULT(S): Analysis revealed a good fit of the model to the data [χ2 (60) = 149.15, p = .000; CFI = .94; RMSEA = .06 (90% CI = .05 to .07); SRMR = .05]. Intrinsic motivation was positively associated with MVPA (β = .20; SE = .06; p = .001) whereas introjected regulation was negatively associated with MVPA (β = -.16; SE = .08; p = .04). Identified (β = .00; SE = .00; p = .00) and external regulation (β = .09; SE = .08; p = .254) were not associated with MVPA.

CONCLUSION(S): The findings provide evidence that motivation for PA driven by fun/enjoyment rather than internal pressures is more behaviorally adaptive for 9-11 yr old children.
A cluster-randomized controlled trial of strategies to increase adolescents’ physical activity and motivation during physical education lessons: results of the Motivating Active Learning in Physical Education (MALP) trial
Lonsdale C, Rosenkranz RR, Bennie A, Peralta L, Sanders T, Lubans D

PURPOSE: Physical education (PE) programs aim to promote physical activity (PA) and reach nearly all school-aged children. However, PA levels within PE lessons are often low. In this cluster-randomized controlled trial we compared the short-term effects of three Self-Determination Theory-based motivational strategies on PA and sedentary behavior, as well as their hypothesized antecedents during PE lessons.

METHOD: After baseline testing, teachers (n = 16) and their Year 8 classes, including 288 students (M = 13.6 years, SD = 0.5 years, 50.4% male), were randomly assigned to one of four teaching strategy conditions: (1) explaining relevance of activities; (2) providing choice from PA options selected by the teacher; (3) providing complete free choice; or (4) usual practice. Prior to the post-intervention lesson, a researcher trained each teacher to deliver the assigned motivational strategy. Primary outcomes were accelerometer-assessed moderate-to-vigorous PA and student motivation during the lesson. Secondary outcomes included students’ sedentary behavior and psychological needs satisfaction (autonomy, competence, and relatedness).

RESULT(S): Linear mixed-model analyses revealed that only the ‘free choice’ intervention resulted in significant increases in PA (p < .05) and decreases in sedentary behavior (p < .05) from baseline to follow-up. Motivation was not influenced by the interventions, but students’ autonomy significantly increased during both choice-based interventions (p < .05).

CONCLUSION(S): Promoting student choice can produce short-term increases in PA and sedentary behavior, as well as perceived autonomy during PE lessons. Long-term effects should be investigated, along with the influence of these strategies on PA and sedentary behavior outside school.
Sedentary behavior interventions

O.025 Does removing sedentary electronic games from children increase their physical activity?

PURPOSE: Children have considerable daily exposure to screen based media and there is community concern that this contributes to reduced physical activity and increased sedentary behaviour. Therefore the purpose of this study was to examine the real-world impact of removing electronic games from children’s homes.

METHOD: Children were recruited from the general community in Perth, Australia. Fifty six children aged 11.0 (sd 0.8) years participated in a within-subject randomised, controlled study. Children had all electronic games removed from the family home for 2 months and were provided with a range of sedentary electronic games and a PlayStation 2 console for 2 months. Children wore an Actical accelerometer and kept a simple activity diary for the final week of each condition.

RESULT(S): When children had access to sedentary electronic games their average daily use was 44.3mins (95%CI 32.8-55.7) and their average daily MVPA was 54.1mins (95%CI 47.5-60.7), light activity 240.3mins (95%CI 228.5-252.2), and sedentary time 522.7mins (95%CI 509.4-535.9). Removal of games from the family home resulted in similar daily activity and sedentary exposures, though in the 3.30pm to 6pm after-school period, children accumulated 3.8mins more MVPA and 4.7mins less sedentary time. Diary reports indicated that whilst children filled some of the time ‘gained’ by not playing electronic games with another sedentary screen activity (TV viewing), they also participated in more active leisure and transport.

CONCLUSION(S): Removing all sedentary electronic games from the homes of children is likely to result in small gains in physical activity and thus other approaches need to be investigated.

O.026 Mid-intervention mediated effects on objectively assessed sedentary time among children in the Transform-us! Clustered-randomized controlled trial
Carson V, Salmon J, Arundell L, Hesketh KD, Ball K, Daly R, Dunstan D, Crawford DA

PURPOSE: To examine the mid-intervention mediating effects on children’s objectively assessed classroom and total weekday sedentary time in the Transform-Us! intervention.

METHOD: The results are based on 293 children, aged 7- to 9-years-old at baseline, from 20
schools in Melbourne, Australia. Each school was randomly allocated to one of four groups, which targeted reducing sedentary time (SB; n=74), increasing or maintaining moderate- to vigorous-intensity physical activity (PA; n=75), combined SB and PA (SB+PA; n=80), or the current practice control (C; n=64). Classroom and total weekday sedentary time was objectively assessed using ActiGraph accelerometers. Child, parent, and teacher attitudes, and the perceived classroom environment for standing in class were assessed by questionnaire. All variables were measured at baseline and mid-intervention (5-9 months).

RESULT(S): The SB+PA group spent 13.3 min/day less in weekday sedentary time at mid-intervention compared to the control group. At mid-intervention, the SB group had more positive child attitudes towards standing in class (0.8 units; 5-unit scale) and all intervention groups had more positive perceptions of the classroom environment for standing (0.3-0.4 units; 3-unit scale), compared to the control group. However, none of the mediator variables had an effect on sedentary time; thus, no mediating effects were found.

CONCLUSION(S): While beneficial effects were observed for some mediating variables and total weekday sedentary time at mid-intervention, no mediating effects were observed. Given the dearth of existing information, future intervention research should explore mediated effects. More work is also needed on the development of accurate mediator measures that are sensitive to change overtime.

O.027 Reduction of sitting time in sedentary men and women. A randomised controlled trial. (Sedentary Intervention Trial)
Aadahl M, Linneberg A, Jørgensen T

PURPOSE: To investigate whether amount of daily sitting time can be reduced through individually tailored, theory-based motivational counselling in sedentary adults.

METHOD: From a population-based epidemiological study (‘The Health2010 Study’), adult men and women (18-69 years), who self-reported at least 3.5 hours of leisure time sitting per day, were invited, and N=166 eligible men and women underwent a baseline health examination, wore an ActivPAL monitor for 7 days and were subsequently randomized to either a control group (usual lifestyle) or an intervention group. The intervention consisted of 4 individual counseling sessions conducted by trained nurses over the following 6 months. The intervention focused on individual goal setting combined with key messages and ideas for reduction of sitting time (booklets, postcards and stickers). The primary outcome measure was change in daily sedentary time measured by ActivPAL. After 6 months, the ActivPAL measurements and the health examination were repeated. Data were analysed using intention-to-treat principles. ClinicalTrials.gov (NCT00289247).

RESULT(S): From the intervention group (n=93) and the control group (n=73), n=12 and n=5 participants, respectively, withdrew (attrition 10.2%), leaving n=68/n=81 in the control/intervention group for analysis. At 6 months follow-up, Intention-to-treat analysis revealed a mean difference in change between the intervention group and control group of – 0.77 hours per day of leisure time sitting (p=0.002), -1.42 cm in waist circumference.
(p=0.007) and -5.38 mmol/l in fasting insulin ((p=0.03).

CONCLUSION(S): In adult sedentary men and women, it is possible to reduce daily sitting time and improve the cardiometabolic biomarker profile using an individually tailored, motivational counseling approach.

O.028  Post-intervention effects on screen behaviours and mediating effects of parental regulation: the Health in Adolescents (HEIA) s study – 20 month multi-component school-based randomized controlled trial

PURPOSE: This study investigated the main effects of HEIA—a school-based obesity prevention intervention—on adolescents’ screen behaviours and whether this effect was mediated by parental regulation which has been called for. Additionally, this study explored whether these main and mediated effects were moderated by gender and weight status.

METHOD: HEIA was informed by a socio-ecological framework. Adolescents (n= 908 Control; 510 Intervention) self-reported their TV-viewing and computer/game-use on weekdays and weekends at baseline and 20 month post-intervention. The adolescents, their mothers (n=591 Control; 244 Interventions) and fathers (n=469 Control; 199 Intervention) reported parental regulation of the screen behaviours. Linear regression analysis following the product-of-coefficient test was used to examine main, mediating and moderating effects.

RESULT(S): No main effects on the screen behaviours were identified in the whole sample, and parental regulation did not mediate change in the screen behaviours neither when reported by adolescents nor parents. Stronger parental regulations were however significantly associated with less TV-viewing and computer/game-use, with effects being conditional on adolescents’ versus parental reports. Gender moderated the intervention effect on computer/game-use weekends with a trend for more favourable effect among girls. Weight status moderated the intervention effect on TV-viewing and computer/game-use weekdays, with more favourable effect among normal weight adolescents.

CONCLUSION(S): Multiple behaviour intervention can produce effect on TV-viewing, but may not reach all subgroups equally well. Future interventions should encourage parents to regulate their adolescents’ screen behaviours as parental regulation seems to be a determinant of TV-viewing and computer/game-use. Future studies should search for more effective intervention strategies targeting parental regulation.
The role of policy in promoting physical activity and nutrition behaviors

O.029 Evidence that key school policies are associated with student behaviors

PURPOSE: To evaluate the association between school policies and student behaviors/overweight. School policy environments were defined two ways: overall policy environment and key policies that appear to contribute most to childhood obesity/prevention.

METHOD: School-level polices (2002 and 2006) and student behaviors/weight (2004 and 2007) were assessed using a cohort of 40 secondary schools (Minnesota, USA). Key policy variables examined included PE required; intramural opportunities available; and availability of foods/drinks in vending machines/school stores (8 policies, yes/no, α=0.65). A broader list defined the overall policy environment (20 policies, yes/no). Behavioral variables of daily glasses of sugar sweetened beverages (SSB), servings of fruits/vegetables (FV), weekly hours of sedentary activities and days per week of physical activity (PA) among 6th, 9th and 12th grade students were examined. BMI percentile was also examined (2007). Associations were estimated using fixed effects regression modeling.

RESULT(S): Preliminary results indicate significant associations between key policies and student behaviors. During any given year, for schools with 4 or more key policies average student intake of SSB decreased by 0.2 glasses (0.07, 0.32), p = 0.002; FV servings increased by 0.12 (0.03, 0.21), p = 0.009); and sedentary activity decreased by 1.4 hours per week (0.6, 2.2), p = 0.0005). Overall policy environment was significantly associated with SSB and FV servings but these effect sizes were smaller. There were no associations between key or overall policy environments and student BMI percentile.

CONCLUSION(S): Study findings indicate an effect of select school policies upon student diet and activity behaviors, independent of secular effects.

O.030 Exploring the implementation of the Toronto charter in Oman
Mabry RM, Al Busaidy Z, Reeves MM, Owen N, Eakin EG

PURPOSE: The Toronto Charter on Physical Activity outlines a comprehensive approach to increasing physical activity in populations. To explore implementing the Toronto Charter in Oman, a qualitative study was conducted to identify barriers and culturally relevant solutions for addressing adults’ lack of physical activity and sedentary behavior.

METHOD: Semi-structured interviews with 10 mid-level public health managers in Oman were conducted using an interview guide presenting recently-derived evidence on the significant association of work and transport physical activity and sedentary behavior with the metabolic syndrome; and, evidence on the socio-demographic correlates of these
behaviors. This was followed by inquiries about reasons and potential solutions to addressing physical inactivity. Interviews were audio-recorded and transcribed. Thematic content analysis was carried out, guided by an ecological model of health behavior.

RESULT(S): Barriers for inactivity emerged around four themes: intrapersonal (lack of motivation, awareness, time), social (norms restricting women’s participation in outdoor activity, low value of physical activity, modernization), environment (lack of places to be active, weather, sedentary work settings) and policy (ineffective health communication, limited resources). Solutions focused on culturally-sensitive interventions at the environment (building sidewalks and exercise facilities), policy (strengthening existing interventions and coordinating actions with relevant sectors) and community levels (encouraging community-based activities).

CONCLUSION(S): The Toronto Charter provides a systematic intersectoral approach to addressing physical inactivity that could be adapted to the Omani context. However, further research is needed on the determinants of physical inactivity and culturally appropriate interventions, in order to guide public health action.

O.031 Barriers and facilitators for use of research evidence in local policy making on physical activity. The REPOPA program
Lau CJ, Fredsgaard MW, Skovgaard T, Jørgensen T, Hämäläinen R-M, Aro AR, Glümer C

PURPOSE: There is a gap on how to improve integration of research evidence in health enhancing physical activity (HEPA) policy making. REsearch into POlicy to enhance Physical Activity (REPOPA) is a 5-year project aiming to explore this area. REPOPA is programmatic, hence first phases built basis for later ones. Phase one deals with mapping and analyses of use of research evidence in selected national, regional and local HEPA policies in six countries. This paper focuses on barriers and facilitators for utilization of research evidence in three local level HEPA policies in Denmark.

METHOD: Three municipality policies were selected for investigation. Document analysis, followed by semi-structured interviews with key stakeholders involved in the policy making process, were carried out. Data were analyzed with focus on barriers and facilitators in the use of research evidence in policy making.

RESULT(S): A specific barrier is lack of time, whereas a specific facilitator is the need for knowledge as powerful arguments. Factors which may inhibit or facilitate the use of evidence are: availability of relevant evidence applicable to local context, stakeholder involvement, plus expertise, knowledge transfer procedures and knowledge management within the organization.

CONCLUSION(S): Our insight into the barriers and facilitators affecting the utilization of research evidence in HEPA policy making is preliminary. However, a common platform (in national language) with research- and experience-based suggestions for initiatives, which can be applied to local context may improve integration of evidence in HEPA policies.
O.032 Critical success factors for promoting physical activity through community partnerships
Lucidarme S, Marlier M, De Bourdeaudhuij I, Cardon G, Willem A

PURPOSE: To study the influence of policy processes and to define key determinants of effective evidence-based policy implementation for physical activity promotion by use of a partnership approach.

METHOD: Using Parent and Harvey’s model for sport and physical activity community-based partnerships, we defined determinants of implementation through Comparative Qualitative Analysis based on 13 face-to-face interviews with network organisations and 39 telephone interviews with partner organisations. Furthermore, the implementation outcome was constructed based on two quantitative data sets (n=991 & n=965) and quantitative regional descriptives.

RESULT(S): Regional differences in implementation effectiveness were found, thus policy processes matter. In total, 9 variables were found to influence implementation. Four contributed directly to success: political motives, absence of a metropolis, commitment and staff quality. Four others resulted in a less successful implementation: absence of positive merger effects, exposure motive and governance, and dispersed leadership. Personal contact was the most powerful variable since its presence contributed to success while its absence led to a negative outcome.

CONCLUSION(S): The policy processes -here network processes- have an influence on the effectiveness of the implementation since regional differences were found. Nevertheless, community networks are a promising instrument for the implementation of evidence-based policies. Determinants of both formation and management of partnerships influence the implementation success. During partnership formation, special attention should be given to partnership motives, e.g. political and exposure motives, while social skills are of utmost importance for the management since people make the partnership work.
Social inequalities in dietary behavior

O.033 Explaining socioeconomic inequalities in preschool children’s consumption of snacks and sugar containing beverages: mediation by the family food environment

Wijtzes AI, Jansen W, Jansen PW, Jaddoe VVW, Hofman A, Raat H

PURPOSE: The present study aimed to examine the associations between family socioeconomic position (as indicated by maternal educational level) and preschool children’s consumption of snacks and sugar containing beverages, and to assess the mediating effects of variables relating to the family food environment, including parental feeding practices, parental consumption, and children’s television viewing time.

METHOD: We analyzed data from 2814 preschoolers and their parents enrolled in The Generation R Study, a large birth cohort study in Rotterdam, the Netherlands. Logistic regression models were used to calculate odds ratios of snacking ≥ 2 times/day and consuming sugar containing beverages ≥ 3 glasses/day for children of mothers with low, mid-low, and mid-high educational level (reference group: high educational level), before and after adjustment for mediators.

RESULT(S): Children of low and mid-low educated mothers were significantly more likely to consume snacks ≥ 2 times/day and sugar containing beverages ≥ 3 glasses/day compared to children of high educated mothers, with children of low educated mothers showing the highest risks (OR: 2.44; 95% CI: 1.84,3.23 and OR: 2.46, 95% CI: 1.87,3.24 respectively). Odds ratios for low and mid-low maternal educational level were reduced with about 45% and 30% respectively after adjustment for all mediators, but remained significant.

CONCLUSION(S): Family socioeconomic position is inversely related with preschool children’s consumption of snacks and sugar containing beverages. These associations were partly explained by parental feeding practices, parental consumption, and children’s television viewing time. Targeting the family food environment may be an effective way of reducing socioeconomic inequalities in children’s unhealthy dietary behaviors.

O.034 Three-year change in diet quality and associated changes in weight among schoolchildren living in socioeconomically disadvantaged neighborhoods: the READI cohort study

Lioret S, McNaughton SA, Cameron AJ, Crawford DA, Campbell KJ, Cleland V, Ball K

PURPOSE: Findings from research assessing the influence of dietary factors on child obesity have been equivocal. We aimed to test the hypothesis that a positive change in diet quality is associated with favorable changes in BMI z-scores in schoolchildren from low socioeconomic backgrounds; and to examine whether this effect is modified by weight status at
baseline.

METHOD: This study utilized data from the Resilience for Eating and Activity Despite Inequality (READI) study, a longitudinal cohort with data collected in 2007-08 (T1) and 2010-11 (T2) in 216 socio-economically disadvantaged women and their children (5-12 years at T1). Dietary data was collected using a food frequency questionnaire, and diet quality index (DQI) scores derived at both T1 and T2. Weight, height and physical activity were objectively measured. The other variables were reported in questionnaires. We examined the association between change in diet quality (DQI_T1-T2) and zBMI_T2, with linear regression analysis adjusted for zBMI_T1, DQI_T1, and potentially confounding variables (physical activity, screen sedentary behavior and maternal education), both in the whole sample, and stratified by overweight status at baseline.

RESULT(S): After accounting for zBMI_T1, change in diet quality was inversely associated with zBMI_T2 only in children who were overweight at baseline (P=0.035).

CONCLUSION(S): The identification of modifiable behaviors such as diet quality that affect weight status longitudinally is valuable to inform future interventions aimed to prevent weight gain in the most vulnerable groups.

O.035 Capturing changes in dietary patterns among older adults: a latent class analysis of an aging Irish cohort
Janas M, Darren D, Fitzgerald AP, Gilthorpe MS, Perry IJ

PURPOSE: Data driven approaches to dietary patterns are underutilized, particularly, Latent Class Analysis models have been rarely used. This study aimed to explore the applicability of LCA methods to classify diet patterns to determine long term diet stability.

METHOD: Cross sectional and longitudinal analyses from the 1998 baseline and 2008 follow up waves of the Cork and Kerry Diabetes and Heart Disease Study. Participant diets were surveyed with a standard FFQ. Latent class analysis was used to identify mutually exclusive subgroups with different dietary patterns. Setting: General population in the Republic of Ireland Subjects: 923 Men and women aged 50-69yr at baseline (n=923) and at 10-year follow up (n=320)

RESULT(S): Three dietary classes emerged: Western, Healthy and Low Energy. Significant differences in demographic, lifestyle and health outcomes were associated with class membership. Between baseline and follow-up most people remained ‘stable’ in their dietary class. Most of those who changed class moved to the healthy class. Higher education was associated with transition to a healthy diet; lower education was associated with stability in an unhealthy pattern. Transition to a healthy diet was associated with higher CVD risk factors at baseline: respondents were, significantly more likely to be smokers, centrally obese and to have hypertension (though non-significant).

CONCLUSION(S): Latent Class Models are useful to explore dietary patterns and diet
transitions. Understanding the predictors of longitudinal stability/ transitions in dietary patterns will assist with targeting public health initiatives by identifying subgroups most/least likely to change and those most/least likely to sustain a change.

O.036 The impact of maternal education on maternal correlates of young children’s diets: findings from the Melbourne InFANT Program
Spence AC, Hesketh K, Cameron AJ, Crawford DA, Campbell DA

PURPOSE: Young children’s diets are important determinants of their health but are often suboptimal, particularly among those of lower socio-economic position (SEP). Of factors within the socio-ecological model, maternal knowledge, behaviors and beliefs are most likely to directly influence child diet, and may be associated with SEP. This research investigated whether maternal factors differed by maternal education level, as a measure of SEP, and whether education moderated an intervention’s effect on maternal factors.

METHOD: The Melbourne InFANT Program was a community-based health-promotion RCT designed to improve infant eating via improving maternal knowledge, feeding practices, self-efficacy and modelling. Measures of each were self-reported, and maternal education assessed as university or non-university educated (baseline n=542, complete post-intervention data n=375). Ordered logistic regression was used to assess associations between maternal factors and education among control participants, as well as moderation of intervention effect on maternal factors by maternal education.

RESULT(S): University-educated mothers reported higher knowledge, intentional modelling of eating, maternal intakes of fruit, vegetables and fruit variety, and self-efficacy for child drinking water (all p<0.05). Maternal knowledge, rewarding, pressuring and non-core sweet snacks were improved in the intervention arm (all p<0.05). Additionally, the intervention effect on maternal fruit intake was moderated by education level, with those of lower education showing a trend towards improved intake (OR 1.77, p=0.06).

CONCLUSION(S): Mothers of lower SEP have poorer knowledge, self-efficacy and modelling behaviors. Some of these factors can be positively influenced by a health-promotion intervention, but ways to more effectively engage and improve behaviors in this group require further research.
O.037  **Physical activity and quality of life association in youngsters: does motivation matters?**  
Palmeira AL, Minderico CS, Martins SS, Sardinha LB

PURPOSE: Physical activity (PA) makes me feel good... But can this association be explained by the self-determination degree of the PA regulations? The study goal was to analyze if the association between PA and quality of life (QoL) is mediated by the PA motivation in youngsters.

METHOD: This study gathered 2052 students participating in the PESSOA program (10 to 15 y, 917 girls). We collected PA level, QoL and PA behavior regulations (BR). Multiple mediation analysis was conducted following Preacher and Hayes procedures.

RESULT(S): Relevant bivariate correlations were significant (all p<.001). With all sample the BR partially mediated the association between PA level and QoL, with the external and introjected regulations thwarting the effect of PA on QoL, while identified and intrinsic regulations supported the positive effect of PA on QoL. In the sub-analysis with only boys and only girls we observed complete mediation. In boys the indirect effects pattern was identical to the one observed with all sample, while on girls the intrinsic motivation alone had a positive effect and amotivation, external and introjected regulations thwarted the effect of PA on QoL.

CONCLUSION(S): Our results support the hypothesis that one of the mechanisms that might explain the "feel-good factor" effect of PA is the fulfilment of more self-determined behavior regulations. On the other hand it also supports the opposite effect, where less self-determined regulations will thwart the potential beneficial effects of PA on our well-being.

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O.038  **Associations between youth participation in organized and non-organized physical activity, motor skills and fitness**  
Hardy LL, Rogers K, St George A, Espinel P, Okely A

PURPOSE: To examine associations between organised (OPA), non-organised physical activity (NOPA), fundamental movement skills (FMS) and cardiorespiratory endurance (CRE) in youth.

METHOD: Secondary analysis of representative, cross-sectional, school-based survey conducted in 2010, Australia (n = 4,273; aged 10-16 years). Time spent in organized (OPA) and non-organized physical activity (NOPA) was assessed by self-report. Seven FMS were assessed by process-orientated criteria (mastery/no-mastery) and CRE was assessed by the 20m-shuttle-run-test (fit/unfit). Covariates included sex, age, and socioeconomic status.
RESULT(S): Total daily physical activity was higher among boys than girls (101.4mins v 87.8mins, P=0.000). OPA contributed to two-thirds of daily physical, and proportionally was higher among girls than boys (67% v 62%, P=0.000). CRE was independently associated with each hour spent in OPA and NOPA for boys and OPA for girls. The odds of FMS mastery of the gallop, catch, kick and leap increased 43-53% among boys and for girls the run, jump, gallop, kick, throw and leap increased 21-95%, for each hour spent in OPA. Among boys each hour of NOPA was associated with FMS mastery (catch, throw) and CRE.

CONCLUSION(S): Both OPA and NOPA are important contributors to youth’s daily physical activity, however only OPA was associated with FMS mastery and CRE among girls. For boys OPA and NOPA were associated with FMS mastery and CRE. FMS increase the likelihood of long-term participation in health-related physical activity and our findings support the importance of providing youth with opportunities to engage in OPA to develop FMS.

O.039 The association between cardio-respiratory fitness and attention in a birth cohort of British children: findings from the Avon Longitudinal Study of Parents and Children (ALSPAC)

Pindus D, Bandelow S, Hogervorst E, Biddle SJH, Sherar LB

AIM: To investigate the associations among cardio-respiratory fitness (CRF) and various aspects of attention in a sub-sample of British children from ALSPAC.

RATIONALE: Research suggests that CRF can benefit children’s cognition. Studies to date focused on cognitive control and found small but significant effects of CRF on children’s cognition. However, the specific effects of CRF on various aspects of children’s attention in a population based cohort have not been reported. The knowledge of how CRF is related to these different aspects of attention can help target future interventions with the potential to benefit learning.

METHOD: Sub-samples of 1444 to 1493 (37% males) from the ALSPAC study (1992 – present) at 9 and 11 years follow-ups were used for the analyses (approx. 20% of the original sample). CRF and attention were measured when children where on average 9.9 (SD=.27) and 11.8 (SD=.19) years old, respectively. CRF was expressed as physical work capacity at a heart rate of 170 beats per minute (PWC170). Selective, divided attention and attentional control were measured with sub-tests from the Test of Everyday Attention for Children (TEA-CH) and expressed as the proportion of time taken to complete the task to correct responses after adjustments for motor speed or task condition (selective and divided attention, respectively), or as simple reaction time (attentional control). Spearman’s correlations were employed to explore the relationships among CRF and attentional indices. Significant relationships were further explored with multiple linear regression controlling for potential confounders.

RESULT(S): Children’s CRF at 9.9 years was positively related to the reaction time (RT) adjusted for accuracy on the task of selective attention at age 11.8 years (r=.13, p<.001). In the multiple regression analyses, CRF explained a small proportion of variance (R2=.01,
F(1,1491)=15.71, p<.001) in children’s RT on the task of selective attention (β = .10, t=3.96, p< .001) after controlling for confounders: chronological age, sex, IQ, hyperactivity, handedness, maternal education, BMI, pubertal stage, birth weight and gestational age (ΔR²= .09, F(1,1481)=14.12, p<.001).

CONCLUSION(S): CRF does not afford benefits to children’s attention in this large sample of children from ALSPAC. Further research is needed to elucidate the associations between CRF and children’s attention.

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**O.040 Trends in physical activity levels of the Dutch population between 2000 and 2011**

Bernaards CM, Hildebrandt VH, Hofstetter H

PURPOSE: In 2000 continuous monitoring of physical activity (PA) of adults (≥ 18 years) was initiated in the Netherlands to identify trends in PA at population level. Since 2006, PA levels of youth (4-17 years) have been monitored as well.

METHOD: The monitor involves a representative rolling sample of the Dutch population (n=approximately 8,000 yearly), interviewed by telephone. Respondents are asked about demographic characteristics, moderate to vigorous intensity (MV) PA, vigorous intensity (V) PA and sport participation. To meet the MVPA guideline, youth need to spend at least 60 minutes of MVPA daily and adults at least 30 minutes of MVPA at minimally five days per week. To meet the VPA guideline all age groups need to spend at least 20 minutes of VPA at minimally three days per week. Sport participants participated in sport activities at least 40 times a year.

RESULT(S): Between 2006 and 2011 the percentage of youth that met the MVPA guideline declined from 26.9 to 17.5%. Between 2000 and 2011, the percentage of adults that met the MVPA guideline increased from 44.2 to 59.3%. The percentage of respondents that met the VPA guideline was relatively stable between 2000 and 2011 among all age groups. Between 2006 and 20011, sport participation was relatively stable among youth and adults but increased substantially among 65-to-74 year olds (from 33.5 to 46.0%) and among elderly (≥ 75 years) (from 22.8 to 30.1%).

CONCLUSION(S): MVPA levels have increased between 2000 and 2011 among Dutch adults but have decreased among youth.

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**O.041 Physical work demands and leisure time physical activity in relation to risk for coronary heart disease**

Clays E, De Bacquer D, Janssens H, De Clercq B, Casini A, Braeckman L, De Backer G, Holtermann A

PURPOSE: There is evidence that high physical job demands have detrimental effects on cardiovascular health, although study results are limited. In addition, the interplay with
leisure time physical activity in affecting coronary heart disease is subject to debate. The aim was to examine the effects of physical work demands and leisure time physical activity on the incidence of coronary events.

METHOD: The study included 14337 middle-aged men free of coronary heart disease at baseline from the BELSTRESS cohort (1994-1998). Data were collected through standardized questionnaires and clinical examinations. The incidence of coronary events was monitored during a mean follow-up time of 3.15 years. Multiple Cox proportional hazard regression modeling was applied.

RESULT(S): During follow-up, 87 new coronary events were registered. Results demonstrated overall a beneficial effect of leisure time physical activity and an adverse effect of physical work demands. However, an interaction effect was observed, in which moderate to high physical activity during leisure time was associated with a 60% reduced risk for coronary events in men with low occupational physical activity, but not in workers with high physical work demands. Men with high physical job demands showed a more than four times increased risk for coronary heart disease when they engaged in physical activity during leisure time.

CONCLUSION(S): This study adds support to the increased risk for coronary heart disease from physical work demands. Moreover, these findings suggest that leisure time physical activity guidelines should be tailored according to the level and nature of physical work demands.

O.042  
**Physical activity and work-related variables associated with the mental and physical health of secondary school teachers**

Bogaert I, De Martelaer K, Deforche B, Clarys P, Zinzen E

PURPOSE: The teaching profession is characterized by high levels of stress and physical complaints, factors that can be improved by regular participation in physical activity (PA). The purpose of this study was to identify factors that are associated to the mental and physical health of teachers, with a special interest for PA variables in order to make suggestions for PA interventions among teachers.

METHOD: An online survey was conducted in a representative sample of secondary school teachers (n=1167, average age 40 years; 68% female). PA and sitting time were measured using the International Physical Activity Questionnaire (IPAQ); mental (MH) and physical health (PH) using the Short Form 36 and Psychosocial Aspects at Work by the PAW questionnaire. Anova’s, univariate and multivariate regression analyses were performed analyzing the association between PA, sitting time and work related variables with teachers MH & PH.

RESULT(S): Only PA in leisure time was associated with a positive MH and PH, whereas occupational PA and sitting time were negatively associated teachers’ health. PA for transportation and PA at home were not associated with teachers’ health. The work related
factors; job satisfaction, social support and occupational stress, were the most important correlates for MH ($R^2=34.7\%$) and for PH ($R^2=9.5\%$).

CONCLUSION(S): Work related aspects were the most important correlates of MH and PH indicating the importance of the work environment. Although any kind of PA may have a positive influence on health, occupational PA was perceived as stressful and wearing. Only Leisure time PA was associated with a more positive MH and PH.

**O.043 Quantifying the association between physical activity and cardiovascular disease, cancer and all-cause mortality: a systematic review and meta-analyses**
Manek N, Kelly P, Scarborough P, Foster CE, Nichols MS, Rayner M

PURPOSE: In this systematic review and meta-analysis we quantify the relationship between total physical activity (PA) and cardiovascular disease (CVD), cancer and all-cause mortality by converting measures of total PA to a single continuous index, and pool results before and after adjustment for a measure of body weight.

METHOD: All prospective cohort studies published from 1991 to 2011 measuring total PA and reporting relative risks adjusted for a measure of body weight were included. The total PA exposure in each study was converted to MET hours per day. Random effects meta-analyses were performed to calculate the change in risk associated with an increase in PA equivalent to moving from a sedentary lifestyle to achieving recommendations.

RESULT(S): A total of 51 studies containing over five million participants were included. An increase of 11·25 MET hours per week (in line with UK Department of Health recommendations) reduced the risk of mortality from all causes by 8% ($RR\ 0.92\ (0.89-0.95)$) after adjustment for body weight. Increasing PA by 22·5 MET hours per week (in line with international recommendations for the reduction of cancer) was associated with a significant protective effect for all cancer mortality ($RR\ 0.85\ (0.79-0.91)$), breast cancer incidence ($RR\ 0.84\ (0.74-0.96)$) and lung cancer incidence ($RR\ 0.74\ (0.55-0.99)$), after adjustment for body weight.

CONCLUSION(S): These findings provide evidence for a significant reduction in the risk of all-cause mortality, all-cancer site mortality, and breast and lung cancer incidence with an increase in total PA levels, independent of any reduced risk associated with lower body weight.
Physical activity and nutrition in preschoolers and children

**O.044** The Baby Nutrition and Physical Activity Self-Assessment for Child Care (Baby NAP SACC) study: assessing childcare providers’ perceptions of physical activity promotion and the childcare physical activity environment
Hesketh KR, Neelon SB, van Sluijs E, Blaine R, Taveras EM, Gillman MW

**PURPOSE:** To assess childcare providers’ perceptions of their role in infant and toddler physical activity promotion and to determine factors associated with the physical activity environment of childcare centres.

**METHOD:** We analysed baseline data from the Baby NAP SACC study, a pilot randomized-controlled trial conducted in 32 childcare centres in Massachusetts, USA. The Environment and Policy Assessment and Observation instrument was used to obtain a physical activity environment (PAE) score for each centre (range 53.2-111.7). Providers completed an activity-related questionnaire from which twelve perception questions were compared by high/low PAE score (median split: 83.8). Linear regression was used to examine which demographic, provider, and centre-level factors were associated with overall PAE score.

**RESULT(S):** 203 childcare providers (96% female, mean±SD age: 32.7±11.2 years) from 29 centres completed questionnaires. Fewer providers from high PAE centres (96% vs. 100%) believed teachers were influential in encouraging children to be active, whereas more reported that encouraging activity was not the teacher’s responsibility (20% vs. 8%) and that teachers had limited responsibility to promote activity (34% vs. 28%). After adjustment, total number of teachers employed was positively associated (β=0.49 per each additional teacher [95%CI: 0.29, 0.69]), and score for providers’ perceived role of a teacher inversely associated (β=−7.64 per standard deviation increase in score [-11.2, -4.37]), with PAE score.

**CONCLUSION(S):** Infant-toddler childcare centres with favourable physical activity environments have more teachers, although these childcare providers are also more sceptical about their role in promoting activity. The influence of this on children’s behaviour requires further investigation.

**O.045** Growing up healthy! A participatory health promotion programme for kindergartens
Axt-Gadermann M, Nölkel M, Schmidt B, Hassel H

**PURPOSE:** Gi-Kitas aims to improve the nutritional and physical activity behaviour of children and moreover the maintenance or enhancement of the nursery nurses’ quality of life with special attention to the conditions in the community.

**METHOD:** Intervention mapping was applied in a modified form to carry out an intervention
study. By means of focus group discussions the expectations of nursery nurses and parents were analysed. Additionally local barriers and difficulties were identified in a participatory way. Gi-Kitas is evaluated by (1) interviews with the head of each kindergarten; (2) questionnaires filled out by the nursery nurses and parents; (3) checking the second breakfast of the children in the kindergartens conducted before and after the intervention phase of 12 months.

RESULT(S): The development of the Gi-Kitas intervention resulted in a standardized intervention framework with seven different modules focusing on nutrition and physical activity of children, parental involvement, teamwork and the living conditions in the community. The intervention focused on environmental and personal factors in the family, kindergarten and community setting. The evaluation at baseline showed that the kindergartens have already implemented different kinds of activities. However, in all kindergartens there is scope for improvement, especially regarding health promotion for nursery nurses and parental involvement. The second survey is currently conducted. The results will be presented.

CONCLUSION(S): To create a lasting health promoting atmosphere in kindergartens a close collaboration between nursery nurses, parents and the community is necessary. The Gi-Kitas intervention supports kindergartens in their existing efforts.

O.046  Habitual physical activity and body mass index effects blood pressure in early ages

PURPOSE: To describe the methodology used to develop a physical activity (PA) intervention for pre-school children in Bradford UK, a low socio-economic, multi-ethnic city.

METHOD: UK government guidelines for pre-school PA interventions were reviewed. Focus groups (5) with White (8) and South Asian (10) parents investigated barriers to, and facilitators for their pre-schoolers PA. A systematic review of behaviour change theory used in successful childhood obesity interventions was conducted (Nixon et al., 2012) and a further literature review synthesised potentially successful strategies to increase PA. A draft of the intervention was presented to 9 early years workers and headteachers from 4 primary schools; refinements were made and a manual, materials and training plan were produced. Parental involvement workers and early years staff based in and employed by primary schools were trained to deliver the intervention.

RESULT(S): The PIP intervention is based on the Social Cognitive Theory of behaviour change. Parents and their pre-school children attend sessions hosted in primary school playgrounds for 30 minutes 3 times a week for 30 weeks (3 school terms). There are two phases; In the 10 week initiation phase facilitators deliver two 5 minute structured play sessions, there is 20 minutes of free play and information provision for parents (e.g. correct clothing for outdoor play). During the 20 week maintenance phase facilities and equipment are available however there is no formal supervision.
CONCLUSION(S): A pilot cluster RCT of PiP is underway. By April 2013 we aim to have recruited 8 schools and 120 preschool children to the trial.

O.047 Physical activity, sedentary behaviour and weight status across the preschool to primary transition

Hesketh KD, Salmon J, Hinkley T, Timperio A, Okely A, Cliff D, Crawford DA

PURPOSE: Elevated Blood Pressure (BP) is a major public health problem. Childhood obesity is associated with increased risk of high BP. Researchers suggest that moderate levels of physical activity (PA) are predictors of lower values of systolic blood pressure (SBP). The purpose of this study was to analyze the associations between compliance of PA recommendations, body mass index and blood pressure preschool children.

METHOD: The sample comprised 452 preschool children (47% female), mean age of 5 years. PA was assessed during 7 consecutive days by accelerometer. We analyzed the recommendation of at least one hour daily of moderate-vigorous PA (MVPA). BMI were used to categorize normal weight (NW) vs overweight/obese (OW), according IOTF (2000). BP was measured using the Colin monitor. Dietary intake will be obtained by a 3-day dietary record (2 weekdays and 1 weekend).

RESULT(S): The prevalence of BP above the 90th percentile (P90) was 8.6% and 1.4% respectively for SBP and DBP. The prevalence of overweight/obese was 38.6%. About 8.8% of the children did not accomplish the recommended daily MVPA. Children who did not meet the daily recommendations of MVPA and have overweight were twice as much more likely to have SBP values above the P90 compared to those who meet the daily recommendations and have normal weight (OR: 14.4; p<0.05), even after adjustment to dietary intake

CONCLUSION(S): We found an association between the no accomplishment of daily PA recommendations and high BMI and high SBP in pre-school children.

O.048 Somali, Latino, and Hmong parental perceptions and practices of raising healthy-weight children

Arcan C, Pergament S, Geele W, Ortega L, Rosas-Lee M, Xiong MB, Culhane-Pera K

PURPOSE: This study investigated associations between physical activity, sedentary behaviour and weight status over the period of transition from preschool to primary school.

METHOD: Participants were recruited to the Healthy Active Preschool and Primary Years (HAPPY) study in 2008-9 when aged 3-5 years (T1) and followed up three years later (T2); 509 provided data at both time points. Children were categorised as healthy weight or overweight based on measured height and weight and international cut-points. Children
wore Actigraph accelerometers for 8 days; proportion of wear time in sedentary, light-, moderate- and vigorous-intensity physical activity was calculated using age-appropriate cut-points. Analyses were stratified by sex.

RESULT(S): At T1, preschool girls classified as non-overweight spent a higher proportion of time in moderate-intensity physical activity and less time sedentary than overweight girls. At T2 non-overweight girls spent a higher proportion of time in vigorous-intensity physical activity. Girls who were non-overweight at both time points spent a higher proportion of time in vigorous-intensity physical activity at T1 and T2 than girls who were overweight at both times and a lower proportion of time sedentary at T1 (all p<0.05). No differences were observed for boys.

CONCLUSION(S): Cross-sectional and longitudinal analyses consistently revealed less favourable physical activity patterns for overweight compared to non-overweight girls, but no associations for boys. This suggests that during early childhood associations between weight status and physical activity may be limited to girls and may require sex-specific strategies to increase physical activity and reduce time spent sedentary for overweight girls.

**O.049 Changes in after-school physical activity and sedentary behavior over five years**

Arundell L, Ridgers ND, Veitch J, Salmon J, Hinkley T, Timperio A

PURPOSE: Based on Community-Based Participatory Action Research (CBPAR), we conducted qualitative research that assessed Somali, Latino and Hmong parents’ perceptions and practices of raising healthy-weight 3-12 year old children, with regard to diet and physical activity (PA).

METHOD: Trained researchers from each ethnic community conducted 10 focus groups with parents (n=67) of children in St. Paul, Minnesota in their native languages. Sessions were tape-recorded, transcribed, and translated to English. Data analysis was collectively conducted by members from each ethnic community and researchers following a CBPAR process.

RESULT(S): Parents agreed that children’s health is not dependent upon weight as other physical characteristics can be more relevant; their traditional foods are healthier than stereotypical American foods; and PA is important. Parents faced similar challenges with children’s food preferences while providing healthy foods on a limited budget; and with children’s sedentary preferences while dealing with winter weather, lack of space, and environmental safety. Ethnic differences were found in parents’ description of healthy children, causes of overweight, approaches in providing healthful foods, and in helping their children be physically active. Cultural norms for all groups and religious beliefs, especially for Somalis, were important factors guiding their nutrition and PA practices. Parents expressed interest in learning how to shop for and prepare healthy foods, especially healthy American foods on a budget, select healthy choices in fast food restaurants, and learn about the relationship between weight and health.
CONCLUSION(S): The results emphasize the need for culturally appropriate dietary and PA interventions among ethnic communities.

O.050 Development of PiP (Pre-schoolers in the Playground) an evidence-based, user informed physical activity intervention for children aged 18 months to 4 years old
Barber SE, Moore H, Summerbell C, Jackson C, Wright J

PURPOSE: Understanding patterns of activity change in the after-school period over time may inform interventions developed for this discrete period. This study examined changes in 5-6 and 10-12 year-old children’s physical activity and sedentary time in the after-school period over 3- and 5-years, and determined the contribution of this period to daily physical activity and sedentary behaviour over time.

METHOD: Data from two longitudinal studies conducted in Melbourne, Australia were used. Accelerometer data were provided for 2053 children at baseline (CLAN: 2001; HEAPS: 2002/3), 756 at 3-year follow-up (T2) and 622 at 5-year follow-up (T3). Light (LPA), moderate (MPA) and vigorous (VPA) physical activity were determined using age-adjusted cut-points. Sedentary time was defined as ≤100 counts/minute. Multilevel analyses, conducted in April 2012, assessed change in physical activity and sedentary time and the contributions of the after-school period to overall daily levels.

RESULT(S): After-school MPA and VPA decreased among both cohorts, particularly in the younger cohort who performed less than half of their baseline levels at T3 (MPA: T1=24min to T3=11min; VPA: T1=12min to T3=4min). LPA also declined in the older cohort. The contribution of the after-school period to overall MPA and VPA increased in the older cohort from 23% to 33% over 5 years. In the younger cohort, the contribution of the after-school period to daily MPA and VPA decreased by 3% over 5 years.

CONCLUSION(S): The importance of the after-school period for children’s physical activity increases with age. This period may be a critical time for intervention delivery, particularly as children enter adolescence.
**O.051 Recruitment and retention of children into behavioural physical activity and nutrition studies – Findings from a Delphi study**
Schoeppe S, Duncan MJ, Badland H, Oliver M, Burke M

**PURPOSE:** Purpose: To conduct a Delphi study with international public health experts to gather expertise and consensus on successful recruitment and retention strategies applicable in behavioural physical activity and nutrition studies with children.

**METHOD:** Methods: In 2012, a Delphi study was conducted with 27 international researchers in the fields of children’s physical activity, sedentary behaviour, nutrition and overweight. This involved three rounds of web-based surveys including open-ended questions (Round 1) and close-ended questions (Round 2 and 3) on successful recruitment and retention strategies. In round 2 and 3, experts rated their agreement with the importance of a strategy on a 5-point Likert scale (ranging between strongly agree and strongly disagree). Median ratings were calculated to identify which strategy experts considered as important. Consensus between experts was reached when at least 80% of the respondents rated an item as either strongly agree or agree. Interquartile ranges were calculated to assess the degree of consensus between experts.

**RESULT(S):** Results: The Delphi study yielded a set of successful child recruitment and retention strategies, and implementation examples. Recognized strategies included building trustful relationships between researchers and study partners, parents and children; having project champions; optimizing consent and follow-up procedures; offering incentives to study partners and children; minimizing participant burden and designing feasible studies with cohesive research teams.

**CONCLUSION(S):** Conclusions: Using multiple strategies is most promising for successful child recruitment and retention, as well as thorough planning, budgeting, and implementation of the recruitment process. Timeframes, efforts and costs should not be underestimated, and the need for extensive follow-up procedures.

**O.052 Nutrition and physical activity in child care centers: the impact of a wellness policy initiative on Environmental and Policy Assessment (EPAO) outcomes**
Lyn R, Evers S, Maalouf J, Griffin M

**PURPOSE:** The child care (CC) environment has emerged as an ideal setting to improve the nutrition and physical activity (PA) of young children. Research on environmental approaches to promote healthful dietary and physical activity patterns in CCs is needed. The purpose of this study was to assess the impact of an environmental wellness policy and training program on the nutrition and PA environment in 24 CC centers in Georgia.
METHOD: Using the EPAO, a pre/post-test design was utilized to assess changes to nutrition and physical activity environments. Day-long observations at each center were performed at baseline and 12-months by a registered dietitian. Analysis was performed using paired t-tests.

RESULT(S): At one year, analysis found statistically significant improvements for numerous EPAO components and overall nutrition (p < .001) and physical activity (p < .001) scores. Specific areas of improvement for nutrition scores included nutrition environment (p < .001), nutrition training and education (p < .001), and nutrition policy (p < .05). Areas of greatest improvement for physical activity scores included, active play (p < .05), sedentary environment (p < .05), portable environment (p < .05), staff behavior (p < .05), and physical activity training and education (p < .001). Results from a second cohort of 40 CCs including comparison centers, will also be available for presentation.

CONCLUSION(S): Findings from this study suggest that adoption of wellness policies and the training of caregivers in PA and nutrition can contribute to a healthy weight environment for young children in CC centers.

O.053 Feasibility trial evaluation of a physical activity and screen-viewing course for parents of 6 to 8 year-old children: Teamplay

PURPOSE: To examine the potential feasibility of a parent-focused intervention to reduce children’s screen-viewing (SV) and increase physical activity (PA).

METHOD: Teamplay was a two arm individualised randomised controlled feasibility trial. Participants were parents of 6-8 year old children. Intervention participants were invited to attend an eight week parenting programme with each session lasting 2 hours. Children and parents wore an accelerometer for seven days and minutes of moderate to vigorous intensity PA (MVPA) were derived. Parents were also asked to report the average number of hours per day that both they and the target child spent watching TV. Measures were assessed at baseline (time 0) at the end of the intervention (week 8) and 2 months after the intervention had ended (week 16)

RESULT(S): There were 75 participants who provided consent and were randomized. Children in the intervention group engaged in 2.6 fewer minutes of weekday MVPA at Time 1 but engaged in 11 more minutes of weekend MVPA. At Time 1 the intervention parents engaged in 9 more minutes of weekday MVPA and 13 more minutes of weekend MVPA. The proportion of children in the intervention group watching > 2 hours per day watching TV on weekend days decreased after the intervention (time 0=76%, time 1=39%, time 2=50%), while the control group proportion increased slightly (79%, 86% and 87%).

CONCLUSION(S): Teamplay is a promising parenting program. The intervention was acceptable to parents, and all elements of the study protocol were successfully completed.
O.054 The Healthy Lifestyles Programme (HeLP); evidence of feasibility, acceptability and ‘proof of concept’ in affecting children’s weight status
Lloyd JJ, Wyatt KM

PURPOSE: To develop a drama-based, school-located obesity prevention programme, that considers both intervention components and the system in which the intervention is delivered, and determine its feasibility and acceptability for schools children and their families.

METHOD: The Healthy Lifestyles Programme (HeLP) has been developed iteratively over 6 years following the MRC framework for the development and evaluation of complex interventions. Using the Intervention Mapping protocol, research evidence, behavioural theory and extensive stakeholder consultation, combined within a complex systems framework, a novel intervention that uses creative delivery methods to promote engagement has been developed. Three phases of piloting (including an Exploratory Randomised Controlled Trial) with 398 children have taken place.

RESULT(S): Phase 1 and 2 identified the appropriate age group and enabled refinement of intervention messages, activities and modes of delivery. In the Exploratory Trial (4 schools), 24 month measures (anthropometric and behavioural) were obtained from 92% of the original cohort. In the intervention schools, positive changes were seen in all targeted behaviours (screen time, physical activity, snacking). In the control schools the proportion of children overweight/obese rose from 26% at baseline to 32% at 18 and 24 months while, for intervention schools, the proportion remained at baseline levels (24%).

CONCLUSION(S): HeLP is a dynamic Programme that has been designed to allow for local adaptively. HeLP is feasible and acceptable and engages schools, children and their families. ‘Proof of concept’ has been established and a definitive trial, funded by NIHR PHR involving 32 schools and 1,300 children is now in progress.

O.055 Short- and long term effects of lifestyle triple P: a family intervention for childhood obesity
Gerards SMPL, Dagnelie PC, Jansen MWJ, Van der Goot LOHM, De Vries NK, Sanders MR, Kremers SPJ

PURPOSE: Parents as primary caregivers are responsible for providing home environmental influences on children’s physical activity and dietary behaviour. We tested the effectiveness of a childhood obesity intervention aimed at parents of overweight children aged 4-8 years in the Netherlands, called Lifestyle TripleP (LTP). The TripleP Positive Parenting Program is a multi-level parenting and family support strategy, based on social learning principles. We will present short- and long-term results (4 and 12 months after baseline) of an RCT testing the effectiveness of LTP in overweight children aged 4-8 years.
METHOD: Eighty-six parent-child triads were recruited for the current study. After baseline measurements, parents were randomly allocated to the intervention or control condition. Participants assigned to the intervention condition received the 14-week LTP intervention, in which a range of strategies related to nutrition, physical activity and positive parenting were provided. Primary outcome measure was child’s body composition, and secondary outcome measures were children’s dietary behaviour and physical activity level, parenting measures (parenting practices, parental feeding style, parenting style, and parental self-efficacy) and parental body composition.

RESULT(S): Statistically significant positive effects of the intervention on several nutrition, physical activity and parenting measures were found on the short-term measurement, with small to moderate effect-sizes, ranging from 0.40 to 0.85. Furthermore, long-term results will be presented.

CONCLUSION(S): The current intervention is one of the first to address parenting styles to prevent further weight gain in overweight and obese children. We expect that such interventions have a large and sustained impact on the child’s energy balance-related behaviours.

O.056 Longer term outcomes of an early childhood obesity prevention intervention: the Melbourne Infant Feeding, Activity and Nutrition Trial (InFANT) Program
Hesketh KD, Campbell KJ, Salmon J, McNaughton SA, McCallum Z, Cameron AJ, Crawford DA

PURPOSE: The Melbourne InFANT Program provided mothers with knowledge and skills over 15-months to support development of positive diet, physical activity and reduced sedentary behaviours in their infants from 3-months of age. Positive intervention effects were observed for sweet snack consumption and television viewing, but no effect for zBMI, physical activity, fruit or vegetable consumption. The aim of this paper is to describe outcomes two years post-intervention when children were aged 3.5-years.

METHOD: Follow-up of participants occurred in 2011-12, 2-years after the final intervention session. Child height and weight were measured, children wore Actigraph accelerometers for eight days, and mothers reported child television viewing time and dietary intake. Differences between intervention and control arm were assessed by linear regression.

RESULT(S): Follow-up data were obtained from 361 families (66% of those originally recruited). No differences were observed between intervention and control children for zBMI, physical activity, television viewing, fruit or vegetable intake two years post-intervention. However intervention children continued to consume significantly fewer sweet snacks than control children (mean 3.3 vs 4.1 serves per day, p=0.008).

CONCLUSION(S): This early childhood obesity prevention program showed no longer term impact on child zBMI, physical activity, fruit or vegetable intake. While the intervention
effect on sweet snack consumption persisted, the effect for television viewing observed at intervention conclusion was no longer evident two years post-intervention. This suggests that while some behaviour change may persist, parents are likely to need continued support through the childhood years to achieve sustained benefit from obesity prevention initiatives.
Social and physical environments and food intake

O.057  Predictors of change over three years in children’s intake of fruit, vegetables, snack foods and soft drinks
Cameron AJ, Lioret S, McNaughton SA, Crawford DA, Campbell KJ, Ball K

PURPOSE: Children’s diet quality deteriorates over time. While cross-sectional factors influencing child diets have been identified, less is known about what drives change in consumption of fruit, vegetables, energy dense foods and soft drinks as they get older.

METHOD: Participants were 361 mothers and children (aged 5-12 with three-year follow-up). On both occasions, mothers reported child food frequency and determinants potentially important in a social ecological model of diet: Maternal working hours, social capital, stress, depressive symptoms, self-efficacy for healthy eating and reasons for liking fruit/vegetables; Presence of siblings; Maternal/child BMI; Socioeconomic position; Perceived cost, availability and quality of fruit/vegetables; Peer group behavior and support; Meal-time behaviours and Home food availability. Change in consumption was assessed using linear regression models including baseline consumption, child age and sex, accounting for floor and ceiling effects where applicable.

RESULT(S): Positive change in fruit consumption was associated with lower maternal working hours and perceived ease of preparation. Positive change in vegetable consumption was associated with peer support, maternal self-efficacy, social capital, less depressive symptoms, liking vegetables, food knowledge, household vegetable availability and higher socioeconomic position. Negative associations with energy dense food consumption were seen for not using sweet food to reward, peer group behaviour, maternal self-efficacy, household food availability and maternal education. No items were associated with change in soft drink consumption.

CONCLUSION(S): This work helps clarify what influences change in children’s eating behaviour as they move toward adolescence. Parental socioeconomic position, self-efficacy, social capital and support as well as food availability may be particularly important.

O.058  The relationship between the healthfulness of mothers’ main grocery stores and their quality of diet

PURPOSE: The consumer nutrition environment measures factors shoppers encounter within food stores including product availability, price, quality, placement and promotions. The literature investigating this environment is limited and few studies have created a composite measure of overall store healthfulness. We assessed the relationship between overall healthfulness of participant’s main food store and their dietary quality.

METHOD: A survey of 50 grocery stores used by mothers (n=832) for their main grocery shop
was completed. The survey measured nine in-store factors, including price, variety, quality, promotions, placement and nutrition information, on 12 foods that are indicative of better and poorer dietary patterns. Positive and negative scores were allocated to healthy and less healthy items, respectively. The composite score for each store was the mean of all nine standardised factors. Data from a validated food frequency questionnaire were used to produce a standardised quality of diet score for each mother.

RESULT(S): The mean healthfulness score was 0.6 (SD: 0.5), range -0.8 to 1.1, and mean diet quality score was 0 (SD: 1), range -2.8 to 2.9. Multivariate analysis, controlling for covariates, showed that for every one standard deviation increase in store healthfulness mother’s diet score decreased by 0.16 standard deviation (p=0.02). Price was the only in-store factor independently associated with diet quality, where lower prices for healthy and higher prices for less healthy products related to better dietary quality.

CONCLUSION(S): Counter-intuitively, shopping in healthier stores was associated with poorer quality diets. However, pricing initiatives that favour healthy rather than less healthy foods may help improve in-store environments.

O.059  
Don’t tell me what I should do, but what others do: the influence of descriptive and injunctive peer norms on fruit consumption in adolescents
Stok M, De Ridder D, De Vet E, De Wit J

PURPOSE: While healthy eating patterns are of high importance in adolescence, most adolescents portray quite unhealthy eating behavior. One reason for this may be that social norms among peers tend to be unsupportive of healthy eating. The current study investigates whether communicating health-promoting descriptive and injunctive norms influences adolescents’ intended and actual fruit consumption, and whether the influence of descriptive and injunctive norms differ.

METHOD: The study employed an experimental prospective design. A norm message manipulation (descriptive vs. injunctive vs. no-norm control) was administered to high school students after which fruit intake intention (N = 98) was assessed. At follow-up, actual fruit intake over two days (N = 80) was recorded.

RESULT(S): Adolescents receiving the descriptive norm did not report higher fruit intake intentions than the control group, but did consume (marginally) significantly more fruit in the following two days (2.3 portions per day) than the control and injunctive norm conditions (1.5 and 1.7 portions per day, respectively; p’s < .057). Adolescents receiving the injunctive norm reported lower fruit intake intentions than the other two groups (p’s < .025), but actual fruit consumption was similar to that of the control group.

CONCLUSION(S): Health-promoting injunctive norms not only had no positive effects on fruit intake but actually caused a decrease in fruit intake intentions, indicating that injunctive norms may be vulnerable to reactance. A health-promoting descriptive norm was found to positively affect fruit intake in adolescents. No effect on intentions was found. Results show
that one-sentence norm messages can substantially influence health behavior.

**O.060 Weight status of grades 7-12 students exposed to less healthful school nutrition environments**
Masse LC, de Niet J, Naylor P-J, Saewyc E

PURPOSE: This study examined the extent to which students who attended schools in British Columbia (BC) Canada with less favorable nutrition environments were more likely to be overweight or obese.

METHOD: An ecological analysis was conducted linking school data (n=174 schools) with student data (n=11,385) collected as part of the 2008 BC Adolescent Health Survey among grades 7-12 students. At the school level, we examined constructs from the Theories of Organizational Change (policy institutionalization of guidelines at the district and school level, nutrition capacity/resources, nutrition program participation, and support from the school community) and availability of sugar-sweetened beverages (SSB) and less healthful foods at school. At the student level, we accounted for student intake of SSB and foods. Multi-level mixed-effects logistic regressions with relevant covariates were employed to examine associations with body mass index (BMI) categories (normal, overweight, and obese).

RESULT(S): Students who were overweight consumed significantly more SSB and less healthful foods than students of normal weight (p<.05). Obese students consumed significantly more SSB than students of normal weight (p<.05). In addition, students were more likely to be obese if they attended a school with greater access to SSB (p<.05). Finally, there was a trend toward statistical significance for participation in provincial nutrition programs, with a trend towards higher student BMIs in schools with less participation in such programs.

CONCLUSION(S): Our findings provide further evidence of an association between the school environment and weight status lending support for eliminating access to SSB beverages at school.

**O.061 The influence of a population-level school food and nutrition policy on dietary intake and body weights of Canadian children**
Fung C, McIsaac J-L, Chu YL, Kuhle S, Kirk SFL, Veugelers P

PURPOSE: In 2003, the Children’s Lifestyle And School performance Study (CLASS) reported on the poor diets and unhealthy body weights of children in the province of Nova Scotia, Canada. These findings led to increased government investment towards school-based health promotion policies, including the introduction of the Food and Nutritional Policy for Nova Scotia Public Schools (NSNP) in 2006. In 2011, CLASS II aimed to evaluate the impact of these provincial programs and policies on the health outcomes of children. The objective of this study is to examine the influence of the NSNP on dietary intake and weight status of children prior to and following implementation of the policy.
METHOD: In 2003 and 2011, we surveyed over 5,200 grade 5 students from approximately 270 public schools across Nova Scotia each year. Students completed the Harvard Youth/Adolescent Food Frequency questionnaire and had their heights and weights measured. We applied random effects regression methods to assess the effect of the policy on dietary and health outcomes.

RESULT(S): In 2011, students reported decreases in dietary energy intake and the consumption of sugar-sweetened beverages relative to 2003. Over time, students consumed more milk products while no differences were observed for fruits and vegetables consumption. Nevertheless, no significant effects on overweight and obesity were observed from 2003 to 2011.

CONCLUSION(S): Our findings provide important insight on the real-world effects that result from a population-level policy intervention. While the NSNP has positively influenced dietary outcomes, more action is needed to curb increases in childhood obesity.

O.062 Choosing healthy foods in a recreational environment: a nudge is not enough
Olstad DL, Raine KD, McCargar L, Goonewardene LA

PURPOSE: Emerging evidence indicates that eating is largely an automatic behaviour governed by environmental cues. Nudging, in which subtle environmental changes are used to shift behaviour in positive, self-interested directions, may therefore support healthier dietary behaviours. This study assessed the comparative and additive efficacy of two nudges and an economic incentive in supporting healthy food purchases by patrons at a recreational swimming pool.

METHOD: An interrupted time series design was used with five 8 day periods. An initial baseline was followed by three successive and additive interventions that promoted sales of healthy items through: descriptive menu labels, free samples, and 30% price reductions; concluding with a return to baseline conditions. Sales of healthy and unhealthy items were monitored and demographic characteristics of patrons were recorded. Data were analysed using ANCOVA and adjusted for covariates. Qualitative process observations provided context for quantitative findings.

RESULT(S): Healthy items represented 46.2% of menu items and 40.2% of sales. Sales of healthy items were significantly lower than sales of unhealthy items (p<0.0001) and did not differ across periods. Sales of healthy beverages (whole fruit smoothies and slushes) exceeded (unhealthy beverages, healthy and unhealthy side dishes, healthy main dishes) or were equal to (unhealthy main dishes) sales of all other product types.

CONCLUSION(S): Sales of healthy items mirrored their availability. Food availability was a more important determinant of food purchases than nudges or price reductions. Whole fruit smoothies and slushes were frequently purchased healthy beverages that could potentially displace unhealthy options in recreational settings.
Environment and physical activity in adults

O.063 Destinations and walking: does the mix of destinations in the neighbourhood matter?
King TL, Thornton LE, Bentley R, Kavanagh AM

PURPOSE: There is evidence that the local environment can influence walking levels. Total number of destinations has previously been found to be associated with walking levels, however to date, destination mix is an under-explored measure. We sought to investigate the effect of destination mix on walking.

METHOD: Residents (n=2349) of 50 areas across Melbourne Australia completed a survey about physical activity, including frequency of walking. Walking frequency was dichotomised to ‘less than weekly’ and ‘at least weekly’. Counts of destination types were collected within 400 metres (m), 800m, 1200m network buffers around each respondent’s home. Destinations were categorised into seven groups (educational destinations, supermarkets, small food stores, community resources, sporting facilities, transport stops and stations, café/takeaway stores). Multilevel linear regression was used to estimate the effect of destination mix on frequency of walking.

RESULT(S): The number of destinations within 400m, 800m and 1200m of home had a significant and positive effect on walking. At 400m, individuals were 10% more likely (OR 1.10; 95% CI 1.01-1.19) to be classified as a high walker for each additional destination type present. This increased to 16% for 800m “(OR 1.16; 95% CI 1.09-1.24), and 15% for 1200m (OR 1.15; 95% CI 1.08-1.22).

CONCLUSION(S): The results of this analysis indicate that the greater the mix of destinations, the higher the odds of walking once a week or more. Future analysis will examine how the clustering of these destinations within neighbourhoods influences walking.

O.064 Examining the impact of neighbourhood walkability across the adult life course: does geographic scale matter?

PURPOSE: Walkable neighbourhoods can facilitate more walking but relationships may differ by life stage. Moreover, how varying geographic scale (i.e., “neighbourhood” size) influences these associations appears relatively unexplored. This study examined the impact of neighbourhood walkability on the walking behaviour of young adults through to older adults across different geographic scales.

METHOD: Cross-sectional study of young adults (18-29 years; n=1663), adults (30-44 years; n=2546), mid-adults (45-64 years; n=4703) and older adults (65+ years; n=3611) across the Perth metropolitan region who completed the Western Australian Health and Wellbeing
Surveillance System Survey from 2003-2009. A neighbourhood walkability score, a composite measure of three objective built environment features (residential density, land use mix, street connectivity), was generated within 200m, 400m, 800m, and 1600m network distances around each participant’s home address. Logistic regression models assessed the impact of neighbourhood walkability on any walking at each geographic scale.

RESULT(S): At 200m, living in a higher walkable neighbourhood increased the odds of walking for all age groups (p<0.05). This was the only significant association found for young adults. For adults aged ≥30 years, living in higher walkable neighbourhoods increased the odds of walking, and minimal difference in effect sizes was found across geographical scales (p<0.05).

CONCLUSION(S): The impact of neighbourhood walkability on walking differs marginally across adult life stages and geographic scale, suggesting that older adults may have a larger walking range than previously thought. Providing walkable neighbourhoods out to at least 1600m from home is important for walking among all adults, even older adults.

O.065 Neighborhood walkability, income and hour-by-hour physical activity patterns
Eriksson U, Arvidsson D, Lönn SL, Sundquist K

PURPOSE: To investigate both the mean daily physical activity and the hour-by-hour physical activity pattern across the day using accelerometry, and how they are associated with neighborhood walkability and individual income. To our knowledge this has not been done previously.

METHOD: Moderate physical activity (MPA) was assessed by accelerometry in 2,252 adults in the City of Stockholm, Sweden. Neighborhood walkability (residential density, street connectivity, land use mix) was assessed by Geographic Information Systems (GIS) within 1,000m network buffers around the participants’ residence and individual income was self-reported.

RESULT(S): Living in a high walkability neighborhood was associated with more mean daily MPA compared with living in a low walkability neighborhood on weekdays and weekend days. Hour-by-hour analyses showed that this association appeared mainly in the afternoon/early evening during weekdays, while it appeared across the middle of the day during weekend days. Individual income was associated with mean daily MPA on weekend days. On weekdays, the hour-by-hour analyses showed that high income was associated with more MPA around noon and in late afternoon/early evening, while low income was associated with more MPA at the hours before noon and in the early afternoon. During the weekend, high income was more consistently associated with higher MPA.

CONCLUSION(S): Hour-by-hour accelerometry physical activity patterns provides a more comprehensive picture of the associations between neighborhood walkability and individual income and physical activity and the variability of these associations across the day.
O.066  Associations of neighbourhood green space attributes with adults initiating or maintaining recreational walking
Sugiyama T, Giles-Corti B, Summers J, du Toit L, Leslie E, Owen N

PURPOSE: Using prospective data, this study examined relationships of neighbourhood green space attributes with adults initiating or maintaining recreational walking.

METHOD: Postal surveys were completed by 1036 adults living in 32 neighbourhoods in Adelaide, Australia, at baseline (two time points in 2003/04) and at follow-up (2007/08). Initiating or maintaining recreational walking was determined using self-reported walking frequency in these surveys. Green space attributes were perceived presence, quality and proximity, and the GIS-derived area (total and largest) and number of recreational green spaces within a 1.6km buffer drawn from the center of each of the study neighbourhoods. Multilevel regression analyses examined the odds of initiating recreational walking (among non-regular walkers at baseline) or maintaining walking (among regular walkers at baseline) separately for each green space attribute.

RESULT(S): At follow-up, 30% of non-regular walkers at baseline (n=395) had initiated walking, while 70% of regular walkers at baseline (n=286) had maintained walking. No green space attributes were associated with initiating walking. However, participants who reported the presence of and proximity to green spaces were significantly more likely to maintain recreational walking over four years. For the objectively-measured green space attributes, the total and the largest areas of green space were positively associated with a higher likelihood of walking maintenance.

CONCLUSION(S): The presence of and proximity to neighborhood green spaces may not assist adults to initiate walking, but may facilitate maintaining recreational walking over time. Other strategies (e.g., focusing on motivation or social support) may be required to encourage adults to take up recreational walking.
RESULT(S): Significant neighborhood environment attribute × country interactions implied some differences across countries in the association between each neighborhood attribute and meeting physical activity recommendations. Across the 11 countries, land-use mix and presence of sidewalks had the most consistent associations with physical activity. Access to public transit, bicycle facilities, and low-cost recreation facilities had some associations with physical activity, but with less consistency across countries. There was little evidence supporting the associations of residential density and crime-related safety with physical activity.

CONCLUSION(S): Generalizability of the associations between neighborhood environments and physical activity was partially supported. The evidence was the strongest for land-use mix and sidewalks.

O.068 Changes in smoking, sports participation and overweight: does neighborhood prevalence matter?
Blok DJ, de Vlas SJ, van Empelen P, Richardus JH, van Lenthe FJ

PURPOSE: Physical and social neighborhood characteristics are important contextual determinants of health and health-related behaviors. Little is known about the contextual importance of the neighborhood prevalence of health-related behaviors for subsequent changes in these behaviors. Therefore this study investigated the association between neighborhood prevalence of health-related behaviors and subsequent behavioral changes for smoking, sports participation and overweight over a period of 13 years.

METHOD: Longitudinal data of Dutch GLOBE study participants residing in 86 neighborhoods of Eindhoven at baseline in 1991 with a follow-up in 2004 were used. Using multilevel analyses respectively smoking cessation, quitting sports, and becoming overweight at follow-up were regressed to baseline neighborhood prevalence quartiles (i.e. non-smoking, no sports participation, and overweight prevalence). These analyses were additionally controlled for baseline age, gender, education and neighborhood deprivation.

RESULT(S): Unadjusted results showed a 49% (95% CI: 1.03 – 2.17) higher odd to quit smoking during follow up in the quartile with the second-highest neighborhood prevalence of non-smoking compared to the lowest. Odds ratios of quitting sports increased with higher neighborhood prevalence of no sports participation. These differences remained significant after adjustments for age, gender and education. Odds ratios of becoming overweight increased with higher neighborhood prevalence of overweight. After adjustments for all confounders, differences between the second-lowest and lowest quartile were significant (OR = 1.50, 95% CI: 1.06 – 2.12).

CONCLUSION(S): Neighborhood prevalence of health-related behaviors, and in particular overweight, appears to be a currently neglected but relevant contextual determinant of changes in health-related behaviors.
Physical activity, sedentary behavior and health

O.069  Physical activity and sedentary time and their relationship to BMI in 6-9 year old European children
Vanwolleghem G, Verbestel V, Moreno L, De Bourdeaudhuij I

PURPOSE: Physical activity and sedentary behaviour are nowadays seen as independent indicators of childhood overweight. This study investigated differences in BMI z-scores between four groups created by a combination of high and low levels of moderate-to-vigorous PA (MVPA) and sedentary time (ST) in 6-9 year old European children. Secondly, it was studied if weight status could be predicted by MVPA and ST at one point in time and over 2 years.

METHOD: Data were used from the IDEFICS study (8 participating European countries): 3220 6-9 year olds were included in the cross-sectional study and 995 in the longitudinal study. Weight and height were measured at T0 (in 2007) and T1 (in 2009) and were used to calculate BMI z-scores. PA and ST were objectively assessed at T0 using accelerometry. The cut points of Evenson et al. were used to calculate minutes per day spent in MVPA and ST.

RESULT(S): The group with MVPAlow and STlow, had higher BMI z-scores compared to children in the two groups with MVPAhigh in combination with STlow and SThigh. Furthermore, only time spent in MVPA could predict weight status in 6-9 year olds at one point in time and over 2 years. Sedentary time was no predictor of weight status.

CONCLUSION(S): MVPA and not ST seems to play an important role in the development of childhood overweight. More research is needed in 6-9 year old children to investigate the influence of objectively measured PA combined with ST in the development of childhood overweight.

O.070  Prospective associations between objectively measured sedentary time and physical activity in late childhood and cardiometabolic risk markers in adolescence: the ALSPAC cohort
Stamatakis E, Coombs N

PURPOSE: Very few prospective studies have looked at the associations between sedentary time (ST) and cardiometabolic risk profiles in children and adolescents. The aim of this analysis was to examine the prospective associations between accelerometer-measured ST and moderate to vigorous physical activity (MVPA) at age 11 and a cluster of cardiometabolic risk markers measured at 15 years.

METHOD: We used data from the Avon Longitudinal Study of Parents and Children (ALSPAC) birth cohort (England). We used multiple linear regression to look at the associations between average daily ST, MVPA and several cardiometabolic markers (BMI, waist, blood
Analyses were adjusted for accelerometer wear time, exact age, parental social class, parental BMI, birth weight, and baseline ST or MVPA. We used multiple imputation to predict missing values.

RESULT(S): Analyses included 3593 cases (1986 girls). There was a direct association between ST at 11yrs and several outcomes at 15yrs in boys only but, with the exception of waist circumference, adjustments for MVPA attenuated these associations to the null. MVPA at 11yrs was inversely associated with the three adiposity markers and insulin in both sexes and with triglycerides, c-reactive protein, and (directly associated) with HDL cholesterol in boys only, even after adjustment for baseline ST.

CONCLUSION(S): We found very little evidence for a prospective association between sedentary time in late childhood and cardiometabolic risk profiles in adolescence. The associations between MVPA and cardiometabolic risk were consistent in boys only.

O.071 Total sitting time and risk of coronary heart disease and all-cause mortality in a prospective cohort of Danish adults
Petersen CB, Bauman AE, Grønbæk M, Helge JW, Thygesen LC, Tolstrup JS

PURPOSE: Evidence suggests that time spent in sedentary behaviours is associated adversely with health risks, even among those who are physically active. However, previous epidemiological studies have mainly addressed sitting during leisure time rather than total sitting time. Furthermore, the outcome of interest has been almost entirely limited to mortality. This study aimed to investigate total sitting time and the risk of all-cause mortality and coronary heart disease incidence.

METHOD: In DANHES (The Danish Health Examination Survey) conducted in 2007/2008 we examined total sitting time among 73,075 men and women aged 18-85 years without coronary heart disease at baseline. Participants were followed for myocardial infarction (ICD-10 codes I21-I22) coronary heart disease (ICD-10 codes I20-I25) and death, in national registers to 2012. Cox regression analysis was performed with adjustment for several confounders and using multiple imputations for missing values.

RESULT(S): During a mean follow-up period of 5.4 years 1178 deaths, 1596 incident cases of coronary heart disease, and 398 incident cases of myocardial infarctions were registered. After adjustments for physical activity level and other confounders, the hazard ratios were 1.32 (95% CI 0.99-1.76) for myocardial infarction, 1.18 (95% CI 1.00-1.40) for coronary heart disease and 1.20 (95 % CI 1.00-1.44) for all-cause mortality for 10 hours or more of daily sitting compared to less than 6 hours.

CONCLUSION(S): Total sitting time is associated to coronary heart disease and all-cause mortality regardless of physical activity level. Therefore, public health programs should focus on reducing sitting time in addition to increasing physical activity.
**O.072** Associations of total sitting time, TV-viewing and occupational sitting with all-cause mortality in adults from the HUNT3 cohort
Chau JY, Grunseit A, Midthjell K, Holmen J, Holmen TL, van der Ploeg HHP

PURPOSE: To examine prospective associations of different indicators of sedentary behaviour with all-cause mortality in adults.

METHOD: We linked data from adults aged at least 20 years old from the Nord-Trøndelag Health Study 3 (HUNT3, 2006-2008) (N=50,817) to the Norwegian Cause of Death Registry up to December 31, 2010. Participants reported their time spent sitting on an average day, their daily time spent watching TV/videos/DVDs, and their occupational sitting/activity. Cox proportional hazard models examined associations of total sitting time, TV-viewing and occupational sitting with all-cause mortality, adjusting for multiple potential confounders (e.g., age, education, BMI, physical activity).

RESULT(S): There were 1068 deaths recorded after mean follow-up of 3.3 years (137315.8 person-years). Hazard ratios for all-cause mortality associated with total sitting time categories 4-<7, 7-<10 and ≥10 h/day were 1.12 (95% CI: 0.89-1.42), 1.18 (95% CI: 0.90-1.57) and 1.65 (95% CI: 1.24-2.21), respectively, relative to total sitting <4 h/day after adjusting for confounders (p-trend=0.001). TV-viewing showed no significant associations with all-cause mortality over the same period, while adults with jobs requiring ‘much walking and lifting’ had lower risk of all-cause mortality than those with jobs requiring ‘mostly sitting’ (HR=0.65; 95% CI: 0.44-0.97).

CONCLUSION(S): Total sitting time appears to be associated with all-cause mortality in the short term, while sedentary behaviour in specific contexts (i.e., watching TV, at work) do not seem to adversely impact health in the same timeframe. These findings support current recommendations that adults should sit less throughout the day in all contexts to reduce their daily total sedentary time.

**O.073** Physical activity and sitting time as mediators of the association between neighborhood environmental perceptions and weight status in African adults
Oyeyemi AL, Deforche B, Sallis JF, De Bourdeaudhuij I, Van Dyck DD

PURPOSE: Neighborhood built environments are related to obesity and physical activity (PA), but inconsistently to sedentary behaviors. This study investigated the mediating effects of PA and sedentary time on the associations of neighborhood environmental factors and body mass index (BMI) among African adults.

METHOD: Cross sectional analysis of anthropometric measurements of height and weight and self reported environmental and physical activity data were collected on 1411 African adults (40% female) in Maiduguri, Nigeria. Primary outcome was Body Mass Index (BMI). The product- of- coefficient test of mediation was performed using generalized linear
models to assess the mediating effects of Moderate-to-Vigorous Physical Activity (MVPA), walking, total PA and sitting time on the associations between 16 perceived environmental factors and BMI.

RESULT(S): Walking and total PA significantly mediated the association between BMI and perception of higher residential density ($\alpha_b= -0.025$ and $-0.037$, respectively), absence of garbage ($\alpha_b= -0.046$ and $-0.076$, respectively) and more safety from crime at night ($\alpha_b= -0.044$ and $-0.083$, respectively). In addition, walking, MVPA and total PA significantly mediated the association between BMI and perception of better aesthetics ($\alpha_b= -0.035$, $-0.022$ and $-0.071$, respectively). Walking and total PA mediated 6.5% to 20.0% of the associations between environmental factors and BMI, and sedentary time did not mediate any of the associations.

CONCLUSION(S): The association of several neighborhood environmental variables with BMI is partially mediated by PA in African adults. This kind of findings can provide a rationale for interventions relevant for obesity control and prevention in the African context.

O.074 The role of physical activity and eating behavior for affective well-being and study goals at university: a longitudinal study
Mata J, Meyer AH, Witthauer C, Lieb R

PURPOSE: Physical activity and balanced eating play a central role in affective regulation and cognitive performance. To date, these variables have not been assessed together in a single study. Importantly, adherence to health behaviors declines during stressful times, such as examination periods: Individuals under stress typically engage in less physical activity and increase consumption of unhealthy foods. This study examines the role of health behaviors for the regulation of affect and academic performance during stressful times.

METHOD: Over 8 months, eating behavior, physical activity, daily affect, experienced stress and studying behavior was assessed 61 times via an online survey in a group of 320 first year university students. A subgroup of 90 students participated in a psychosocial stress experiment in which stress-reactivity was measured via cortisol concentration.

RESULT(S): More physical activity and healthier nutrition were associated with improved affect and less stress intensity ($p<.05$). Improved affect and less experienced stress predicted better achievement of learning goals. Healthier nutrition and lower physical activity predicted better achievement of learning goals ($p<.05$). Physiological stress reactivity in the stress experiment moderated the effect of physical activity on perceived day-to-day stress intensity: high cortisol responders experienced significantly less stress on days on which they were more physically active ($p<.05$).

CONCLUSION(S): These results emphasize the relevance of physical activity and balanced eating behavior for affect and stress regulation. Importantly, positive health behaviors are also linked with better learning performance. Findings have the potential to inform prevention and intervention programs targeting stressful situations in a university setting.
Food pricing, marketing and policy

O.075 Developing a standardized approach for monitoring food marketing to children
Kelly B, King L, Baur LA, Swinburn B, Rayner M, Lobstein T, Macmullan J, Mohan S

PURPOSE: Monitoring the scope of children’s exposure to unhealthy food marketing is necessary to describe the extent of this problem, identify priority issues and determine appropriate and effective policy responses. A standardised framework is needed to allow comparisons between countries, between companies and between different time periods.

METHOD: A review of studies measuring the nature and extent of food marketing was undertaken to identify approaches to monitoring across media platforms. This was supplemented with detailed methods used by the authors in national and international monitoring studies since 2007 to describe food marketing across multiple media, including television, print, internet and outdoor advertising.

RESULT(S): Food marketing studies indicate children in both high and low/middle income countries are exposed to large volumes of unhealthy food promotions on different media. Active monitoring using a standard assessment tools currently underway in a range of countries, including China, Mongolia, Malaysia, Philippines and these 2012/3 data will be released. A step-wise approach to monitoring food marketing is proposed, suitable for differing levels of engagement and resources. This framework includes monitoring activities that assess the frequency of food promotions across different media and time points, and measures of persuasive appeal of promotions.

CONCLUSION(S): Globally, children are exposed to high volumes of unhealthy food promotions. The monitoring framework proposed here will assist in the implementation of the World Health Organization’s set of recommendations on the marketing of foods and non-alcoholic beverages to children, which recognise the need for reducing the impact of unhealthy food marketing to children.

O.076 Are cheap calories to blame? How the monetary cost of diets consumed by British adults relates to overweight and obesity
Timmins K, Hulme C, Cade JE

PURPOSE: Obesity rates may be attributed to trends in food prices – of energy-dense foods in particular – which are a supposed determinant of dietary choice. This study describes for the first time the diet costs of adults in the National Diet and Nutrition Study (NDNS), a representative UK sample, and explores how they relate to body mass.

METHOD: Adult diary information from 2008-2010 was matched to a database of food
prices, assigning a cost to each food or non-alcoholic beverage consumed. Daily diet costs were calculated and, to improve comparability across subgroups with differing energy requirements, costs per 10MJ. Subgroup comparisons used Kruskal-Wallis ANOVA. Multivariable regression explored the link between energy-adjusted diet cost and BMI.

RESULT(S): The median daily diet cost was £2.84 (IQR £2.27, £3.64; n=1014). Energy intake and daily diet cost were strongly correlated. The median energy-adjusted cost was £4.05 (£3.45, £4.82). Energy-adjusted costs differed significantly (p<0.01) between many subgroups, including by sex, employment and household income. The median BMI was 26.4kg/m2 (IQR 22.9, 30.0; n=938). Energy intake varied by BMI category, with the lowest intake among the obese. Energy-adjusted diet cost was not associated with BMI in the regression models.

CONCLUSION(S): This is the first time monetary costs have been applied to the diets of NDNS adults. Sociodemographic differences imply that costs do influence food choice. However, the regression results suggest that food budgets are not related to weight. Alternatively, the lack of association may be explained by dietary assessment measurement error or the cross-sectional design.

O.077 Food prices and consumer demand: differences across income levels and ethnic groups

Ni Mhurchu C, Eyles H, Schilling C, Yang Q, Kaye-Blake W, Genc M, Blakely T

PURPOSE: Targeted food pricing policies may improve population diets. To assess their effects on inequalities, it is important to determine responsiveness to price changes across income levels and ethnic groups. Our goal was to estimate price elasticity (PE) values for major commonly consumed food groups in New Zealand, by income and ethnicity. PE values represent percentage change in demand associated with 1% change in price of that good (own-PE) or another good (cross-PE).

METHOD: We used food expenditure data from national household economic surveys in 2007/08 and 2009/10 and Food Price Index data from 2007 and 2010. Adopting an Almost Ideal Demand System approach, own-PE and cross-PE estimates were derived for 24 food categories, household income quintiles, and two ethnic groups (Māori and non-Māori).

RESULT(S): Own-PE estimates (with two exceptions) ranged from -0.53 to -1.78. Cross-PE estimates were generally small; only 28% of values were greater than 0.10. Excluding the outlier ‘energy drinks’, nine of 23 food groups had significantly stronger own-PEs for the lowest versus highest income quintiles (average regression-based difference across food groups -0.23 (95% CI -0.49 to 0.03)). Eight own-PEs were significantly stronger among Māori, but two were stronger among non-Māori; the average difference for Māori: non-Māori across food groups was -0.25 (95% CI -0.48 to -0.01).

CONCLUSION(S): Food pricing policies have potential to improve population diets. The greater sensitivity of low-income households and Māori to price changes suggests the beneficial effects of such policies on health would be greatest for these groups.
**O.078  The impact on obesity by income group of a 20% tax on sugar sweetened beverages in the UK**

Briggs A, Mytton O, Kehlbahcer A, Rayner M, Tiffin R, Scarborough P

**PURPOSE:** To estimate the impact on obesity and the revenue generated from a 20% tax on sugar sweetened beverages (SSBs) in the UK considering both overall and income-group effects.

**METHOD:** We estimated the effect of a 20% tax on purchases of SSBs by deriving elasticity values from the Living Costs and Food Survey for three income tertiles (equivalised income). Substitution effects were modelled using cross-price elasticity estimates. SSB consumption and nutritional data are taken from the National Diet and Nutrition Survey. These were used to estimate the changes in energy intake by age and income group. The impacts of these energy intake changes on obesity were estimated using the DIETRON model, assuming physical activity levels were held constant.

**RESULT(S):** SSB consumption is predicted to fall by 14% (for income tertiles from lowest to highest by 13%, 14%, 15% respectively). The mean reduction in daily energy intake is 3.1 kcal per person (by income tertile: 3.0 kcal, 2.7 kcal and 4.4 kcal respectively) among adults. The reductions are greatest among adults under 30 years (12kcal per person per day). Overall the tax is projected to reduce obesity in the UK by 0.96% or 140,000 people. The reductions for the income tertiles are 35,000 people (0.7%), 25,000 people (0.5%) and 80,000 people (1.8%) respectively. The tax is projected to raise £1.4 billion in revenue.

**CONCLUSION(S):** A 20% tax on SSBs in the UK is estimated to reduce the number of people with obesity by 140,000. The differences by income group are unanticipated and deserve further investigation.

**O.079  Assessing the relationship between soda taxes in the U.S., household soda purchasing, and adult BMI**

Chriqui JF, Nicholson L, Kraus R, Powell LM, Chaloupka F

**PURPOSE:** Governments worldwide are considering sugar-sweetened beverage (SSB) taxation to generate revenue, and to reduce consumption and obesity. In the U.S., besides states, county and municipal governments also have taxing authority; however, all studies have examined the relationship between state-only taxes and purchasing/weight outcomes. This is the first presentation to examine the combined effect of state+local soda taxes on household purchasing and adult BMI.

**METHOD:** Soda sales taxes rates were compiled as of 1/1/10 for all jurisdictions located within 959 counties (covers 90% of the US population). For each county, a weighted tax rate was created that was adjusted for the proportion of the county population subject to various taxes within the county. A combined tax rate (Σ state+weighted county rate for each county), was linked to Q3 2010 AC Nielsen household soda purchasing data (N=57,798 households) and 2010 Behavioral Risk Factor Surveillance System (BRFSS) adult BMI data
(N=253,046 adults). Multivariate zero-inflated negative binomial and multivariate OLS regression models, with state fixed effects and county clustering, examined the relationship between the combined tax and purchasing and BMI, respectively.

RESULT(S): Higher combined soda taxes increased the odds of not purchasing for families without children (OR: 1.047, 95% CI: 1.004-1.091) after controlling household/individual characteristics but did not influence the rate of purchasers’ purchasing. Adult BMI was lower (β=-0.221; p<.001) in jurisdictions with higher combined soda taxes, after adjusting for all covariates.

CONCLUSION(S): Although based on only one year of data, this study illustrates the potential association between higher soda tax rates, household purchasing, and adult BMI.

O.080     The public health implications of the current marketing and fortification of energy drinks, nutrient enhanced waters and fruit beverages in Canada
Tarasuk V, Mendelson R, Dachner N, Sumanac D, Sacco J

PURPOSE: Food products fortified at the discretion of manufacturers are proliferating, particularly in the beverage sector, but there has been little study of their nutritional implications. This study reports on the micronutrient composition of nutrient enhanced beverages currently sold in Canadian supermarkets (i.e. energy drinks, vitamin enhanced waters and fruit drinks) and critically examines on-package product marketing.

METHOD: All nutrient enhanced beverages (n=46) found in three large supermarkets (representing Canada’s leading food retail chains) were purchased. Nutrient content levels were compared to Canadian population data to assess the potential for benefit and risk of excessive nutrient exposure. A content analysis of the product labels was undertaken to document how the products were being marketed.

RESULT(S): Nutrient additions ranged from one to 11 vitamins and minerals, but most were nutrients with no evidence of inadequate intakes in the Canadian population. Riboflavin; Niacin; Vitamins B12, B6, and A were often at levels several times greater than requirements. The Niacin and Vitamin A content of some products exceeded Tolerable Upper Intake Levels, and when existing intake patterns were taken into account, additional concerns about excessive nutrient exposure emerged for Zinc. Messaging on product labels implied nutrient formulations designed to replenish essential nutrients, achieve wakefulness of mind and body, and provide nutrient enhanced hydration.

CONCLUSION(S): This new class of beverages is marketed as providing nutritional and health benefits for which there is little scientific evidence and many appear to increase risks of excessive nutrient exposure.
Physical activity and environment

O.081 Relationships between the neighborhood social environment and walking for transportation among older adults
Van Cauwenberg J, De Donder L, Clarys P, De Bourdeaudhuij I, Deforce B

PURPOSE: Ecological models state that physical activity (PA) behaviors can be explained by the interplay between individuals and their surrounding physical and social environment. However, the majority of research on PA-environment relationships has focused upon the physical environment. The purpose of the current study was to investigate the relationship between the social environment and older adults’ walking for transportation, while adjusting for individual and physical environmental factors.

METHOD: Questionnaires were used to collect data on walking for transportation, individual, physical and social environmental factors in a clustered random sample of 50,986 Flemish older adults (≥ 65 years) in the period of 2004-2010. Multilevel logistic regression analyses were applied to examine the relationships between social environmental factors and the odds of daily walking for transportation.

RESULT(S): The final models showed that more frequent contacts with neighbors, living in a neighborhood with many immigrants and higher levels of neighbors’ social support, neighborhood involvement, participation and volunteering were significantly related to higher odds of daily walking for transportation.

CONCLUSION(S): These results emphasize the need for including social environmental factors in future studies examining correlates of older adults’ physical activity. Current findings indicated that policies should stimulate projects in neighborhoods that foster interpersonal relationships, place attachment and formal participation in order to promote walking for transportation among older adults.

O.082 How walkable, bikable, and physical activity ready is our city of Gaffney community? A fitness trail feasibility study template for all rural to mid-size cities across the globe
Cavallini MF

PURPOSE: The purpose of this study is to develop a connective trail model template for all rural to mid-size communities to help increase a standard of living and decrease behavioral risk factors that contribute to chronic conditions that ultimately lead to morbidity and mortality. This study reflects the importance of implementing sound public health practices relating to the importance of physical activity.

METHOD: Four zones were chosen to assess based on historical significance, central location and accessibility to trail connectivity: Limestone College, Gaffney Residential Historical
District, Downtown Gaffney and the Mill Neighborhood. Each of the 4 zones were broken down into 12 smaller segments total in order to be examined thoroughly by trained evaluators. Each walking segment included the Walkability Check List, the Physical Activity Resource Assessment Instrument, and the Rural Activity Living Assessment tool. In addition, the city manager completed the Rural Activity Living Assessment Town Wide tool and the Program and Policy Assessment tool.

RESULT(S): Upon completion of the 5 assessments, a complete and comprehensive profile was compiled representing each of the zones physically and aesthetically. As a result of each zone profile, a digital GPS map was constructed choosing potential fitness trail routes connecting all 4 zones.

CONCLUSION(S): As a result of this study, Limestone College and the City of Gaffney are in the process of building and sustaining connective trails. This community wide effort raised the consciousness level of prioritizing the needs of our community. This procedure can be used for the benefit of improving community health standards.

O.083 Global variation in neighborhood walkability, recreation and transit environments using GIS: the IPEN adult study

PURPOSE: The WHO recommends strategies to improve urban design, public transit, and recreation facilities to facilitate large portions of the world population to be physically active to prevent non-communicable diseases. Most evidence supporting environmental associations with physical activity (PA) comes from North America, Australia, and Europe. The International Physical Activity and Environment Network (IPEN) study aims to examine whether a selection of representative cities in 12 diverse countries would result in greater variation in the built environment (BE) and relate those BE features to PA and other outcomes.

METHOD: Investigative teams in Australia, Belgium, Brazil, Colombia, the Czech Republic, Denmark, Hong Kong, Mexico, New Zealand, Spain, UK, and the US followed a common set of GIS Templates to create internationally comparable GIS variables. Objective measures of walkability (i.e. residential density, street connectivity, mix of land uses, enumeration of retail destinations), access to public transit, parks, and private recreation facilities around each participant’s residential address using 1km and 500m street network buffers were created. Two raters ensured comparability across countries for each attribute.

RESULT(S): Eleven countries had access to GIS data. For several countries greater variability was observed internationally than within country. For example, median intersection density per km2 for 1km buffers ranged from 32.0 in New Zealand to 188.0 in Colombia, whereas the min/max range in the U.S. was 1.5 to 155.1.

CONCLUSION(S): Findings demonstrate previously unobserved worldwide variation in environmental attributes. Next steps include relating BE attributes to objective and reported PA and health outcomes.
O.084 Using a social-ecological framework to examine active living among residents of retirement villages
Nathan A, Wood L, Giles-Corti B

PURPOSE: Neighbourhood housing options for older adults include congregate facilities like retirement villages. No studies have comprehensively considered how village and surrounding neighbourhood environments jointly influence residents’ active living. Our aim was to examine environmental attributes within and outside of villages and associations with active living.

METHOD: We utilised cross-sectional data from a mixed methods study conducted in Perth, Australia. Residents from 32 villages (n=323) reported village and neighbourhood environmental perceptions, social factors inside and outside the village, and physical and social activity. Most wore accelerometers (n=288). Village managers were also surveyed and objective environmental measures generated using Geographic Information Systems. Logistic regression models assessed environmental factors associated with active living, adjusting for age, sex, physical functioning, and clustering.

RESULT(S): Mean participant age was 76.9 years and 68.0% were female. Objective distance to public transport (OR=0.82, p=0.005), perceived proximity to neighbourhood destinations (OR=1.65, p<0.001), family support for physical activity (OR=1.22, p=0.003), and neighbourhood aesthetics (OR=1.53, p=0.038) were associated with more walking, while perceived personal safety within the village halved the odds of brisk walking (OR=0.51, p=0.035). More village amenity increased social participation (OR=1.12, p=0.039), while moving from a further distance when relocating to the village approached significance (OR=0.52, p=0.053).

CONCLUSION(S): Built and social environmental attributes within and outside of villages were associated with active living. Locating villages close to destinations is important for walking, and close to previous and familiar neighbourhoods appears important for social participation. Further understanding and consideration into village designs that promote both walking and social participation are needed.

O.085 The impact of parental fear of strangers and collective efficacy on children’s independent mobility
Foster S, Villanueva K, Trapp G, Giles-Corti B

PURPOSE: Purpose: To examine parents’ fears about stranger danger as a deterrent to children’s independent mobility (IM); and test whether collective efficacy might mitigate this association.

METHOD: Methods: The Travel Environment and Kids (TREK) project is a cross-sectional study investigating the active transport of 10-12 year-old school children in Perth, Australia. Children and parents (n=1314) completed questionnaires about the child’s IM (i.e., active travel to at least one activity/destination without an adult), parental fear of strangers,
collective efficacy (focusing on informal social control), and other individual, social and built environment factors. Logistic regression examined the association between parental fear and IM, stratified by gender, with progressive adjustment for collective efficacy and other factors.

RESULT(S): Results: Parental fear was associated with lower odds of IM for both girls (OR=0.65, p=0.000) and boys (OR=0.67, p=0.000), whereas collective efficacy had a stronger association with girls IM (OR=1.32, p=0.006) than boys (OR=1.24, p=0.056). For girls, the association between fear and IM was constant, despite adjustment for collective efficacy and other social and built environment factors (OR=0.76, p=0.017). For boys, social and built environmental factors appeared to lessen the restrictive impact of parental fear on IM (OR=0.87 p=0.293).

CONCLUSION(S): Conclusions: Parental fear of strangers appeared to inhibit girls IM, irrespective of whether the social and built environment was supportive. Reducing the impact of parental fear on girls’ IM will be challenging. Community initiatives that minimise physical disorder and increase natural surveillance and social connectedness may reduce parents’ fear of crime and may also help alleviate their fear of strangers.

O.086 Why some walk and others don’t: exploring interactions of perceived safety and social neighbourhood factors with psychosocial cognitions
Beenackers MA, Kamphuis CBM, Mackenbach JP, Burdorf A, van Lenthe FJ

PURPOSE: While physical activity is often believed to be influenced by both environmental and individual factors, little is known about their interaction. This study explores interactions of perceived safety and social neighbourhood factors with psychosocial cognitions for leisure-time walking.

METHOD: Cross-sectional data were obtained from residents (age 25-75) of 212 neighbourhoods in the South-East of the Netherlands, who participated in the Dutch GLOBE study in 2004 (N=4395, survey response 64.4%). Direct associations of, and interactions between perceived neighbourhood safety, social neighbourhood factors (social cohesion, social network, feeling at home), and psychosocial cognitions (attitude, self-efficacy, social influence, intention) on two outcomes of leisure-time walking (yes vs. no (binary), and among walkers: minutes/week (continuous)) were analyzed in multilevel regression models.

RESULT(S): The association between attitude and participating in leisure-time walking was stronger in those who felt less at home in their neighbourhood. Social influence and attitude were stronger associated with participation in leisure-time walking in those who sometimes felt unsafe in their neighbourhood. A positive intention was associated with more minutes walked in those who perceived their neighbourhood as unsafe among those who walked. CONCLUSION(S): Only limited support was found for interactions between neighbourhood perceptions and psychosocial cognitions for leisure-time walking.
O.087  Modelled health impacts of the London cycle hire scheme

PURPOSE: Bicycle sharing systems are being implemented in many cities worldwide, but have received little robust evaluation. We modelled the impacts of the London cycle hire scheme (LCH) upon the health of its users.

METHOD: Data sources included total-population operational registration and usage data for LCH (April 2011-March 2012); surveys of LCH users (2011); and London data on travel, physical activity, road traffic collisions and PM2.5 air pollution (collected 2005-2012). We quantified health impacts in terms of disability-adjusted life years (DALYs), using a stochastic macro-simulation model.

RESULT(S): Over the year examined, 578,607 users made 7.4 million LCH trips (estimated 71% by men). These would mostly otherwise have been walked (31%) or used public transport (47%). To date there have been no fatalities on hire bikes and a trend towards fewer injuries than expected for London cycling. Using these observed injury rates, LCH benefits substantially outweighed risks (gain currently estimated at 116 DALYs (95%CI 80, 172) among males; 28 (19, 64) among females). When we modelled injury rates as being equal to rates for all cycling in central London, however, these benefits reduced and became non-significant for women (97 DALYs (95%CI 60, 153) among males; 5 DALYs (-9, 40) among females). This sex difference reflected comparatively high road collision fatality rates for female cyclists in London.

CONCLUSION(S): LCH has positive health impacts overall, but these benefits are clearer for males than females. The benefits of bicycle sharing systems, and cycling more generally, do not necessarily apply to all groups in all settings.

O.088  Using agent-based modelling to inform neighbourhood walkability

PURPOSE: The importance of creating walkable, liveable, and supportive urban environments is widely recognised. Through use of spatial datasets and agent-based modelling techniques, we now have the potential to test different built environment scenarios for their impact on neighbourhood walkability.

METHOD: An open-source ‘ped-catch’ agent-based modelling tool and user-interface was developed. End-users can upload various spatial data sources (e.g., street / footpath network, traffic lights, features of interest (schools, public transport stops) and manipulate these data layers using vector editing tools. End-users are also able to modify characteristics of the agents (e.g., walking speed, distance travelled). Together these facilitate testing of different built environment scenarios related to walkability.

RESULT(S): A series of metrics and maps are generated showing the relationship between
different neighbourhood built environment scenarios and ‘ped-catch’ access. End-users can subsequently identify the treatments that will increase neighbourhood permeability, and therefore enhance walkability.

CONCLUSION(S): The ‘ped-catch’ is an accessible and cost-effective tool for researchers, urban designers, planners, and policy makers to generate animated models of different neighbourhood walkability scenarios. These can include testing placements of features of interest (e.g., schools, public transport) and pedestrian linkages.

O.089 The direct and indirect relationship between the built environment and physical activity: testing interactions in the socio-ecological model using structural equation modelling

PURPOSE: There is a lack of evidence on how different levels in the socio-ecological model interact to influence physical activity (PA). The aim of this study was to examine the direct and indirect relationships between built environment and PA.

METHOD: As part of the PARC study (http://www.communitygreenway.co.uk/reports-and-research/parc-study), a baseline survey of 1209 adults was conducted. This included self-reported perceptions of the environment, social capital, social support, psychological factors (attitudes, self-efficacy, outcome expectancy), physical & mental health and socio-demographic characteristics (sex, age, income, income). Walkability was objectively measured using GIS. Moderate and vigorous PA (MVPA) was measured using the Global Physical Activity Questionnaire and an Actigraph accelerometer (n=98). Structural equation modelling was used to test a series of mediating relationships through which environmental (objective and subjective), social and individual factors interact to influence PA.

RESULT(S): A perception that the local neighbourhood was attractive for PA (p=0.01) and offered convenient infrastructure to support PA (p<0.0001) were associated with higher levels of MVPA. Living in more walkable neighbourhoods was associated with a perception of unattractive neighbourhoods (p<0.0001) and convenient infrastructure (p=0.001). Social support significantly predicted MVPA (p=0.04) and was associated with perceiving a convenient infrastructure for PA (p=0.001). Greater physical health (p<0.0001) and younger age (p<0.0001) were also associated with MVPA. 10.7% of the variance in MVPA was explained by these variables. These findings will be compared to models fitted substituting self-reported MVPA with accelerometer, travel and recreational MVPA.

CONCLUSION(S): Perceived built environment factors predict MVPA and interact with a number of individual, but not community factors.
O.090 Does perceived neighborhood environment influence daily steps in Czech adults?

PURPOSE: To promote whether perceived neighborhood walkability influence objectively measured daily number of steps in Czech adult population in meeting the recommended level of 10,000 steps per day in relation to selected socio-demographic characteristics.

METHOD: The Czech versions of standardized questionnaires A-NEWS (Neighborhood Environment Walkability Scale – abbreviated) with IPAQ (International Physical Activity Questionnaire) and pedometer YAMAX SW700 were used for data collection. The total of 1231 records (700 females and 531 males) was included into analysis. Comparisons between level of walkability derived from A-NEWS and physical activity level observed from pedometer were calculated using descriptive statistics and Kruskal-Wallis ANOVA test.

RESULT(S): For females the higher walkability was a significant factor for meeting the recommended level of 10,000 steps/day [$\chi^2=13.60; p<.004; w=.105$], there was no difference in males. However both males and females living in more walkable environments indicated significantly more steps than those living in less walkable neighborhoods [$H(3, 1231)=21.42; p<.001; \chi^2=.017$]. Participants living in walkable areas were meeting the recommended level of 10,000 steps/day in all age groups (53 % of adults aged 25-35, 38 % of adults aged 36-45 and 42 % of those aged 46-57) more often than those living in less walkable locations [$\chi^2=21.92; p<.001; w=.132$].

CONCLUSION(S): Higher walkability in Central European country seems to indicate similar results to other developed countries. However increasing prevalence of overweight and obesity within the population (more than 50% of adults) and no clear national strategy in planning healthy neighborhoods are the key challenges for future development in the Czech Republic.
**O.091**  **Walking to work: the contribution to adult physical activity levels**  
Audrey S, Procter S, Cooper AR

**PURPOSE:** To objectively examine the contribution of walking to work on adult physical activity levels.

**METHOD:** Employees (n=145) at 17 workplaces in Bristol, who lived within 2 miles of the workplace, were asked to wear accelerometers for 7 days from waking in the morning to going to bed at night, and to carry a GPS receiver during the daily commute to and from work. GPS data were matched with accelerometer data to provide a measure of duration of the journey and associated physical activity. Outcome measures included: overall levels of moderate to vigorous physical activity (MVPA); temporal pattern of physical activity (to identify when activity has increased and whether there is a compensatory decrease in activity at other times), and; objective measures of routes taken and physical activity associated with journey.

**RESULT(S):** Preliminary examination of this unique dataset show significant differences in the overall activity levels of those who walk to work and those who do not. For some participants, the active commute to work was the main contributor to meeting recommended levels of MVPA. [Data cleaning and further analysis is currently taking place and will be presented at the conference.]

**CONCLUSION(S):** We are not aware of any other study in adults using objective methods to measure the contribution of walking to work on physical activity levels. Our study clearly shows that the daily commute provides an opportunity for adults who live within walking distance of their workplace to meet their daily physical activity requirements.

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**O.092**  **Evaluation of a workplace intervention to promote commuter cycling: a RE-AIM analysis**  
Dubuy V, De Cocker K, De Bourdeaudhuij I, Maes L, Seghers J, Lefevre J, De Martelaer K, Cardon G

**PURPOSE:** Recent collaboration between public health and transportation researchers has led to new perspectives in the promotion of physical activity. In line with this new focus, a workplace intervention to promote commuter cycling was implemented. The aim of the study was to evaluate the dissemination efforts of the workplace intervention ‘Bike to Work: cyclists are rewarded’.

**METHOD:** The RE-AIM framework was used to guide the evaluation. Two months after the start of the intervention a questionnaire was send to 4880 employees. The contact person of each company (n=12) was interviewed at the end of the intervention. Comparison analyses were conducted using independent-samples t-tests for quantitative and chi-square tests for
qualitative data. Difference in the frequency of commuter cycling was assessed using an ANOVA.

RESULT(S): In total seven of the twelve participating companies adopted the program and all adopting companies implemented all intervention components. As five out of seven companies intended to continue the intervention, a high proportion of maintenance was found. At the individual level, a relatively high project awareness (65%) was found. Furthermore, employees aware of the intervention reported significantly (p < 0.001) more commuter cycling than those unaware of the intervention.

CONCLUSION(S): The results of the dissemination study are promising. The adoption and implementation rates indicate that ‘Bike to Work: cyclists are rewarded’ seems to be a feasible workplace intervention. Among employees aware of the intervention, a higher score of commuter cycling was found. Nevertheless, more evidence regarding long term effectiveness and sustainability of the intervention is needed.

O.093 Psychosocial and behavioural predictors of weight and physical activity changes in Australia’s Get Healthy telephone-based lifestyle coaching service: a translational program for chronic disease prevention
O’Hara B, Greenaway M, Phongsavan P, Bauman A

PURPOSE: Understanding the influences of psychosocial-behavioural factors of participants in lifestyle-based coaching programs is critical for behaviour change. This study examined whether changes in any psychosocial-behavioural factors exerted stronger influences than others on weight and physical activity (PA) outcomes, and whether the influences of these factors vary between weight and PA in a 6-month telephone-based coaching program.

METHOD: 1088 individuals participated in a 12-month follow-up in 2009-2012. Self-reported weight/height, PA and psychosocial-behavioural information were collected using validated instruments at baseline, 3- and 12-months (6-months after coaching completed). Analysis included 277 participants with data across all three time points. Seven composite scores were computed: confidence to undertake healthy eating, PA; social support for healthy eating, PA, and; planning for structured and incidental PA, and healthy eating. Linear models regressing baseline to 12-months weight loss and PA increases on these seven psychosocial-behavioural variables, adjusting for socio-demographics, were fitted with a quadratic term.

RESULT(S): Changes in planning for structured PA from baseline to 3-months significantly predicted 12-months weight loss (-3.88kg, 95% CI: -7.64kg, -0.13kg) and PA increases (135mins/wk, 95% CI: 35mins/wk, 234mins/wk). Changes in social support for PA from baseline to 3-months significantly predicted increased PA at 12-months (99mins/wk, 95% CI: 6mins/wk, 192mins/wk). Structured PA planning had a curvilinear relationship with weight loss, and a linear relationship with PA outcome. No other psychosocial-behavioural factors examined predicted changes in body weight and PA.
CONCLUSION(S): Results affirm the importance of incorporating planning strategies in the coaching processes of behavioural-based programs for facilitating sustained weight loss and PA improvements.

**O.094 Integrating motivational interviewing in online computer tailoring; with or without the presence an embodied virtual coach?**

Friederichs S, Oenema A, Bolman C, Guyaux J, Lechner L

PURPOSE: Current research on physical activity (PA) promotion increasingly shows the importance of increasing autonomous motivation. Motivational interviewing (MI) is a counseling style which focuses explicitly on increasing autonomous motivation. Online computer tailoring (CT) potentially offers an alternative delivery channel for MI. Combining MI with online CT could result in innovative PA promotion interventions. The present study assessed whether the presence of an embodied virtual coach in an online MI based PA intervention provides additional effectiveness and/or appreciation.

METHOD: An RCT was conducted, comparing 1) a text-based MI intervention, 2) the same MI intervention with an embodied virtual coach and 3) a control condition. Measurements included process variables and self-reported PA at one month post intervention. Measurements were completed by 501 participants (57.7% female; age 45 ±14.1).

RESULT(S): Both interventions significantly increased self-reported PA at one month when compared to the control condition. No differences were found in self-reported PA between both interventions. Furthermore, the process data did not reveal any significant differences between both interventions.

CONCLUSION(S): The results suggest that the presence of an embodied virtual coach does not result in an additional increase in effectiveness or in higher appreciation. More research is needed in order to determine whether the presence of a virtual coach in online computer tailored MI is totally unnecessary, or whether such a coach might still be beneficial for specific subgroups of people, or when used during some specific subcomponents of an online MI intervention.

**O.095 Online social networking by young adult cancer survivors: communication and engagement through Facebook in the Fostering Improvement through Networking and Exercising Together (FITNET) study**

Valle CG, Tate DF

PURPOSE: While social networking site (SNS) use continues to rise, little is known about how young adult cancer survivors use SNS and how discussion group format (moderated vs. peer-
led) influences communication and engagement in SNS interventions. This study evaluates the effects of Facebook group discussion format on communication and engagement among young adult cancer survivors in a physical activity (PA) intervention study.

METHOD: Participants (n=66; M=31.7yo, 89% white, 89% female) completed a 12-week randomized trial of an Internet-delivered intervention aimed at increasing moderate-intensity PA compared to a self-help condition. Facebook groups (moderated vs. peer-led) were utilized to promote social interaction in both conditions. We compared groups on self-report and objective measures of Facebook engagement collected after 12 weeks.

RESULT(S): Both groups posted a comparable number of Facebook comments (peer-led: 4.6, SD=7.8 per person vs. moderated: 3.4, SD=4.6; p=0.39). Posts in both groups included cancer experiences, PA-related encouragement and accomplishments. Among almost 80% of participants that recalled Facebook group discussions (peer-led: 79.4% vs. moderated: 78.1%; p>.05), a majority found information to be somewhat-completely designed especially for me (peer-led: 73.1% vs. moderated: 58.3%; p>.05) and important to me personally (both 66.7%; p>.05). Over 90% of survivors in both groups trusted the accuracy of information in discussions (p>.05). Peer-led group participants were more likely to agree that Facebook group members were supportive (62.7% vs. 32.4%; p<.04) and report that information caused them to become physically active (66.7% vs. 37.5%; p<.05).

CONCLUSION(S): Peer-led group discussions on SNS may hold potential for encouraging PA among young adult cancer survivors.

O.096 Tweeting for fitness: use of mobile fitness apps for fitness-based social networking over 6-months
Martin Ginis KA, Sweet SN, Vickey T

PURPOSE: Purpose. Thousands of fitness apps are available for download. Apps connecting users to communities (e.g. social networking sites) may be most efficacious for eliciting behaviour change because they facilitate provision of real-time social support and reinforcement (West et al., 2012). This study examined the use of fitness apps for fitness-related social networking, via Twitter, across a 6-month period.

METHOD: Methods: Over 6 months, 1.2 million tweets were collected from 60,338 international users of five well-known fitness apps. Tweets were classified according to content. Friedman’s ANOVAs were conducted to analyze changes in tweet-frequency over time.

RESULT(S): Results: Most tweets (62%) were workout reports (e.g., “I ran 4.2 km in 32 minutes”) or workout reports plus commentary (20%; e.g., “I cycled for 42km and felt great!”); 17% of tweets were information sharing (e.g., “Come to the annual fun run on Sunday”) and just 1% were statements of support (e.g., “Congratulations on your run Jane Doe!”). Average number of tweets/person/month significantly decreased for: workout reports (3.7 tweets at month-1 vs. 1.8 at month-6, padj < .001), workout reports plus
commentary (1.3 tweets at month-1 vs. 0.5 at month-6, padj < .001), and information sharing (0.5 tweets at month-1 vs. 0.4 at month-6, padj < .001). Statements of support did not change (.01 tweets at month-1 and month-6).

CONCLUSION(S): Conclusions: Mobile fitness apps do not necessarily stimulate ongoing social networking or the provision of social support. Interventionists should not assume that apps provide the social support and reinforcement necessary for eliciting physical activity behaviour change.

O.097 Long-term effectiveness and mediators of need-supportive physical activity coaching among Flemish sedentary employees
Van Hoecke A-S, Delecluse C, Opdenacker J, Lipkens L, Martien S, Boen F

PURPOSE: The year-round effects and mediators of a need-supportive physical activity program were examined.

METHOD: Sedentary employees (n = 92) of the university of Leuven received four months of physical activity coaching based on the Self-Determination Theory by bachelors in kinesiology (n = 30). The program consisted of five individual contact moments between coach and client (i.e. an intake session, three follow-up contacts and an outtake session), either face-to-face, by phone or by e-mail. Self-reports on physical activity, social support, self-efficacy and autonomous motivation were completed in an intervention condition (n = 92) and a control condition (n = 34) at three moments: before the intervention (pre-test), after the intervention (post-test) and one year after pre-test (follow-up-test).

RESULT(S): Repeated measurement analyses showed that changes in physical activity were significantly different over time between the conditions. More specifically, the intervention condition increased in moderate, strenuous and total physical activity from pre- to post-test, whereas the control condition did not change. Additionally, the intervention condition increased in mild, moderate, strenuous and total physical activity from pre- to follow-up-test, while no changes occurred in the control condition. Bootstrapping analyses indicated that self-efficacy and autonomous motivation significantly mediated the intervention effect on physical activity from pre- to post-test, while social support significantly contributed to the long-term effect.

CONCLUSION(S): This study provides evidence for the long-term effectiveness of a need-supportive physical activity program that might be efficient at the community level.
O.098  Main outcomes of the Move More for Life Trial: a randomized controlled trial of the effects of computer-tailored and targetted-print materials on physical activity behaviour among post-treatment breast cancer survivors
Short CE, James E, dSouza M, Plotnikoff R

PURPOSE: This study aims to assess the relative efficacy of two promising theory-based print interventions (tailored and targeted-print) designed to promote regular PA amongst breast cancer survivors.

METHOD: 330 breast cancer survivors were randomized into one of three groups: (1) A tailored-print intervention group (TP); (2) a targeted-print intervention group (TB); or (3) a standard recommendation control group (SR). All participants were assessed at baseline, 4 months post-baseline, and 10 months post baseline. Primary outcomes (mins/wk MVAPA; sessions*exercises per week resistance PA) and secondary outcomes (meeting PA guidelines, step counts, QOL, fatigue) were assessed using ANCOVA, controlling for baseline physical activity.

RESULT(S): At 4 months follow-up, attrition was 90% and did not differ between groups (P =.36). MVAPA increased by 24 minutes per week in the TP group, compared to 12.5 minutes per week in the TB group and a decrease of 64 minutes per week in the SR group. This difference was only marginally significant (P = 0.06). Resistance training scores increased by 8 in the TP group, compared to 1.5 in the TB group and 1 in the SR group. The difference between groups was statistically significant, owing to the enhanced efficacy of the TP group (P= <0.05).There were no significant differences between groups for any of the secondary outcomes, except for meeting the resistance-training guidelines. The 10 month follow-up data will be available March 2012.

CONCLUSION(S): TP interventions do seem the most promising in terms of short-term efficacy; however the cost-effectiveness of each approach requires further examination.

O.099  Developing a self-help intervention to increase active commuting: rationale for and design of the iPACE study
Baker G, Bill E, Bird E, Ogilvie D, Powell J, Sahlqvist S, Mutrie N

PURPOSE: Improving environmental infrastructure is frequently recommended for increasing levels of walking and cycling yet little evidence exists that would suggest provision of such infrastructure is sufficient to prompt behaviour change. The multidisciplinary ‘iPACE’ study aims to examine whether the effects of a new network of walking and cycling routes constructed in 2013 can be enhanced by a self-help intervention targeted at individuals using a two group (infrastructure vs infrastructure plus self-help) randomised design. This paper describes the development of the ‘iPACE’ self-help intervention.

METHOD: iPACE is guided by the Medical Research Council framework for the design and
evaluation of complex interventions (Craig et al, 2008) and by an applied socioecological framework (Ogilvie et al, 2011). The self-help intervention will be delivered via an interactive website over 12 weeks coinciding with completion of the infrastructural improvements. Theoretically-based intervention materials were informed by a systematic review of behaviour change techniques, an investigation of barriers to active commuting and an evaluation of novel visualisation technology modelling the completed network.

RESULT(S): The systematic review identified specific behaviour change techniques, such as intention formation and self-monitoring, as important. The main barriers for active commuting were perceived to be time and safety – issues addressed using intervention components such as factsheets, journey planners and problem solving activities. Visualisation technology was judged to be a useful addition.

CONCLUSION(S): iPACE materials are based on current evidence on behaviour change theory and techniques whilst being acceptable to potential users and addressing local contextual barriers.

O.100 Long-term effectiveness of a print-delivered or Web-based tailored physical activity intervention among people aged over fifty
Peels D, Bolman C, Mudde A, Golsteijn R, de Vries H, van Stralen M, Lechner L

PURPOSE: This study provides insight in the long-term effectiveness of a Web-based or print-delivered tailored intervention (with or without environmental approach) to promote physical activity (PA) in the over-fifties.

METHOD: The intervention groups (i.e. print-delivered basic (PB; N=439), print-delivered environmental (PE; N=435), Web-based basic (WB; N=423), Web-based environmental (WE; N=432)) and a no-advice control group (N=411) were studied in a clustered RCT. Intervention participants received (within 4 months) three times tailored advice. PA was assessed using the validated SQUASH questionnaire. Long-term effects on PA (i.e. weekly days and minutes of total PA, minutes of transport and leisure PA) were studied using multilevel regression analyses.

RESULT(S): Both the PB-intervention (Bdays=0.59; p=.003; Bmin=105.53; p=.023) and the PE-intervention (Bdays=0.69; p=.001; Bmin=160.19; p=.001) were effective in increasing total days and minutes of PA. Both Web-based interventions did not significantly increase total PA, while the control group decreased PA. The effect on days of PA was moderated by the participants’ baseline PA intention and by the presence of a chronic physical limitation. The different conditions were effective in stimulating different types of PA. The PB-intervention significantly increased transport and leisure walking, and leisure cycling; the PE-intervention increased leisure cycling, and sports; the WB-intervention increased gardening behaviour; the WE-intervention increased none of the PA behaviours.

CONCLUSION(S): Whereas a previous study showed that after 6 months, all intervention
conditions were equally effective, after 12 months the Web-based intervention is less effective than the printed intervention. More efforts should be taken to stimulate the sustainability of Web-based interventions.
**O.101**  
**Light sensors and GPS to differentiate indoor vs. outdoor physical activity in preschoolers at child care**  
Tandon PS, Saelens B, Zhou C, Kerr J, Christakis D

**PURPOSE:** To study the accuracy and validity of light sensor and GPS for quantifying outdoor time among preschoolers at child care and examine differences in indoor and outdoor sedentary and physical activity.

**METHOD:** An observational study of 46 children (mean age 4.5 yrs, 64% boys) from 5 child care centers who wore accelerometers and GPS devices around their waists for up to 5 days at child care. Direct observation for 2 days at each site was the gold standard. Light sensor readings (lux) and GPS Signal-to-Noise Ratios (using the Personal Activity and Location Measurement System) defined indoors vs. outdoors. ROC analyses determined thresholds. GPS data was used for non-observation days.

**RESULT(S):** The light sensor (cutoff 110) had a sensitivity of 74%, specificity 86%. GPS (SNR cutoff 250) had a sensitivity of 82%, specificity 88%. Over all days, children spent 24% of time outdoors, averaging 74 min/day [range 30-119 min]. 54% of children spent >60 min/day outdoors. Mean activity counts were over twice as high outdoors [345 (95) vs 159 (38)]. Children were significantly less sedentary (65% of time vs 86%) and engaged in more light (12% vs 7%) and MVPA (22% vs 7%) when outdoors. Only 7% of children achieved >60 min of MVPA/day.

**CONCLUSION(S):** A light sensor and GPS both distinguish indoor from outdoor time for preschoolers with moderate to high accuracy. Preschoolers are twice as active and less sedentary outdoors vs. indoors. One strategy to increase preschoolers’ MVPA while conferring other benefits might be to increase their outdoor time at child care.

**O.102**  
**Variations in youth spatial activity patterns using Global Positioning Systems (GPS) and accelerometers: results from the When Cities Move Children study**  
Klinker CD, Schipperijn J, Christian HE, Troelsen J

**PURPOSE:** To operationalize the domains and behavioral settings for youth physical activity using new methodologies and investigate how daily spatial activity patterns vary by gender, age (children vs. adolescents), ethnicity and socioeconomic status within domains (e.g., school, home) and behavioral settings (e.g., recess, public open space).

**METHOD:** Cross-sectional data from the baseline sample of 523 youth (10-16 years) in the When Cities Move Children project were used. Data from accelerometer, GPS, questionnaire, student-diary, and class time tables were compiled using a Geographical
Information System (GIS) and a database specifically designed to calculate individually time-matched spatial activity patterns. Mean Minutes of moderate-vigorous physical activity (MVPA), amount of time, and proportions of time in MVPA were determined for domains and behavioral settings. Group differences were investigated using t-test.

RESULT(S): Four domains (leisure, school, transport, home) and four behavioral settings (recess, organized sports facilities, public open space, shared open yards) were operationalized. Distinct spatial activity patterns existed and varied according to groups. For example children and adolescents were equally active during total week days (MVPA: children 66.6 vs. adolescents 60.8) but children were significantly more active than adolescents during schooldays (MVPA: children 25.0 vs. adolescents 19.9) and recess (MVPA: children 9.9 vs. adolescents 6.4).

CONCLUSION(S): A framework for operationalizing and analyzing youth spatial activity patterns has been provided to guide future research. The inclusion of new methodologies in physical activity research, and a trend towards investigating activity in domains and behavioral settings over time, will provide new insight into youth physical activity patterns and better tailored interventions.

O.103 Using self-identified neighborhoods to map the locations and physical activity of youth
Robinson Al, Oreskovic NM

PURPOSE: To compare youth-identified neighborhood (YIN) boundaries to census-defined neighborhood (CDN) boundaries, and determine how moderate-to-vigorous physical activity (MVPA) levels compare within both boundary types.

METHOD: Twenty-one participants aged 11-15 years (study goal n=60) outlined their neighborhood using a map which included their town of residence and bordering towns. YIN boundaries were georeferenced and compared to CDN boundaries using Geographic Information Systems. Objective MVPA and location data collected over 2 weeks using accelerometers and Global Positioning Systems devices were used to calculate the amount of MVPA and time spent within youth-identified and census-defined neighborhood boundaries. Paired bivariate analyses compared mean area (meters squared), percent of total time (minutes), MVPA (minutes), and MVPA density (minutes of MVPA within a boundary divided by total boundary area) for both boundary types.

RESULT(S): The mean area for YIN (1,741,266m2) was significantly smaller than the mean area for CDN (15,185,067m2), p=<0.0001. Percent of subject time spent (CDN: 90.2% vs YIN: 80.3%, p=0.04) and mean daily MVPA levels (CDN:19.3 minutes YIN:15.7 minutes, p=0.01) were greater in CDN than YIN. However, after accounting for the area of the boundaries, MVPA density was significantly greater within YIN (2.5x10-4) than CDN (2.2x10-5) boundaries (p=0.0004).

CONCLUSION(S): Youth-identified neighborhood boundaries are significantly smaller than
census town boundaries and appear to be more precise at capturing the locations where children engage in physical activity. Asking children to identify the boundaries of their neighborhood is a feasible and innovative method for defining and measuring the locations where youth engage in physical activity.

O.104 **Cyclist’s radius of action – GPS derived activity space**  
Madsen T, Schipperijn J, Christiansen LB, Troelsen J

PURPOSE: Several studies have looked into how the build environment is associated with physical activity but there is an absence of literature concerning the relationship between the build environment and cycling for transport. Some of the factors related to walking are also positively associated with cycling on a zone level but one potential problem using walkability scores to “calculate” bikeability is the obvious difference between walking and cycling, primarily in regards to travel speed and therefore radius of action. The purpose is to study cyclist behavior and use GPS to construct a valid cycling activity space in order to better study cyclist’s radius of action.

METHOD: A GPS study on 81 regular cyclists for 7 days was carried out to create cycling activity spaces. The QStarz BT-Q1000X GPS was used in combination with PALMS and ArcGIS to evaluate the GPS tracks and conceptualize cyclist movement. A valid activity space for future analysis was created using the standard deviation ellipses method for spatial analysis as this method better reflect cyclists transport behavior than using traditional buffer sizes.

RESULT(S): App. 4.7 million GPS points were recorded and a standard deviation ellipse was created for every respondent. The average network distance from home address to the outermost point in the ellipse equals the activity spaces and hence the bikeability buffer size.

CONCLUSION(S): GPS tracks can inform researchers about revealed cycling behavior and can be used to calculate cycling activity spaces. Bikeability can then be calculated within the cycling activity space, and associated with transportation data.
Nutrition interventions in children and families

O.105  Interventions to promote healthy eating: a systematic review of regulatory approaches
Hendry VL, Monsivais P, Jebb S, Almiron-Roig E, Benjamin Neelon S, Griffin S, Ogilvie D

PURPOSE: Excessive bodyweight accounts for ~279,000 excess deaths annually across the European Union. Multifactorial strategies may help address this burden of ill-health. This review considers the effectiveness of regulatory interventions to change diet or diet-related behaviour.

METHOD: The review includes regulation, rules and legislation (collectively, “regulation”) seeking to directly alter diet, dietary behaviour or nutrition by influencing (a) dietary behaviour (e.g. through regulating labelling, calorie display, marketing, food in schools, or built environments; or by using taxes or subsidies) or (b) the nutritional content of food (e.g. by specifying salt or trans fat levels). The review follows Cochrane and EPPI-Centre guidance and comprises a scoping review of regulatory interventions and in-depth reviews on (1) control of trans fats and (2) school-based fruit and vegetable schemes.

RESULT(S): Medline, Embase, ISI WoK and EconLit searches identified 134 studies eligible for full text review. Studies of information labels (packaging or menus) and compliance with school food standards occurred most frequently. Ten studies examined trans fat controls through bans or labelling. These measures achieved good compliance, with evidence of reformulation and minor effects on food availability, price or quality. Seven studies of school-based fruit and vegetables provided only weak evidence of short-term increases in intake.

CONCLUSION(S): Regulations with monitoring achieve compliance, but whether this affects food choices, dietary behaviour, nutrition, obesity prevalence or other health outcomes is unclear since those impacts are under-evaluated. Understanding the effectiveness and costs of regulatory interventions will highlight where government-led action may be effective in promoting healthy diets in the population.

O.106  Maternal mediators of improved child dietary quality following the Melbourne InFANT program
Spence AC, Campbell KJ, McNaughton SA, Crawford DA, Hesketh KD

PURPOSE: Mothers have an important influence on their children’s diets, and child diet quality in turn is likely to impact upon child health outcomes. However, children’s diets often do not meet recommendations. This research investigated whether maternal knowledge, behaviours or beliefs mediated the impact of a health-promotion intervention on child diet quality.
METHOD: The Melbourne InFANT Program was a community-based health-promotion RCT aimed at improving child dietary intakes via improving maternal feeding knowledge, beliefs and practices from child age 3 months. Child diet was assessed using three 24-hour recalls and a purpose-designed diet quality index reflecting intakes of fruits, vegetables and non-core foods/beverages. Mothers self-reported their feeding/nutrition knowledge and self-efficacy (using purpose-designed items), feeding practices (using the Comprehensive Feeding Practices Questionnaire), and modelling of eating (by validated food frequency questionnaire).

RESULT(S): Of 542 families recruited, 375 provided complete data post-intervention, at child age 18 months. The significant intervention effect on child diet quality (scores 15.6 and 14.5/30 for intervention and control respectively, \(p=0.014\)) was mediated by higher maternal feeding/nutrition knowledge and lower use of rewards in child feeding for intervention participants (assessed by test of joint significance). Maternal self-efficacy, modelling, and other feeding practices were correlated with child diet quality but not significantly improved by the intervention.

CONCLUSION(S): This novel intervention achieved improved child diet quality via improving maternal feeding/nutrition knowledge and reducing use of foods as rewards. This research provides evidence of intervention efficacy, but also highlights the need for further research in effectively targeting other potential maternal mediators.

O.107 The effect of an individually tailored nutrition intervention in Dutch parents on dietary patterns and health outcomes

PURPOSE: To determine the effect of an individually tailored nutrition intervention on dietary patterns and health outcomes of apparently healthy adults with at least one child aged 4 to 12. Improving the dietary intake of parents is important as it may influence the dietary intake of their children.

METHOD: In total, 165 Dutch participants were randomized to intervention or control group. During five visits distributed over the six-month intervention period, the dietician provided dietary counseling based on motivational interviewing and the Dutch guidelines for a healthy diet. The dietician also sent the participants three personalised e-mail messages based on the participant’s goals and dietary intake. The control group did not receive any treatment. Before and after the intervention period, participants filled in a food frequency questionnaire and the SQUASH. This to score the adjusted Dutch healthy diet-index, a score based on seven components representing the 2006 Dutch guidelines for a healthy diet, with a maximum score of 70 points. In addition, serum blood cholesterol levels and anthropometric measures were determined.

RESULT(S): The adjusted Dutch healthy diet-index score improved 6.3 points more in intervention group than in control group (\(p<0.001\)). The difference can be explained by
significantly increased scores on fruit, fish, dietary fiber and saturated fatty acids in the intervention group. This finding was supported by a significant lowering of total serum cholesterol. No differences in changes for weight, BMI, waist or blood pressure were found between the study groups.

CONCLUSION(S): An individually tailored intervention in healthy people with children improved their dietary pattern.

O.108 Does a one-year school intervention in 11-year-old children in Finland change children’s fruit intake and factors determining fruit intake?
Ray CM-L, Lehto RL, Roos EB

PURPOSE: To examine if a school intervention in the Pro Greens intervention project during one school year will change children’s fruit intake and factors determining fruit intake.

METHOD: The intervention was planned using intervention mapping strategies. The factors which were intervened were increasing availability of fruit and vegetables (FV) in school, increasing the interest in tasting FV and knowledge of FV recommendations. In Finland 11-year-old children 387 in intervention and 424 in control schools participated in year 2009 and one school year later. Fruit intake was assessed as a 24 hour recall (g/day) and FFQ (times/week). Analysis of covariance was used when determining the associations between intervention/control schools and fruit intake. Logistic regression analysis was used when determining the associations between intervention/control schools and factors determining fruit intake.

RESULT(S): Children in intervention compared to control schools had a significant positive change in their fruit intake based on 24 h recall. Also the fruit intake during school time increased and changed positively as did the daily fruit intake based on food frequency questionnaire. The odds ratio of bringing fruit to school and the knowledge about recommendations was higher in intervention schools after one year compared to control schools, whereas no differences were found for eating fruit as a habit or positive fruit attitudes.

CONCLUSION(S): By targeting right determinants for FV intake in children it is possible to increase fruit intake by a school intervention among children in a low fruit intake country.
O.109 Evaluation of a natural experiment of the impact of a new urban planning code on walking: longitudinal results from RESIDE
Christian HE, Knuiman M, Bull F, Timperio A, Foster S, Divitini M, Giles-Corti B

PURPOSE: To investigate the causal relationship between the built environment and walking by examining whether people moving into a housing development designed according to a state government ‘Liveable Neighborhoods’ sub-division code engage in more walking than people who move to other development types.

METHOD: RESIDE is a natural experiment of 1813 people building homes in 73 new housing developments in Perth, Western Australia. Participants were surveyed before, then 12 and 36 months after moving (response 67.8% of eligible participants). Self-report walking was measured using the Neighborhood Physical Activity Questionnaire. Perceptions of the environment and self-selection factors were collected. Street connectivity, residential density, land use mix and destination access were calculated using GIS. General linear modelling was used.

RESULT(S): After relocation, participants in Liveable compared with Conventional developments had greater street connectivity, residential density, land use mix and access to destinations and more positive perceptions of their neighborhood (all p<0.05). However, after adjusting for baseline walking, socio-demographic, clustering and self-selection factors, there were no significant differences in change in mean minutes of neighborhood total, transport or recreational walking over time by development type (p>0.05).

CONCLUSION(S): The introduction of urban and transportation policies are natural experiments, providing unique health-related evaluation opportunities. Implementation of the ‘Liveable Neighborhood Guidelines’ code produced more supportive environments, however the level of intervention was insufficient to significantly impact walking. Future natural experiments of urban planning policies need to incorporate long-term follow-up to allow time for new neighborhoods to develop and should consider process evaluation to monitor policy-implementation and fidelity.

O.110 Outcomes from a ‘Self-explaining roads’ intervention and considerations for ‘Future streets’
Mackie HW, Charlton SG, Baas PH

PURPOSE: To implement an area-wide ‘Self Explaining Roads’ (SER) intervention and evaluate its influence on road safety and road user behaviour.

METHOD: Approximately 11km of local and collector roads were modified within the intervention area. Local roads received landscaping and road marking removal to create a
visually distinct road environment from collector roads, which received increased delineation, cycle lanes, and improved pedestrian facilities. For the research, crashes, traffic volume and speed, resident perceptions and road-user behaviour (from video) were measured before and after the intervention. A comparison control area was used for traffic measurements.

RESULT(S): There was a 30% reduction in traffic crashes and an 85% reduction in crash costs three years following the SER intervention. Mean traffic speed for local streets reduced to 30 km/hr and speed variance reduced for all streets. On local roads there was a relatively higher proportion of pedestrians following the intervention, less uniformity in vehicle tracking and less indicating by motorists along with less through traffic, reflecting the more informal/low speed local road environment. Pedestrians were less constrained on local roads following the intervention, possibly reflecting a slower, less formal environment. These behaviours were generally not evident on collector roads which reinforce the creation of distinct road types that reflect desired road-user behaviour.

CONCLUSION(S): This area-wide SER intervention has resulted in traffic and pedestrian behaviour that suggests a more user-friendly environment for pedestrians. A further intervention study (“Future Streets”) focussing more deliberately on active modes is currently underway. Safe physical activity may be promoted through improved street design

O.111 Effects of a school-based health promotion intervention on physical activity and physical fitness in Ecuadorian adolescents: a cluster-randomized controlled trial

PURPOSE: We assessed if a school-based intervention improved physical activity (PA), physical fitness (PF) and sedentary behavior among Ecuadorian adolescents.

METHOD: The ACTIVITAL program promoted PA and the reduction of sedentary behavior in 11 to 15y old adolescents (n=1440) through 15 classes, awareness-raising activities and the provision of walking trails. Ten schools were randomly allocated to the intervention and ten schools were pair-matched as controls. PF measures (EUROFIT battery) and self-reported sedentary behavior were collected at baseline and after 28 months. Accelerometer data were collected during five weekdays in a random subsample (n=224). The differences between intervention and control group were analyzed using mixed models considering the pair-matched design. We present the tentative findings.

RESULT(S): The intervention resulted in an improvement of two measures of PA i.e. shuttle-short run (P=0.03, ß=-0.8), vertical jump (P=0.01, ß=2.4) and a lower increase of time spent in sedentary activities (P=0.04, ß=-43.8) per day. Overall however, PA and sedentary behavior deteriorated but the decrease was less (but non-significant) in the intervention group as measured by accelerometer counts (P=0.32, ß=14695.9), time spent in light (P=0.46, ß=1.2) and moderate to vigorous activities (P=0.17, ß=9.7). A similar trend was observed for PF parameters i.e. plate tapping (P=0.10, ß=-0.70), sit-and-reach (P=0.37,
sit-ups ($P=0.35$, $\beta=0.1$), bent-arm-hang ($P=0.12$, $\beta=0.9$) and handgrip ($P=0.22$, $\beta=0.4$) tests.

**CONCLUSION(S):** A school-based intervention can improve PA, sedentarism and PF in adolescents. The improvement was consistent for most PA and PF parameters but did not reach significance for most outcomes possibly due to a power problem with pair-matched analyses.

**O.112 Mediating effect of parental determinants on sport participation in the school-based JUMP-in intervention in Dutch children from deprived neighbourhoods**

de Meij JSB, van Stralen M, van der Wal MF, van Mechelen WW, Chin A Paw MJM

**PURPOSE:** By specifying mediating mechanisms of existing interventions one can improve future physical activity interventions. This study aimed to investigate whether parental determinants mediated the JUMP-in intervention effect on the sport participation of 6-12-year-old Dutch children from low socio-economic status.

**METHOD:** JUMP-in was systematically developed following Intervention Mapping protocol. JUMP-in is a school-based strategy based on the EnRG-framework combining environmental policy, neighbourhood, parents- and personal components. A controlled trial was carried out in 19 primary schools. In total 1808 children had complete data on parental determinants at baseline and 20-month-follow-up. Mediated effects were tested with structural equation modelling using Mplus.

**RESULT(S):** JUMP-in effectively increased parental social support and social pressure to encourage children to participate in sports. These determinants significantly mediated the intervention effect on sports participation, explaining 9% and 6% of the intervention effect, respectively. Additionally, parental perceived pros, self-efficacy, perceived sports competence, perceived barriers, planning skills and habit strength, were significantly associated with children’s sport participation, but these potential mediators were not affected by the intervention. We found no intervention effect on parental intention, perceived cons, social modelling and social norm, but these constructs were not significantly associated with sports participation.

**CONCLUSION(S):** The present study showed that a school-based multi-component strategy combining improved social support and social pressure among parents regarding their children’s sports participation. Several parental factors were found to be relevant in predicting children’s sport participation, but these were not significantly changed by the intervention. Future intervention studies should search for more effective intervention strategies targeting pedagogic skills of parents.
Physical activity and sedentary behavior in older adults

O.113 Results of a home-based physical activity and nutrition RCT for seniors

PURPOSE: The study aimed to confirm if a low-cost, home-based physical activity and nutrition program could improve physical activity and nutrition behaviours of insufficiently active 60-70 year-olds.

METHOD: A 6-month RCT targeted sedentary and overweight adults from low to medium socio-economic suburbs within metropolitan Perth. Intervention participants (n = 248) received mailed materials and telephone/email support to improve nutrition and physical activity behaviours. Controls (n = 230) only received small incentives to complete baseline and post-intervention questionnaires. A questionnaire measured nutritional behaviours, and physical activity was measured using the International Physical Activity Questionnaire. Generalised estimating equation models were used to assess the repeated outcomes over both time points.

RESULT(S): 176 intervention and 199 control group participants (response rate 78.5%) with complete data were available for analysis. After controlling for demographic and other confounding factors, the intervention group demonstrated increased participation in strength exercise (p < 0.001), walking (p = 0.029) and vigorous activity (p = 0.015), together with a significant reduction in mean sitting time (p < 0.001) and waist to hip ratio measurements (p = 0.03) relative to controls. Improvements in nutritional behaviours for the intervention group were also measured in terms of fat avoidance (p < 0.001), fat intake (p = 0.021) and fruit intake (p = 0.008).

CONCLUSION(S): A home based program can positively influence changes to seniors’ physical activity and nutrition behaviours. The project provides guidelines for the development, implementation and evaluation of a minimal, home-based tailored physical activity and nutrition intervention program.

O.114 Relationships of individual, social and physical environmental factors with older adults’ television viewing time
Van Cauwenberg J, De Donder L, Clarys P, De Bourdeaudhuij I, Owen N, Deforche B

PURPOSE: Sedentary behaviors (involving prolonged sitting) can be associated detrimentally with health outcomes. Older adults, the most sedentary age group, are especially at risk due to their high levels of television viewing. Guided by an ecological model of sedentary behaviour, this study examined individual, social and physical environmental correlates of
older adults’ television viewing.

METHOD: Questionnaires were used to collect data on daily television viewing time, individual, social and physical environmental factors in a clustered random sample of 50,986 Flemish older adults (≥ 65 years). Multilevel linear regression analyses were performed to examine relationships of individual, social and physical environmental factors with daily television viewing time.

RESULT(S): For individual-level factors, older age, being a man, not being widowed, less functional limitations, higher educational attainment, and rural residence were related to less television viewing time. For social environmental factors, not feeling emotionally lonely, not living in a neighborhood with too many older adults, youngsters and immigrants, feeling involved, participation in organizations, and volunteering were associated with less television viewing time. For physical environmental factors, medium distance to facilities, presence of sport facilities, more greenery and noise, and feeling safe were related to less television viewing time.

CONCLUSION(S): Our findings suggest that to decrease older adults’ television viewing time, neighborhoods should have a balanced mix of demographic subgroups, the engagement of older adults with formal neighborhood organizations should be promoted, and safe places for alternative activities are required. Particular attention should be devoted to women, those who are functionally limited, less educated, widowed, and (semi-)urban residents.

O.115 Relationship of the perceived social and physical environment with mental health in older Australian adults: mediating effects of physical activity

Van Dyck DD, McNaughton SA, Salmon J, Teychenne M, De Bourdeaudhuij I, Crawford DA

PURPOSE: Mental health problems are highly prevalent in developed countries, inducing high (in)direct health costs and increased mortality risk. The interplay between multidimensional correlates of mental health remains unclear. The purpose of this study was to examine the contribution of different physical activity types in mediating the relationship of social and physical environmental factors with mental health in older Australian adults.

METHOD: Data of the Wellbeing, Eating and exercise for a Long Life study were used, a prospective cohort study of older adults (55-65 years) conducted in Victoria, Australia. Baseline data collection took place in 2010. In total, 4082 older adults completed a mailed survey. Mental health was assessed with the SF-36, physical activity with the long IPAQ. Socio-demographic factors and perceived physical and social environmental factors were assessed with validated questionnaires. Mediation analyses were conducted in SPSS 19.0 using the MacKinnon product-of-coefficient tests. Clustering of participants in areas was taken into account by using multilevel analyses.

RESULT(S): Leisure-time walking (3.5%) and leisure-time MVPA (3.2%) mediated the
relationship between the perceived neighborhood physical activity environment and mental health. Transport-related cycling (2.8%), leisure-time walking (10.5%) and leisure-time MVPA (14.3%) mediated the association between social support from family/friends and mental health. Finally, leisure-time MVPA (2.0%) mediated the relationship between neighborhood social cohesion and mental health.

CONCLUSION(S): This study highlights the importance of both social environmental factors and leisure-time physical activity to explain mental health. If future studies confirm these results, this knowledge can be used to optimize interventions to prevent/treat mental health problems in older adults.

O.116 Targeting the personal and social self: year-round effectiveness of identity-based physical activity promotion among sedentary older adults
Van Hoecke A-S, Vanbeselaere N, Boen F

PURPOSE: To evaluate the year-round effectiveness of three identity-based physical activity counseling strategies among older adults.

METHOD: In the Personal Identity condition (PI), participants’ personal self was targeted by physical activity coaching based on the Self-Determination Theory. More specifically, during weekly contact, a Health Fitness Specialist (HFS) explicitly fostered the needs for autonomy, competence and relatedness at a personal level. In the Social Identity condition (SI), a HFS weekly targeted participants’ social self by coaching according to the Self-Categorization Theory. More specifically, participants’ physical activity behavior was facilitated by postulating social-identity based normative support for physical activity, i.e. by advancing physical activity as prototypical of a relevant social identity. In the Integrated Identity condition (II), a HFS targeted both the participants’ personal and social self during the weekly contact. Sedentary adults aged 55- to 70 years (n = 169) completed measurements on physical activity and autonomous forms of motivation before (pre-test) and immediately after (post-test) the six-week intervention. Year-round follow-up data will be collected in February 2013.

RESULT(S): Linear mixed models demonstrated significant pre- to post-test increases in daily steps and self-reported physical activity in PI, SI and II. However, changes over time were not significantly different between the conditions. In the long term, larger physical activity increases are expected in SI and II compared with PI because a more self-determined form of motivation was facilitated in SI and II (i.e. integrated versus identified regulation).

CONCLUSION(S): Targeting the personal or/and social identity among older adults appears to be effective to increase their physical activity.
O.117  Eat now, exercise later: the relation between consideration of immediate and future consequences and healthy behavior
van Beek J, Antonides G, Handgraaf M

PURPOSE: In light of the current obesity epidemic, individual choices for food and exercise should be understood better. Consideration of the immediate and future consequences of these choices (i.e., time orientation) can be an important predictor of eating and exercising behavior. In contrast to previous studies, we measure time orientation at a behavior-specific level and aim to show that behavior-specific time orientation differentially predicts eating and exercising behavior. We hypothesize that time orientation for food predicts eating behavior, whereas time orientation for exercise predict exercising behavior. Additionally, we hypothesize that consideration of immediate and future consequences differentially predict eating and exercising behavior.

METHOD: Two studies were conducted among students (N = 55) and the general public (N = 165). Participants completed two adapted versions (for food and exercise) of the Consideration of Future Consequences Scale (CFC), each consisting of the subscales CFC-future and CFC-immediate. Thereafter they reported their eating and exercising behavior.

RESULT(S): Study 1 showed that CFC-food, but not CFC-exercise, predicted eating behavior. Similarly, both studies showed that CFC-exercise, but not CFC-food, predicted exercising behavior. Moreover, eating behavior was only predicted by CFC-food/immediate, whereas exercising behavior was only predicted by CFC-exercise/future.

CONCLUSION(S): In conclusion, behavior-specific time orientation predicts behavior within a behavioral domain but less well across behavioral domains. Additionally, consideration of immediate and future consequences differentially predict eating and exercising behavior. This indicates that different self-regulatory processes might be involved in eating and exercising behavior. Finally, in order to predict behavior, time orientation is measured best at a behavior-specific level.

O.118  Autonomy support and control in weight management: what important others do and say matter
Ng JYY, Thogersen-Ntoumani C, Ntoumanis N

PURPOSE: Drawing from self-determination theory (Ryan & Deci, 2002), we examined how individuals’ psychological needs, motivation, and behaviours (i.e., physical activity and eating) associated with weight management could be predicted by perceptions of their important others’ autonomy supportive and controlling behaviours.

METHOD: Using a cross-sectional survey design, 235 participants (aged 27.39 ± 8.96 Years;
77.90% females) who were trying to lose or maintain weight completed an online questionnaire. Assessments included perceptions of autonomy-supportive and controlling behaviours of important others, need satisfaction and need thwarting, behavioural regulations and behavioural outcomes (physical activity and eating).

RESULT(S): Structural equation modelling analysis showed that autonomy support by important others predicted need satisfaction and autonomous motivation for weight management, as well as physical activity and healthy eating behaviours. In contrast, controlling behaviours by important others predicted need thwarting, controlled motivation, and amotivation. In turn, controlled motivation predicted lower levels of physical activity. Amotivation was related to less healthy eating and more unhealthy eating behaviours. Significant indirect effects were also found from autonomy support and controlling behaviours to physical activity and eating behaviours, all in the expected directions.

CONCLUSION(S): The findings support the importance of important others providing autonomy support and refraining from controlling behaviours in order to facilitate motivation and behaviours conducive to successful weight management.

O.119  Feasibility and weight loss using a combined Internet, SMS and face-to-face intervention in a diverse community: Lose Now NC
Tate DF, Crane MM, Valle CG, Erickson KE, Polzien K

PURPOSE: Comprehensive Internet programs with low intensity face to face contact have been shown in efficacy trials with homogenous samples to produce weight losses of 4-7kg in 6 months; however, few have been conducted in community settings with diverse populations.

METHOD: The Lose Now NC study was a 4 month Internet weight loss intervention coupled with monthly in-person sessions which examined the feasibility of recruitment and delivery in a community setting. The web program provided self-monitoring tools, tailored automated behavioral feedback, weekly lessons, social support and 4 weekly text messages.

RESULT(S): Participants (n=195) were age 46.3±10.8y; BMI 37.9±8.4 kg/m2; 52% African American; 90% female; and 49% college degree. There were no differences in session attendance by race, gender, education, age, or baseline BMI (p’s>.11). White participants logged in more times (56.8) than African American participants (30.5; p <.01) though logins were not associated with age (p=.06), BMI (p=.45), education (p=.80), or gender (p=.12). Logins were associated with weight loss after controlling for race. Assessment completion (75%) did not vary by any baseline demographics (p’s>.22). Overall weight losses were -3.95kg +4.94 (-2.85 + 4.56 ITT BOCF). White participants lost more weight than black participants -5.56kg ±5.48 vs. -2.80kg ±4.17; p<.01; respectively (-3.91±5.25 vs. -.2.02±3.76, p<.01; ITT BOCF).

CONCLUSION(S): Lose Now NC successfully recruited a diverse population and was effective at producing weight loss approaching clinically significant levels.
O.120  Images of a healthy worksite: results of a worksite environmental intervention for weight gain prevention
Fernandez ID, Chin NP, Devine CM, Dozier AM, McIntosh S, Martina C, Yang H, Thevent-Morrison K

PURPOSE: To test the effect of a comprehensive worksite environmental intervention with employee participation in intervention design addressing food and physical activity on employee body mass index (BMI).

METHOD: Group-randomized trial. Twelve worksites in Northeastern USA were randomized within pairs into a 2-year environmental intervention and control conditions. A total of 3799 adult, full-time employees with no exclusions on BMI category participated at baseline and post-intervention assessments. Demographic, eating, physical activity and sedentary behaviors, and working conditions were assessed. The outcome measures were change in average BMI and in the proportion of overweight/obesity (BMI ≥ 25). Within-group differences in intervention and control worksites and between-group changes by the difference of difference method (DID) were examined using mixed models.

RESULT(S): The sample was mostly white, middle aged, male, married, highly educated, and earning more than $60,000 a year. The within-group mean BMI decreased at intervention sites (-0.54 kg/m², p-value 0.02) and at control sites (-0.12 kg/m², p-value 0.73) resulting in a DID in the expected direction (-0.42 kg/m², p-value 0.33). The proportion of overweight/obesity decreased in intervention worksites (3.7%, p-value 0.07) and increased in control worksites (4.9%, p-value 0.10) resulting in a DID of -8.6% (p-value 0.02).

CONCLUSION(S): We observed a small change in the average employee BMI and a movement of the population BMI distribution to the left that translated into improvements in the proportion of overweight and obese employees. These observations lend support to the population approach that might eventually reduce the incidence and prevalence of overweight and obesity in the community.

O.121  Does employee health literacy status influence enrollment, retention, and success in a worksite weight loss program?
Zoellner JM, You W, Almeida FA, Allen K, Harden SM, Estabrooks PA

PURPOSE: Low health literacy (HL) impacts health status by reducing information access and skill building opportunities and could result in lower enrollment and retention rates within intervention studies. We examined if employee HL influenced enrollment, retention, and success in a multi-site, worksite weight loss program.

METHOD: Twenty-eight worksites were randomly assigned to receive one of two weight-loss interventions with a 6-month follow-up. Prior to the announcement of a weight loss program, an employee survey was administered that included self-reported anthropometrics, demographics, and a 3-item validated HL perception measure. Weight loss (objectively assessed) as well as physical activity and dietary behaviors (self-reported) were
assessed at baseline and follow-up for program participants. The impact of health literacy on the effectiveness of program outcomes was assessed through fixed effect parametric models that control for individual and worksite fixed effects.

RESULT(S): Of eligible employees, those who enrolled in the study had better HL status [n=1014, HL=13.54(1.68)] as compared to those who did not enroll [n=3976, HL=13.04(2.17)] (p<0.001). Among those enrolled, HL status was not related to retention [retained; n=845, HL=13.50 (1.91) vs lost to follow-up; n=234, HL=13.32(1.96)]. Health literacy level did not predict weight (beta=0.22, s.e.=0.60) or dietary behavior (beta=-0.03, s.e.=0.02) changes across treatment conditions, but was predictive of physical activity changes between treatment conditions (beta=-3.60; s.e.=1.49; p<.05).

CONCLUSION(S): Health literacy status has little impact on participant retention or success; however, designing marketing and recruitment materials that address HL may be necessary to improve enrollment in worksite weight loss programs.

O.122 Does social capital and social cohesion enhance retention in a worksite weight loss program?  
Hill JL, Harden SM, Almeida FA, Estabrooks PA

PURPOSE: Purpose: Worksite cohesion and social capital have been related to a number of health outcomes, but have had limited examination within the context of worksite weight loss programs. Using Carpiano’s model of social influences on health we hypothesized that worksite cohesion can be operationalized as socially or task (e.g., employees united in the goal of healthy eating and physical activity) related and that worksite cohesion may influence health outcomes through employees’ enhanced perception of social capital reflected in supportive resources. Further, employees with higher perceptions of the social environment will be more likely maintain participation in worksite programs.

METHOD: Methods. Participants (n=1,805; age=46.6±11; 75% women; 76% white) were enrolled in a worksite weight loss trial. At baseline participants completed measures for task cohesion (α .87), social cohesion (α .94) and social capital (i.e. resources for social support, α .81; policy support, α .62; and co-worker support, α .74). Participants were considered retained if they completed the 6-month program weigh-in.

RESULT(S): Results. Task cohesion (p<.01) and social cohesion (p<.01) were significantly related to general resources for social support (R2=.30, p<.01), policy support (R2=.12, p<.01), and co-worker support (R2=.08, p<.01). Multiple logistic regression indicated that only social cohesion was significantly related to retention (OR=1.28, CI 1.14-1.7). Therefore, those reporting higher social cohesion had increased odds for program retention.

CONCLUSION(S): Conclusions. We did not support Carpiano’s hypothesis that social cohesion influences employee behavior through social capital, but did show that social cohesion may influence retention in worksite-based programs.
O.123 Losing weight on reality TV: a content analysis of weight loss behaviors and practices portrayed on The Biggest Loser
Klos LA, Greenleaf C, Paly N, Kessler MM, Shoemaker CG, Suchla EA

PURPOSE: A number of “reality” television programs, such as The Biggest Loser, chronicle the weight loss experience of obese individuals in a competitive context. These shows may cultivate a view of reality that misrepresents the behaviors needed to achieve successful weight loss if a discrepancy exists between the portrayal of weight loss behaviors by contestants and the scientific evidence in weight management.

METHOD: A content analysis of four seasons (n=67 episodes) of The Biggest Loser was conducted to determine the amount of time that diet/nutrition (D/N), physical activity (PA), or other weight management strategies were presented. Coding rules were established to ensure consistency between coders, and inter-coder reliability was high.

RESULT(S): Contestants’ initial BMI was 46.9 ± 7.3 kg/m2 and finale BMI was 29.9 ± 5.6 kg/m2. Preliminary analyses revealed that the average episode length was 83.8 minutes. About 3.5 minutes (4.2% of the episode) portrayed D/N-related content (e.g., counting calories), 27.7 minutes (33.0%) portrayed PA (e.g., running on treadmill), and 0.04 minutes portrayed other weight management strategies.

CONCLUSION(S): Recent seasons of The Biggest Loser portray that dramatic weight losses can be achieved by obese adults through physical activity and exercise, with little emphasis on modifying diet and eating behavior. While physical activity can impart substantial metabolic health benefits for obese individuals, it is difficult to create an energy deficit through physical activity sufficient to induce significant weight loss in the real world. Future studies should examine the weight loss attitudes and behaviors of obese individuals after exposure to reality weight loss shows.
**Energy-dense foods, drinks and food choices**

**O.124**  
Intake of energy-dense foods among Dutch children aged 7-12: when, where, and what do they snack?  
Gevers DWM, Kremers SPJ, De Vries NK, Van Assema P

PURPOSE: In order to determine priorities for dietary health promotion interventions, it is necessary to assess the actual intake of energy-dense foods. The aim of this study was to disentangle the consumption of those foods by examining when, where, which types, and how many energy-dense foods are consumed by Dutch children aged 7-12.

METHOD: Data from the 2007-2010 Dutch National Food Consumption Survey (DNFCS) were used. Trained dietitians administered a 24-hour recall on two days. Data collection was evenly distributed over the seasons and days of the week. In addition to the interviews, written questionnaires were administered to assess demographic variables including length and weight. In total, 860 children aged 7-12 were interviewed at home twice, in the presence of their parent or caregiver.

RESULT(S): Preliminary results indicate that most energy-dense foods were consumed during the afternoon (between lunch and dinner). This was followed by consumption during the evening (after dinner), and consumption during the morning (between breakfast and lunch). Children consumed energy-dense foods most often at home, followed by consumption at school, and consumption at a friend’s home. The most often consumed energy-dense foods were cookies, and subsequently candy and potato chips. On average, children consumed 2.94 (SD=1.96) energy-dense foods per day.

CONCLUSION(S): The outcomes provide valuable information to health promoters, to address the consumption of energy-dense foods, specifying subgroups of children, types of energy-dense foods and risk moments for the consumption of those foods.

**O.125**  
Prediction of parental education on adolescents’ soft drink intake, and mediation effects of availability and accessibility at home.  
The HEIA cohort study  

PURPOSE: This study aimed to investigate whether parental education predict adolescents’ consumption of soft drinks between the ages of 11 and 13 years, and whether availability and accessibility in the home environment mediated this effect.

METHOD: A total of 866 adolescents from the HEalth In Adolescents (HEIA) cohort study were included in the analyses. Data was collected from adolescents and their mothers and fathers at the age of 11 and 13 years. Mediation analyses were conducted by linear regression. Mediation effects with 95% confidence intervals were obtained from
RESULT(S): Parental education at the age of 11 years predicted adolescents’ intake of soft drinks at the age of 13 years, before and after adjusting for possible mediating effects of availability and accessibility. Adolescents’ perceived accessibility of soft drinks measured by adolescents and by mothers at the age of 11 years, mediated the relationship by explaining 39% of the total effect.

CONCLUSION(S): Interventions aimed at families with low parental education should target the perceived accessibility of soft drinks in the home, in order to diminish social differences in adolescents’ soft drink consumption.

O.126 Dietary fatty acid intake, its food sources and determinants in European adolescents. The HELENA study

Vyncke K, Libuda L, Moreno L, Vanaelst B, Michels N, Huybrechts I, De Henauw S

PURPOSE: Dietary fatty acids (FA) play a role in several (patho)physiological processes at any age, and different FA have different effects on lipid status and health outcome. This study aims to describe the FA intake and its main food sources in a population of healthy European adolescents and to assess the variation in intake as a function of non-dietary factors.

METHOD: FA intake was assessed with 24h-recall interviews in 1804 adolescents aged 12.5-17.5. Usual intakes were calculated using the Multiple Source Method. Multilevel analyses, adjusting for study centre, were used to investigate the influence of non-dietary factors.

RESULT(S): The mean total fat intake was 33.3% of total energy intake (%E) (SD 1.2). The mean saturated FA (SFA) intake was 13.8 %E (SD 1.2), with 99.8% of the population exceeding the recommendations. SFA were mainly delivered by meat and cake/pies/biscuits. In most adolescents, the poly-unsaturated FA (PUFA) intake was too low, an inadequate intake of long chain omega-3PUFA was observed in 90.5% of the adolescents. The main determinants of FA intake were age and gender, as well as physical activity in the male subgroup. In this group higher physical activity was associated with lower intake of total fat, SFA and mono-unsaturated FA. No contributions of body composition, socioeconomic status or sexual maturation to the variance in FA intake were observed.

CONCLUSION(S): The most important public health concerns regarding FA intake in this adolescent population were the low intake of omega-3 fatty acids and the high intake of SFA, mainly seen in the younger-aged boys.
O.127 Decreased intake of sweetened soft drinks in the Capital Region of Denmark but increased social inequality in the behavior
Robinson K, Glümer C

PURPOSE: Health behaviors are unequally distributed in the population and partly determined by socioeconomic factors. We investigated the change in intake of sweetened soft drinks – a known risk factor for obesity and diabetes - from 2007 to 2010, and how these changes were distributed across different socioeconomic groups.

METHOD: Data from two cross-sectional questionnaire health surveys (“How are you?”) and central registers was used. The study population included citizens aged 25-79 years in 2007 (N=69,800, response rate 52.3%) and 2010 (N=77,517, response rate 54.8%) from the Capital Region of Denmark. Inequality was analyzed using logistic regression models adjusted for sex and age with education as socioeconomic indicator.

RESULT(S): The percentage of people drinking sweetened soft drinks more than five times per week decreased significantly from 13.2% in 2007 to 8.5% in 2010. However, for both years, a significant association was found between education level and intake of sweetened soft drinks, with fewer drinking sweetened soft drinks among those with longer educations compared to those with less education. Also, the difference between those with a master degree and those with no education increased significantly (p<0.0001) from 2007 (OR=3.2; CI 2.7-3.8) to 2010 (OR=4.7; CI 3.9-5.7).

CONCLUSION(S): The percentage of people frequently drinking sweetened soft drinks decreased in the Capital Region of Denmark. However, this positive change was unequally distributed across social groups with increased inequality in this behavior as a result. This may in turn lead to a rise in the unequal distribution of chronic diseases such as diabetes in the future.

O.128 Energy drink intake among young Australian adults: associations with alcohol and illicit drug use
Allen K, O’Sullivan T, Oddy W, Trapp G

PURPOSE: To determine the prevalence of energy-drink consumption and its associations with socio-demographic characteristics, alcohol and illicit drug use in a population-based sample of young adults participating in the Western Australian Pregnancy (Raine) Cohort Study.

METHOD: At the 20 year follow-up, we used self-administered questionnaires to assess energy-drink consumption patterns, alcohol intake, smoking and illicit drug use. Data was also collected on socio-demographics, physical activity, BMI and dietary intake. Our sample included 1234 participants (47% male, age 18-22 years). We considered energy-drink consumption as a categorical (users vs. non-users) and as a continuous variable (millilitres per day).
RESULT(S): Overall, 47% of participants consumed energy drinks at least once per month. Consumption ranged from 0 to 1000 millilitres per day. Multivariate logistic regression analyses revealed that energy-drink users were more likely to be male, have a less educated mother, be employed, smoke, have heavier alcohol consumption, and use illicit drugs (all p<0.05). Multivariate linear regression analyses revealed that energy-drink consumption was positively related to alcohol consumption, engagement in illicit drug use, not completing high school, being a smoker, being male, and engaging in regular physical activity (all p<0.05). No significant associations were observed with BMI or dietary intake.

CONCLUSION(S): Energy-drinks are becoming a popular beverage choice among young adults. Energy-drink users tend to consume more alcohol and other drugs relative to non-users of energy-drinks. More research is needed regarding the health risks associated with energy-drink use in young adults, including their possible role in the development of substance abuse problems.

O.129 Importance of cooking skills for balanced food choices
Hartmann C, Dohle S, Siegrist M

PURPOSE: Today’s cooking practice and its relationship to diet quality and to people’s health are not well studied. A fundamental issue and core problem in the study of cooking skills is the lack of a reliable, universally applicable cooking skill measurement.

METHOD: We developed a cooking skill scale to measure cooking skills in a European adult population, and examined the relationship between cooking skills and the frequency of consumption of various food groups. Moreover, we determined which sociodemographic and psychological variables predict cooking skills. The data used in the present study are based on the first (2010) and second (2011) surveys of a yearly paper-and-pencil questionnaire (Swiss Food Panel). Data from 4436 participants (47.2% males) with a mean age of 55.5 years (SD=14.6, in the range of 21–99) were available for analysis. The cooking skills scale was validated using a test-retest analysis.

RESULT(S): Our self-developed cooking skills scale is a reliable and consistent instrument. Cooking enjoyment was the most important predictor for cooking skills, especially for men. Women had higher cooking skills in all age groups. Cooking skills correlated positively with weekly fruit and vegetable consumption, but negatively with weekly consumption of convenience food, sugar-sweetened beverages, sweets and savouries.

CONCLUSION(S): Cooking skills may help people to meet nutrition guidelines in their daily nutrition supply. They allow people to make healthier food choices. It is, therefore, important to teach children and teenagers how to cook and to encourage them to develop their cooking skills.
O.130  Does bitter taste sensitivity affect food preferences, food intake or cancer risk? Analysis from the UK Women’s Cohort Study  
Cade JE, VanDusen SR, Cockroft JE, Greenwood DC

PURPOSE: Bitter taste sensitivity has a genetic basis and may affect consumption of some beneficial vegetables. Bitter taste sensitivity, food preferences, dietary patterns, and cancer incidence were investigated in the UK Women’s Cohort Study (UKWCS).

METHOD: Women (n=5500) from the UKWCS completed a questionnaire on food attitudes and preferences. Respondents were classified by phenotype as “nontasters”, “tasters”, or “supertasters” based on phenylthiocarbamide-impregnated filter paper tests. Of these women, 750 were contacted again after 1 year and asked to provide a buccal DNA sample for genotyping. Descriptive statistics, food likes and dislikes, bitter food and nutrient intakes were compared between taster status and genetic diplotype groups using regression analysis. Differences between taster status, diplotype and all-cause malignant cancer incidence was assessed using survival analysis.

RESULT(S): Supertasters disliked more foods than nontasters (2.6 more foods disliked, 95% CI 0.5, 4.7). The majority of foods and nutrients were not significantly different between either the diplotype or taster groups. Supertasters consumed significantly less cress-type vegetables than nontasters, although total amount consumed was low. Tasters had significantly lower intakes of vitamin B1 than nontasters. Supertasters had higher intakes of carbohydrate and sugars than nontasters. Cancer incidence from all-causes did not differ between phenotypes although there was not enough power to detect small associations.

CONCLUSION(S): Bitter taste sensitivity affects food preferences. However, bitter taste phenotype or genotype was not associated with differences in most bitter food consumption, nutrient intakes or risk of cancer from all causes.
O.131 The neighborhood environment, physical activity, and screen time among young children and their parents
Carson V, Rosu A, Janssen I

PURPOSE: To examine the independent influence of several features of the built environment on physical activity and screen time among young children (≤5 years old) and their parents.

METHOD: The study is based on 511 child-parent dyads from Kingston, Canada. Physical activity and screen time for both parents and children were assessed through a parent questionnaire. Several built environment features were measured at the home (distance to closest park, yard space) and in the neighborhoods (aesthetics, outdoor play/activity space, recreation facilities, road speed, walkability) using Geographic Information Systems. Multilevel linear regression analyses were used to examine the relationships, after adjusting for several socio-demographic factors.

RESULT(S): While socio-demographic variables, including age and family socio-economic status for children and sex for parents, predicted physical activity, no independent associations were observed with features of the built environment. Socio-demographic variables, including age and family socio-economic status for children and neighborhood socio-economic status for both children and parents, also predicted screen time. However, no beneficial associations were observed between features of the built environment and child or parent screen time.

CONCLUSION(S): The findings suggest that socio-demographic factors may be more important targets than features of the built environment for future interventions aiming to promote a healthy active lifestyle in young children and their parents. However, given this was one of the first studies to examine these associations in young child-parent dyads, future research is needed to better understand the role of the built environment on their behaviors.

O.132 Children’s screen use and the neighborhood environment

PURPOSE: To examine the relationships between children’s screen use and objective built environment features and whether these relationships vary according to: 1) gender; 2) age; and 3) size of the neighborhood.

METHOD: Cross-sectional study of 2997 children aged 5-17 years, who participated in the Western Australian Health and Wellbeing CATI Survey (2003-2009). Hours/week watching television, videos, or using the computer was obtained via parent- (5-15years) and self-
report (16-17 years). Objective built environment measures included land use types (m2), connectivity, residential density, traffic exposure, greenness, crime, public open space (type, access, quantity and quality) and a destination index (count of different types of destinations). The built environment was examined at two neighborhood service areas and stratified by child gender and age group (Boys: 5-14, 15-17 years; Girls: 5-11, 12-17 years). Linear regression modelling was used.

RESULT(S): At the 400m service area, associations between screen use and the built environment were observed for younger boys only. Neighborhoods with less land allocated to sporting infrastructure, entertainment, recreation and culture, and greater road traffic exposure were associated with more screen use (p<0.05). At the 1600m service area, neighborhoods with more land allocated to sporting infrastructure (younger girls only) and a greater number of types of destinations present (older girls only) were associated with less screen time (all p<0.05).

CONCLUSION(S): Associations between the built environment and screen use varied by child age, gender and by the size of the neighborhood service area examined. Neighborhoods that provide little opportunity for children to be active may encourage children’s sedentary behavior through increased screen use.

O.133 My space: exploring the influence of space on children’s sedentary behaviour and activity at home
Maitland C, Stratton G, Braham R, Foster S, Rosenberg M

PURPOSE: The private home is an important component of the built environment that has received little attention in the sedentary behaviour and physical activity literature. The purpose of this study was to explore how family home space influences the sedentary behaviour and activity of pre-adolescent children at home.

METHOD: Home based interviews were conducted with 28 families with children aged 9-13 years (n=74), living in Perth, Australia. Families were stratified by socio-economic status and selected to provide variation in dwelling type and size. A tour method was employed whereby families guided the researcher through their home, thus enabling discussion while present in the space. Audio recordings were transcribed verbatim and thematically analysed.

RESULT(S): Five key themes relating to home space emerged: 1) overall size, layout and utility, 2) prioritisation of space for specific purposes, 3) allocation of adult, child and family space, 4) perceived availability of outdoor space, and 5) adapting to changes in the family circumstances. Themes highlighted that the family home was a dynamic environment where the use of home space was prioritised, controlled and adapted, mostly by parents.

CONCLUSION(S): Family home space may be important in influencing the sedentary behaviour and activity of pre-adolescent children at home. Yet, home space is somewhat changeable and able to be shaped by the family residing within it, presenting both
opportunities and challenges for interventions. Additional quantitative research is required to determine relationships between elements of the home space and children’s sedentary behaviour and activity at home.

**O.134 Can neighbourhood characteristics contribute to less TV watching? The impact of the social and built environments on screen-based entertainment across the life-course**

Foster S, Pereira G, Villanueva K, Nathan A, Christian HE, Bull F

**PURPOSE:** Purpose: Neighbourhoods that encourage walking and social interaction may limit sedentary behaviours. This study examined the social and built environment correlates of screen-based entertainment, and explored whether associations differed by life-stage and gender.

**METHOD:** Methods: Cross-sectional study of a representative sample of adults in Perth (n=12,270) who completed the Western Australian Health and Wellbeing Survey (2003-2009). Items included hours/week spent watching television, videos or using the computer (excluding work), and group participation. Objective environmental measures were generated for each participant’s 1600m neighbourhood. Linear regression analyses were stratified by gender and life-stage (18-24, 25-64 and 65+ years) with adjustment for sociodemographics.

**RESULT(S):** Results: Group participation was the most consistent correlate of less screen-based entertainment and was significant for all groups except younger men (p<0.05). More greenness and community infrastructure (e.g., café, community hall) were negatively associated with screen-based entertainment for working age and older women (all p<0.05), but had little impact on younger women. Greenness was also associated with less screen-based entertainment (p=0.015) in older men only.

**CONCLUSION(S):** Conclusions: Community initiatives that encourage social participation are likely to reduce screen-based behaviours, regardless of life-stage and gender. In contrast, the built environment had less consistent associations with screen-based entertainment; however a supportive built environment with community infrastructure is necessary to create opportunities for group participation. This is particularly relevant for older adults, who typically spend more time in the local neighbourhood and are more likely to be influenced by the opportunities it affords. Future research should further unpack the social environmental influences on sedentary behaviour.
Physical activity in youth

O.135 Children’s in-school and out-of-school hours physical activity patterns
Ridgers ND, Timperio A, Salmon J

PURPOSE: Identifying whether children who are active in one part of the day compensate by decreasing their activity levels in other parts of the day is critical for informing physical activity interventions. The aim of this study was to examine children’s in-school and out-of-school physical activity patterns.

METHOD: Baseline data drawn from two longitudinal cohort studies were analysed. Children (n=2303; 47% boys) aged 5-6 and 10-12 years wore a hip-mounted accelerometer for 8 consecutive days. Time spent in moderate- (MPA) and vigorous-intensity (VPA) physical activity during and outside-of-school hours was determined using age-adjusted cut-points. Kendal’s Tau-b correlation examined the association between tertiles of activity during these periods.

RESULT(S): There were low to moderate associations between activity tertiles ‘in-school’ versus outside-of-school hours (MPA r=0.1-0.38; VPA r=0.29-0.33, p<0.01). Approximately 90% of older children and 50% of younger children in the lowest ‘in-school’ activity tertile did not appear to increase their activity outside of school. However, none of the older children in the highest ‘in-school’ activity tertile remained in the highest tertile outside-of-school hours, suggesting a ‘compensation’ effect for MPA and VPA. In the younger cohort, 43% and 2% maintained their high MPA and VPA categories, respectively.

CONCLUSION(S): Unlike younger children, few older children compensated for low in-school activity levels by increasing their out-of-school activity, yet all older children compensated for high in-school activity after school hours. There is a need to better understand the issue of physical activity compensation, particularly for the development of effective interventions.

O.136 Practical lessons learned during the development of an implementation strategy for the school-based obesity prevention program DOiT, applying the Intervention Mapping protocol
van Nassau FF, Singh AS, van Mechelen MW, Brug J, Chin A Paw MJM

PURPOSE: In an RCT, the Dutch Obesity Intervention in Teenagers (DOiT) program showed promising health effects. To prepare for implementation throughout the Netherlands, this study aimed to develop an implementation strategy and materials that facilitate the implementation process of DOiT.
METHOD: We applied the Intervention Mapping protocol to gain insight into barriers and facilitators for implementation. First, we used the results of the previous process evaluation and nine semi-structured interviews with teachers and professionals. Next, we discussed the draft strategy and implementation materials in twelve interviews with different stakeholders. During an expert meeting, we discussed the final strategy. All interviews were recorded, transcribed, coded for common themes and analysed.

RESULT(S): Guided by the input of our stakeholders, the stepwise development of the implementation plan resulted in: (1) identification of teachers as main users; (2) specification of performance objectives to support teachers’ implementation; (3) identification of modifiable determinants of teachers’ implementation behaviour: knowledge, self-efficacy, skills, perceived advantage and support from colleagues and management; and (4) translation of the performance objectives into essential elements and practical strategies that were applied to the implementation materials. We developed the 7-step implementation strategy and supporting materials to facilitate the implementation process.

CONCLUSION(S): The stepwise development the DOiT implementation strategy can serve as an example for other evidence-based programs in preparation for wider implementation. By combining knowledge of previous evaluations, involving different stakeholders and applying a person-to-person approach the implementation plan supports continued implementation of DOiT. Practical issues that were overcome will be discussed.

O.137 Reducing physical inactivity at Dutch pre-vocational secondary schools with “VMBO in Beweging” (pre-vocational schools on the move)
Bernaards CM, Slinger J

PURPOSE: The goal of this project was to create sport and physical activity (PA) facilities for students who do not meet the PA guideline (i.e. inactive students) at 80 pre-vocational secondary schools and to reduce the prevalence of inactive students at these school with 10%.

METHOD: The intervention consisted of financial support for a sport and PA coordinator, an external coach, network meetings and a toolbox with intervention materials. Data on student level (e.g. PA levels) and school level (e.g. sport and PA facilities) were collected through questionnaires at pre- (2010) and post-assessment (2012). Changes at student and school level were analyzed using logistic multilevel analysis and the Mc Nemar Chi-square test.

RESULT(S): At the pre-assessment 26.446 students from 78 schools filled out the questionnaire; at post-assessment 17.891 students from 69 schools. The prevalence of inactive students decreased significantly from 58.4 to 45.6%. The number of schools with special sport and physical activity facilities for inactive students increased significantly from 13.2% to 69.0%. Furthermore, creating access to more different types of sports
accommodations (e.g., a gym, sports field, swimming pool) and realizing multiple positive changes with regard to sport and PA facilities, school policy regarding sport and PA, and collaborations with sport clubs and other schools, were both significantly associated with a larger reduction in the prevalence of inactive students.

CONCLUSION(S): The significant association between changes at the student and school level suggest that this project contributed to a reduction in the prevalence of inactive students.

O.138 KAPS: an intervention targeting mediators of children’s physical activity
Brown HL, Salmon J, Pearson N, Hume C

PURPOSE: Previous intervention studies which aim to promote children’s physical activity (PA) have shown limited effectiveness and this may be due to a poor understanding of mediating pathways through which interventions achieve behaviour change. This paper presents the findings of the Kids Physical Activity with Parental Support (KAPS) pilot intervention, which examined the effectiveness and feasibility of targeting potential mediators of children’s physical activity.

METHOD: KAPS is a pilot randomised controlled trial delivered over a 12 week period involving 59 families of 10-12 year old children. KAPS targeted six potential mediators of children’s PA: parental support; co-participation; accessibility and availability to equipment and facilities; self-efficacy and ‘fear of the unknown’. Baseline and post-intervention assessments included objectively measured child PA (accelerometry) and self- and parental proxy-reports of the potential mediators. Analyses examined the potential mediating pathways using the Preacher and Hayes macro using bootstrapped confidence intervals. A process evaluation was also conducted.

RESULT(S): No direct effects of the KAPS intervention on PA were found; however, parental support, self-efficacy and access to equipment at home were shown to be associated with increased moderate-intensity PA. The KAPS intervention had a positive effect on parental support; however, there was no mediated effect found. The process evaluation suggested that KAPS was a feasible intervention.

CONCLUSION(S): While the intervention had direct effects on parental support, there were no significant improvements in children’s PA or any mediating effects. Further research is needed to identify and develop interventions that target key mediators of children’s PA.
O.139  Using direct observation to investigate the association between parental feeding styles and overweight status in preschoolers
Hughes SO, Power TG, Johnson SL, Goodell LS, Andrea Jaramillo Duran J, Williams KA, Frankel LA

PURPOSE: Purpose: Parents influence children’s weight through interactions that shape the family eating environment. Most information on family eating has been obtained through parent report. Our aim was to use direct observation of parent-child interactions during meals to examine the influence of family eating on child weight.

METHOD: Method: African-American and Latino low-income parents of preschoolers participated in the study (n = 79). Audio/videotapes of home mealtime interactions were coded for parental responsiveness and demandingness to categorize parents into feeding styles (FS). Logistic regression and chi-square analyses were used to evaluate FS, ethnicity, and child weight.

RESULT(S): Results: Using an ordinal logistic model (chi-square = 12.95; p = .04), FS were significantly associated with child weight. Indulgent parents were 5.22 times more likely to have overweight/obese children compared to authoritative parents (p = 0.01). None of the remaining comparisons were significant. Significant ethnic differences were found as well (chi-square = 17.25; p = .001). All but one authoritarian parent was African-American; all but two indulgent parents were Latino (African-American: 12 authoritative, 11 authoritarian, 2 indulgent, 15 uninvolved; Latino: 18 authoritative, 1 authoritarian, 11 indulgent, 9 uninvolved).

CONCLUSION(S): Conclusions: FS may impact child eating through parental behaviors fostering excess child calorie intake. General parenting styles have been linked to child weight but processes or mechanisms through which these global dimensions shape child eating are unknown, especially among low-income diverse populations. Direct observation provides more accurate information regarding specific parent-child dyadic processes that may promote less optimal child eating behaviors and the development of obesity.

O.140  More than the sum of its parts – How the family affect individuals’ health behavior
Niermann C, Krapf F, Reiner M, Woll A

PURPOSE: The family environment is important to explaining individual health behavior. We developed the Family Health Climate (FHC) construct to describe the family environment concerning health and health behavior. The FHC-Scale measures the climate specifically for nutrition (FHC-NU) and physical activity (FHC-PA). This study investigates associations between FHC and individual health behaviors in families.
METHOD: Correlations between FHC-NU, FHC-PA, and health behavior were examined in 212 families (mother, father, adolescent). Nutrition was captured by a food frequency questionnaire, physical activity was screened. Further, it was investigated whether behavior-specific self-determination mediated the relationship between FHC and behavior. Relationships between the family members’ scores on these variables were tested in structural equation models.

RESULT(S): The more positive mothers, fathers, and adolescents perceive the FHC-NU, the more they reported to consume fruits, vegetables, salad, and whole-grain bread (r=.16 to .39; p<.01). For all family members the perception of FHC-PA significantly correlated with self-reported physical activity (r=.20 to .27; p<.01). Parents’ perception of FHC, modeled as a latent variable, was shown to affect the behavior of their child. This effect was mediated by adolescents’ self-determination. Both models fit the data well: chi²(df)=53.56(37), p=.04; CFI=.97; RMSEA(95%CI)=.05(.01/.07), p=.57 for nutrition, chi²(df)=34.41(28), p=.19; CFI=.99; RMSEA(95%CI)=.03(CI .00/.07), p=.77 for physical activity.

CONCLUSION(S): A positive FHC was shown to be significantly relevant for healthy behavior. By using different informants’ ratings, it was impressively demonstrated that the family climate perception of parents can explain the health behavior motivation of their children. Thus, the shared FHC is an important determinant of family members’ individual health behavior.

O.141 A positive home food environment during adolescence is associated with favorable food-related attitudes and behaviors in young adulthood
Arcan C, Neumark-Sztainer D, Hannan PJ, Larson N, Story M

PURPOSE: To examine the association between home food environment during adolescence and eating-related attitudes and behaviors in young adulthood.

METHOD: Middle and high school students in Minneapolis/St. Paul, MN, US (mean age = 15.0 years) completed surveys in 1998-1999 and 10 years later in 2008-2009 (mean age = 25.3 years) as part of Project EAT (Eating and Activity in Teens and Young Adults). The current study included 2287 participants (45% male). Principal component factor analysis was conducted to describe the home food environment during adolescence and separately during young adulthood. Multivariate analysis, stratified by gender, for each outcome variable was conducted by simultaneously including all predictors in the model along with gender, race, and socioeconomic status.

RESULT(S): For adolescents two factors describing the home-food environment were identified: positive environment (healthy foods, family meals, parent caring and encouragement to eat healthy, family meals enjoyment) and unhealthy food availability. For young adults, six factors were identified: healthy and unhealthy home food availability, meal enjoyment, eating patterns, food-related attitudes (caring and liking the taste of healthy foods), and social eating. For males and females, a positive food environment during
adolescence was associated with having healthy foods (males p<.0001, females p<.0001), meal enjoyment (males p=0.021, females p=0.012), positive food-related attitudes (males p=0.021, females p<.0001), and more social eating (males p=0.0002, females p=0.0079) in young adulthood.

CONCLUSION(S): The home environment during adolescence can play a positive role on the development of healthy food-related attitudes and behaviors in young adulthood.

O.142 Family and infant characteristics associated with timing of core and non-core food introduction

PURPOSE: Little attention has been paid to factors related to the types of foods offered during complementary feeding, despite potential health implications. This study aimed to identify family and infant characteristics associated with timing of introduction of two food types: core foods (nutrient-dense) and non-core foods (nutrient-poor) in a population-based sample of mothers and infants.

METHOD: Participants were 1861 mothers and infants from the Gemini twin birth cohort (one child per family). Family and infant characteristics were assessed when the infants were around 8 months old. Timing of introducing core and non-core foods was assessed at 8 and 15 months and categorized as earlier (core: 1–4 months; non-core: 3–8 months), average (core: 5 months; non-core: 9–10 months), and later introduction (core: 6–12 months; non-core: 11–18 months), based on the sample distribution. Ordinal logistic regression was used to examine predictors of core and non-core food introduction, with bootstrapping to test for differences between the core and non-core models.

RESULT(S): Younger maternal age, lower education level, and higher maternal BMI were associated with earlier core and non-core food introduction. Not breastfeeding for at least 3 months and higher birth weight were specifically associated with earlier introduction of core foods. Having older children was specifically associated with earlier introduction of non-core foods.

CONCLUSION(S): There are similarities and differences in the characteristics associated with earlier introduction of core and non-core foods. Successful interventions may require a combination of approaches to target both food types.
Nutrition interventions in adults

O.143 Implementing the ‘water- and fruit campaign’: a process evaluation of the integrated community approach Youth At a Healthy Weight (JOGG) in the Netherlands
van der Kleij MJJ, Crone MR, Reis R, Kloek GC, Paulussen TGWM

PURPOSE: Preventative programs often deviate from the effective implementation as intended. With more complex programs, such as JOGG, even greater implementation challenges arise. There is limited knowledge of factors influencing the implementation of complex programs, making it difficult to formulate sound implementation strategies. To bridge this gap, we studied the implementation of the JOGG water- and fruit campaign in a disadvantaged neighborhood. This JOGG campaign aimed to promote healthy eating habits through multiple settings, including schools, Centre for Youth & Family (CJG), library, sport clubs, welfare organizations and local enterprises.

METHOD: For one year, we monitored the actual implementation of JOGG and the determinants influencing this process. To this end, we used a mixed-method design including semi-structured observations, interviews, questionnaires, focus groups, an activity monitoring system and professionals’ logs. All data was then analyzed using a framework approach based on the framework of Paulussen et al. (2007).

RESULT(S): Results show moderate levels of implementation fidelity, differing per setting. Data revealed that the implementation is influenced by implementation strategies, design of the approach (fit within setting), characteristics of professional(s) (personal goals & ownership), characteristics of the target population (language barriers) and the presence of an intervention advocate, level of support and decision-making within participating organizations.

CONCLUSION(S): Taking into account the important role of context variables, we advise to approach organizations with a tailored implementation strategy based on key determinants influencing implementation in this setting. In addition, we recommend involving professionals in the design and planning of the approach, hence using a mutual adaptation concept.

O.144 Changes in dietary intakes and in motivational profile in men and women in response to a 12-week nutritional intervention promoting the Mediterranean diet and based on the self-determination theory

PURPOSE: To determine gender differences in adherence to the Mediterranean diet and in self-determined motivation, in response to a 12-week nutritional intervention promoting the
Mediterranean diet.

METHOD: The intervention was based on the Self-Determination Theory and used a motivational interviewing approach. It included 3 group and 7 individual sessions. A Mediterranean score (Medscore) was calculated with a validated food frequency questionnaire. Motivation was evaluated with the Regulation of Eating Behaviors Scale. Sixty-four men (BMI: 30.8±4.4 kg/m2) and 59 premenopausal women (29.6±6.0 kg/m2) were included in the study.

RESULT(S): Medscore increased and body weight decreased (time effect, p<0.0001) in response to the nutritional intervention in men and women, but without significant gender by time interaction. The global score of self-determined motivation increased, with increases in intrinsic motivation and integrated regulation of motivation (time effect, p<0.0001), in men and women. When self-determined motivation was split into autonomous and controlled motivation, changes in autonomous motivation were positively associated with changes in the Medscore (r=0.36 ; p=0.008) and tended to be negatively associated with changes in body weight (r= -0.25 ; p=0.06) in men, while changes in controlled motivation were negatively associated with changes in waist circumference (r= -0.35 ; p=0.01) in women.

CONCLUSION(S): Results suggest that the nutritional intervention based on the Self-Determination Theory allowed positive changes in self-regulation motivation, which possibly contributed to improvements in dietary intakes and lowering of body weight more specifically in men. Gender differences in the pattern of associations between motivational variables and dietary changes warrant to be further investigated.

O.145 Short-term efficacy of a cognitive feedback and an environmental feedback version of a web-based computer-tailored nutrition intervention

Springvloet L, Oenema A, de Vries H, Lechner L

PURPOSE: This paper describes the one-month efficacy of two versions of a web-based computer-tailored intervention targeting fruit, vegetable, snack and fat intake. One version is tailored on individual cognitions and aims to improve self-regulation skills (traditional version). The other version additionally includes tailored feedback on the home environment and availability of healthy food products in supermarkets (environmental version).

METHOD: The interventions are evaluated in a RCT with two intervention groups and a generic information control group. Participants (N=1709, mean age: 48.63, 35.4% men) completed online questionnaires assessing fruit, vegetable, snack and fat intake at baseline and 1-month post-intervention. Linear regression analyses are conducted to analyze post-test differences between groups.

RESULT(S): Preliminary results from a subsample (N=424) of the total population indicate that the traditional version was successful in increasing fruit (beta=.130, p=.019) and
vegetable consumption (beta=.203, p<.001) as compared to the control group. Even though the group differences were in the right direction, the effect for snack intake was not significant (beta=-.089, p=.110). There were no significant differences on any outcome measures between the environmental version and control or between the two versions.

CONCLUSION(S): The preliminary results indicate that the traditional version is effective in modifying fruit and vegetable consumption. The non-significant effect on snack intake could be due to the small subsample in these analyses. The environmental version did not outperform the traditional version. Analyses on the full sample and stratified analyses among SES and risk groups will be conducted, which give more insight in the short-term efficacy.

O.146 Effectiveness of price reduction and behaviour change strategies for improving fruit, vegetable and beverage consumption: results from the Supermarket Healthy Eating for LiFe (SHEf) randomised controlled trial

Ball K, McNaughton SA, Ni Mhurchu C, Le H, Andrianopoulos N, Inglis V, Pollard C, Crawford DA

PURPOSE: To evaluate the effects of price reductions and skills-based behaviour change strategies on women’s purchase and consumption of fruits, vegetables, and high- and low-joule beverages.

METHOD: A randomised controlled trial was conducted in the supermarket setting over three months. Participants were recruited from low and high socioeconomic areas and randomly allocated to one of four intervention arms: skills-based behaviour change, delivered via mailed resource packs and an online forum; 20% price reduction on fresh, tinned and frozen fruits, vegetables, low-joule carbonated soft drinks and water; a combined behaviour change + price reduction intervention; or control (no intervention). Outcomes, assessed with supermarket sales data and self-report surveys, were changes from baseline in purchasing and consumption of vegetables (primary), fruit, high- and low-joule carbonated soft drinks and water (secondary).

RESULT(S): 643 women completed baseline surveys, had their supermarket transaction data collected retrospectively, and were randomised to one of the four intervention arms. After receiving the intervention, 620 participants completed post-intervention surveys (96% retention) and had transaction data collected for the intervention period. Preliminary analysis demonstrated a significant increase in vegetable purchasing for the price reduction relative to the control condition; and a trend towards increased vegetable purchasing for the combined price-reduction/behaviour change intervention. Full results for all outcomes will be released for the first time internationally at the ISBNPA meeting.

CONCLUSION(S): A price reduction and behavioural intervention was successful in recruiting and retaining women. Price reductions showed promising early results in terms of increased vegetable purchasing.
O.147  A multi-component intervention to improve diet and physical activity in community residences for adults with intellectual disabilities: effect on work routines

Bergström H

PURPOSE: To investigate the effectiveness of a multi-component intervention to improve diet and physical activity, targeting both caregivers and residents, in community residences for adults with intellectual disabilities.

METHOD: The study was conducted as a cluster randomised controlled trial. 30 community residences for people with mild or moderate intellectual disability were included, in total 130 participants. The intervention included three components: 1) Appointment of a health ambassador participating in network meetings, 2) study circle for caregivers and 3) health course for the residents. Work routines were assessed by a questionnaire to managers and/or caregivers including 26 items with four response options each. The questionnaire covered three domains, which were analysed separately and as a total score: 1) general health promoting work, 2) food and meals and 3) physical activity. Analysis was by linear regression adjusted for baseline values and related to intervention dose.

RESULT(S): The total score at baseline was significantly higher in the control group (p=0.03). A positive intervention effect was found for the total score (p=0.02) and for the domains physical activity (p=0.04) and general health promotion work (p=0.01). The high fidelity group improved their results more than the low fidelity group, but this difference was not significant.

CONCLUSION(S): A multi-component intervention to improve diet and physical activity, targeting both caregivers and residents, in community residences for people with intellectual disabilities, can be effective in improving work routines. Analysis of effects at individual level is on-going.

O.148  Sex differences in theory-based predictors of physical activity in a population-based sample of adults with a disability

Stapleton J, Martin Ginis KA

PURPOSE: Research indicates that men with physical disabilities are more physically active than women with physical disabilities. The primary purpose of this study was to examine sex-differences in theory-based predictors of physical activity (PA) among men and women with physical disabilities. The secondary purpose was to identify factors that predict theory-based constructs for each sex.

METHOD: Demographic data were collected and theory of planned behavior (TPB)
constructs (attitudes, subjective norms, perceived behavioral control [PBC], and intentions) were measured among men (n = 536) and women (n = 165) with physical disabilities. Analyses of variance (ANOVA) were conducted to identify demographic-related differences within TPB constructs for PA.

RESULT(S): Perceived behavioral control (PBC) (p < .05) and barrier self-efficacy (SE) (p < .05), which both represented the PBC construct, were significantly different between sexes. Linear regressions were then conducted to identify predictors of PBC and barrier SE. For PBC, the model was significant for women (R2 = .14, p < .001) and men (R2 = .17, p < .001). Social support significantly predicted PBC for both sexes, and health, pain and physical independence also significantly predicted PBC for men. For barrier SE, the model was significant for women (R2 = .06, p < .05) and men (R2 = .15, p < .001). The same predictors for each sex emerged except physical independence for men.

CONCLUSION(S): In order to advocate PA for women with disabilities, TPB constructs should be targeted through social support, whereas for men with disabilities, other variables should be used in addition to social support.

O.149 Results of a brief self-regulation based physical activity program for chronic fatigue patients
Marques M, De Gucht V, Leal I, Maes S

PURPOSE: This study aimed at analyzing the effectiveness of a brief self-regulation based physical activity program for patients suffering from unexplained chronic fatigue, the “Four steps to control your fatigue” program. This is the first self-regulation based physical activity intervention designed for chronic fatigue patients.

METHOD: A 12-week multicentre randomized controlled trial with equal randomisation to either the intervention condition (4-STEPS program) or the control condition was conducted. The 4-STEPS program combined motivational interviewing and self-regulation skills training. Patients were assessed at baseline (T1), post intervention (12 weeks-T2) and 1 year follow-up (T3) for fatigue severity (primary outcome), physical activity behavior (number of daily steps, leisure-time physical activity and personal goal progress), self-regulations skills and health-related quality of life. Repeated-measures ANOVAs and mediation analyses were conducted.

RESULT(S): Forty-four patients equally distributed to each condition completed baseline assessment. Significant group x time effects were found for fatigue severity, all physical activity related variables and health-related quality of life, both at T2 and T3. Further, personal goal progress and self-regulation skills at T2 mediated the treatment effect on the primary outcome at T3.

CONCLUSION(S): This brief physical activity self-regulation based intervention looks promising for the management of chronic fatigue. Brief interventions require less resources and can be easily incorporated in the usual health care provided.
O.150 Maintaining improvements in weight loss, physical activity and diet in breast cancer survivors via text messaging
Spark LC, Fjeldsoe B, Eakin EG, Reeves MM

PURPOSE: This study evaluated the impact of a six-month text message-delivered extended contact intervention on maintaining improvements in weight and related behaviors in breast cancer survivors.

METHOD: Following a randomized controlled trial of a six-month telephone-delivered weight loss intervention, intervention participants (n=30) received tailored text messages (mean of 8 per fortnight; range 3-15) targeting a range of evidence-based constructs and strategies. Usual care participants (n=32) received weight loss-related print materials at six months. Data were collected on objectively-measured weight, moderate-to-vigorous physical activity (MVPA; Actigraph GT3X+ accelerometers) and diet (total energy intake; 2x24-hour dietary recalls) at baseline, end of intervention (6 months) and end of extended contact intervention (12 months), with analysis via linear mixed models.

RESULT(S): Cancer registry-recruited participants had a mean age of 55 (SD 8.56) years and were on average 25.8 (SD 3.16) months post-diagnosis. Significant intervention effects (Intervention-Usual Care; mean [95% CI]) were observed for weight loss at end of intervention (-4.83 [-6.90, -2.76] kg, p<0.001) and extended contact intervention (-3.11 [-5.47, -0.75] kg, p=0.01), but not at either time point for MVPA (7.07 [-0.95, 15.09] minutes/day, p=0.08; -3.77 [-13.07, 5.53] minutes/day, p=0.42) or diet (128.12 [-544.92, 801.17] kJ/day, p=0.71; -280.27 [-1278.25, 717.71] kJ/day, p=0.58).

CONCLUSION(S): Meaningful weight change was still present following an extended contact intervention, suggesting text messaging may be a promising and novel modality to promote maintenance of weight loss. Further research is needed to determine the utility of text messaging to promote maintenance of behavioral changes.
Determinants of dietary behavior in children

O.151 Validation of a scale to measure parent emotion during feeding
Frankel LA, Hughes SO, Chen T-A, Orlet Fisher J

PURPOSE: Questionnaires developed to measure parent-child interactions that may contribute to childhood obesity need to be context specific. Although general emotions have been conceptualized as two separate constructs (positive emotions and negative emotions), a measure of parental emotions during the feeding experience is needed to provide a better assessment of feeding interactions that may influence the development of child eating behaviors. The aim of this study is to develop a measure of positive and negative emotions in the context of parent-child feeding interactions.

METHOD: An expert panel came up with 20 emotional descriptors of the two constructs of interest. Hispanic and black (n=296) parents with preschoolers in Head Start were asked to rank these emotional descriptors on a 5-point Likert scale in response to the following: “How often have you felt this way when FEEDING your child?” The 20 items were categorized as either positive or negative by a panel of 5 experts. Confirmatory Factor Analysis was used to confirm the model with Positive and Negative Emotions as two separate subscales with correlated paths.

RESULT(S): Analyses suggested a good fit with indices as follows: RMSEA = 0.07, CFI = 0.96, chi-square statistic $\chi^2 (169, n=296) = 413.86, p< .001$, TLI = 0.95, SRMR = 0.08.

CONCLUSION(S): Parenting has been posited to be domain specific. The Feeding Emotion Scale is a new measure of parent emotions during feeding to assess the constructs of positive and negative emotions during feeding. This context specific measure may provide a better measure of problematic parent-child feeding interactions.

O.152 Physical and social determinants of early child fruit and vegetable intake: a mediation analysis
Boles R, Johnson SL, Davies P, Gavin W, Burdell AC, Bellows L

PURPOSE: Preschool aged children eat less than the recommended daily servings of fruits and vegetables. Parental feeding practices and the home food environment have been linked to children’s fruit and vegetable preferences and intake. The Colorado LEAP study, an obesity prevention program in rural Colorado, investigated the mediating effects of parental feeding practices and home fruit and vegetable availability on child fruit and vegetable intake.

METHOD: Participants included families of preschool aged children (n = 143; 52% female; 36% minority). The Home Inventory Describing Eating and Activity, parent reported feeding practices (Child Feeding Questionnaire Plus-Urging and Offering New Foods), and Food Frequency Questionnaire were completed by parents and child height and weight were
measured. Linear regressions were conducted to test whether home food availability and parental feeding practices mediated each other for effects on child food intake.

RESULT(S): Home Vegetable Availability (p<.001) and Urging (p<.05) independently and positively predicted parent report of child vegetable intake, controlling for covariates. Sobel tests showed Home Vegetable Availability (p<.05) significantly partially mediated Urging when predicting child vegetable intake. Offering (p<.01), Urging (p<.05), and Home Fruit Availability (p<.005) independently predicted child fruit intake; only Urging (p<.05) predicted child fruit intake when controlling for covariates.

CONCLUSION(S): Home availability of fruits and vegetables and feeding practices related to new foods facilitated increased child intake of fruits and vegetables. Interventions designed to increase consumption of fruits and vegetables may benefit from targeting the home food environment and parental feeding behaviors.

**O.153 Presence of cartoon characters does not increase child preference for healthier food options**
Graham DJ

PURPOSE: To determine whether adding cartoon characters to food packages increases child preference for healthier food options.

METHOD: 64 6-9 year-old children from Minnesota, U.S. participated in a computer game designed to assess food preferences. Children saw a series of side-by-side product pairs (one was a healthier alternative of the other; side of the screen and presence of a cartoon character were randomized) and pressed a button on the left-hand side of a video-game controller when they would prefer to eat the product on the left-hand side of the screen and pressed the right-hand button when they preferred the product on the right. ANOVA was conducted to identify significant differences in product selection.

RESULT(S): There was a significant overall effect for product healthfulness (p<.001), with children preferring less-healthy products over healthier alternatives. Presence of a cartoon character on the healthier food did not diminish child preference for the less healthy food option (i.e., when both foods appeared without a character, the less healthy option was selected approximately 2 out of 3 times; this proportion remained virtually unchanged when the healthier food in the pair had a character on its package and the less healthy food did not). In addition, presence of a cartoon character on the less-healthy food did not make that product even more attractive to children.

CONCLUSION(S): Simply adding familiar images of licensed cartoon characters to food packages may not be a sufficiently strong manipulation to impact child food preferences.
O.154  Children’s stress is associated with diet, physical activity and sleep - The ChiBS survey
Michels N, Sioen I, Braet C, Boone L, Vanaelst B, Huybrechts I, De Henauw S

PURPOSE: Psychosocial stress has been suggested to change food selection into unhealthy choices, to decrease the motivation for physical activity and to increase sedentary behaviour. Consequently, psychosocial stress could trigger overweight. This study will test the stress-diet and the stress-activity association in children as the foundations of behaviour start in childhood.

METHOD: The ChiBS study (Children’s Body composition and Stress) investigated the two-year follow-up relationship of chronic psychosocial stress in +/-500 Belgian children (5-12y) with physical activity/sedentary behaviour, diet, sleep and body fat. Stress was measured by salivary cortisol and by questionnaires on stressful events, emotions and problem behaviour. Data was collected on children’s emotional eating behaviour, dietary pattern (frequency of fat foods, sweet foods, snacks, fruit and vegetables), sedentary and physical behaviour (questionnaire and accelerometry).

RESULT(S): All three concepts of stress were positively associated with emotional eating. Problem behaviour was positively associated with sweet and fatty foods consumption and stressful events were negatively associated with fruit and vegetables consumption. Also cortisol patterns were related to an unhealthier dietary pattern (more sweet, fat and snack items). Dietary pattern could even moderate the stress-obesity relation. Problem behaviour was related to more and happiness to less sedentary behaviour. Peer problems were also linked to lower physical activity.

CONCLUSION(S): Stressed children showed more psychological driven eating behaviour, an unhealthy dietary pattern and more sedentary behaviour. Consequently, this study advances insight in diet and activity motivations by stressing the role of psychosocial factors and creating new prevention perspectives.

O.155  Kindergarten teachers’ perceptions of children’s energy balance related behaviours. The ToyBox-study

PURPOSE: This study provides evidence on the personal and environmental determinants of energy balance-related behaviours in a large sample of European pre-school teachers.

METHOD: The ToyBox-study is a cluster-randomized intervention with a pre- and post-test design targeting pre-school children, their parents and their teachers. 744 teachers from six European-countries provided information by means of a self-administered questionnaire at the pre-intervention phase.
RESULT(S): In terms of knowledge, 18% of the teachers responded correctly on the daily physical activity recommendations, 51% on the recommended time of TV viewing and 42% on the recommended intake of water for 4-6 years old. In terms of attitude, 42% indicated that they would try to restrain themselves from drinking soft drinks or pre-packed juices and eating sweet or salty as a snack (42%) in the presence of children. >80% of the teachers habitually planned activities in which children do not have to sit for >30 minutes and a similar proportion encouraged parents to dress their children according to the weather conditions. In terms of environmental factors, 13% strongly agreed with the statement of finding it easy to rearrange the classroom so that children can fulfil standing up assignments, whereas 22% indicated that they find it difficult to decrease children’s total sitting time under tight schedule.

CONCLUSION(S): The findings of this study highlight the need of improving teachers’ knowledge on lifestyle recommendations of pre-school children, additionally to the influence of the environment and time-pressure on their attitudes and habits at class-room and playground level.

O.156 Mediation of parental education level on fruit and vegetable intake among schoolchildren in ten European countries

PURPOSE: Children with lower parental education have been shown to have lower fruit and vegetable (FV) intake, but little is known about the factors mediating this association. The aim of the present study was to examine which factors act as mediators between parental educational level and child’s FV intake in ten European countries.

METHOD: In total, 8159 11-year-old children (response rate 72%) and their parents, in ten European countries, participated in the Pro Greens project in 2009. Children completed a validated Food Frequency Questionnaire about their daily FV intake. They also filled in a validated questionnaire about availability of FV at home, parental facilitation of FV intake, knowledge of the recommendations about FV intake, self-efficacy to eat FV, and liking for FV. Parental educational level was determined from parents questionnaire. Associations were examined with regression and mediation analyses.

RESULT(S): Parental educational level differences were found in child’s daily fruit intake in five of the ten countries. This association was mediated by self-efficacy, knowledge, availability, and facilitation. The associations between parents education and child’s daily vegetable intake, found in seven countries, was mediated by availability, knowledge, self-efficacy, and liking.

CONCLUSION(S): Parental educational level differences in child’s daily FV intake were found in most countries, and the pattern of mediation varied between the participating countries. Future intervention studies, which aim to decrease the educational level differences in FV intake, should take into account the country specific features in the relevant determinants of FV intake.
Adherence to a vitamin D supplement intervention in urban schoolchildren
Au LE, Harris SS, Dwyer JT, Jacques PF, Sacheck JM

PURPOSE: To examine children’s and their parents’ beliefs about health effects of vitamin D and to determine how these beliefs and other factors influence children’s adherence to daily chewable vitamin D supplements in a randomized-controlled trial.

METHOD: Health beliefs about vitamin D were examined at a 3-month follow-up visit with self-administered questionnaires in 256 Boston-area children aged 9-15 and parent pairs enrolled in a vitamin D intervention trial. Adjusted multivariate regression was used to determine the associations of adherence (measured by pill count) to health beliefs and other factors (parental vitamin D-containing supplement use and child age, gender, maternal education and race/ethnicity).

RESULT(S): Mean and median adherence over 3-months were 84% and 89% respectively. 64% of parents compared to 39% of children believed vitamin D was important for condition-specific reasons including bone health, heart health, and colds. About a third of each group believed it was important for strength or energy (37% vs. 39%). However, parent and child pairs did not differ from each other in either health belief (P=0.29, P=0.07, respectively). Adherence was positively associated with parents’ use of vitamin D-containing supplements (6% higher, P=0.01) and negatively associated with parents’ belief that vitamin D is important for strength or energy (3% lower, P=0.01). Other factors were not associated with adherence.

CONCLUSION(S): Overall, adherence to daily vitamin D supplement use in this trial was high. Adherence was higher when parents were taking vitamin D-containing supplements and parents’ or children’s beliefs that vitamin D is important for specific health conditions were largely unrelated to adherence.
O.158 Stability of mothers’ beliefs and attitudes towards young children’s physical activity-related behaviours and their own physical activity and TV time
Hnatiuk J, Salmon J, Campbell KJ, Ridgers ND, Hesketh KD

PURPOSE: Mothers’ beliefs and attitudes towards children’s physical activity and their own physical activity and TV viewing are thought to influence young children’s behaviours. However, very little is currently known about how these beliefs, attitudes and behaviours change as children get older. The purpose of this study was to examine the stability of maternal beliefs and attitudes towards children’s physical activity and towards their own physical activity and TV time.

METHOD: Mothers (n=338) from the Melbourne InFANT Program reported their beliefs and attitudes towards their child’s physical activity and their own physical activity and TV time through self-administered questionnaires when their children were 4- (T1) and 19- (T2) months of age. Tracking of 11 maternal beliefs and behaviours was assessed using Spearman’s rho, Pearson’s correlation coefficient and Kendall’s tau-b.

RESULT(S): Maternal beliefs and behaviours showed low-moderate tracking over the 15-month period (Spearman’s $\rho=0.27-0.61$, Pearson’s $r=0.31-0.36$, $p<0.01$). Few mothers moved from the highest tertile to the lowest tertile or vice versa. Stronger tracking was observed for mothers with more favourable physical activity or TV beliefs and behaviours (highest tertile) and for those with less favourable physical activity or TV beliefs and behaviours (lowest tertile).

CONCLUSION(S): Mothers with stronger positive or negative beliefs and behaviours about physical activity and TV viewing were more likely to maintain those beliefs over the first two years of their children’s lives. Interventions aiming to both develop and support favourable physical activity and TV viewing attitudes, beliefs and behaviours amongst mothers are warranted.

O.159 Preventing disease through opportunistic, Rapid EngagEMent by primary care teams using behaviour change counselling
Simpson S, Randell E, Hood K, Cohen D, Rollick S, Pickles T, Moore L, Butler C

PURPOSE: To test whether exposing practitioners to a behaviour change training programme led to an increased proportion of patients who consulted with them reporting more beneficial behaviour changes at three and 12 months, recalling having received a behaviour change intervention, intending to change, and more favourable biometric and biochemical parameters at 12 months.
METHOD: We recruited General Practices and consenting patients who screened positive for smoking, risky drinking, unhealthy eating or sedentary lifestyle into a cluster RCT. The primary outcome was the proportion of patients who reported making beneficial changes in at least one of the risky behaviours at three months. Patients completed questionnaires before and immediately after the baseline consultation, at three and 12 months later, and biometrics were assessed at 12 months.

RESULT(S): No effect on the primary outcome at three months or on biochemical or biometric measures at 12 months. More patients consulting with trained clinicians recalled discussion about a health behaviour and intended to change. More intervention practice patients reported making an attempt to change, a sustained behaviour change at three months, and reported slightly greater improvements in healthy eating at three and 12 months, plus improved activity at 12 months.

CONCLUSION(S): Although training primary care clinicians in BCC did not increase patients reported beneficial behaviour change at three months or improve biometric and a biochemical measure at 12 months, it did increase patients’ recollection of a discussion about behaviour change, intentions to change, self-reported attempts to change and perceptions of having made a lasting change at three months.

O.160 Multiple health behaviors and the association with perceptions and motivation to change: results from the National Cancer Institute’s Food Attitudes and Behaviors (FAB) survey
Pinard CA, Smith TM, Oh A, Nebeling LC, Yaroch AL

PURPOSE: To explore the relationship between multiple health behaviors (diet, physical activity (PA), smoking) and the clustering of these health behaviors in relation to the perceptions and motivations.

METHOD: Data from the 2007 National Cancer Institute’s Food Attitudes and Behaviors (FAB) Survey was analyzed. To explore the relationship between health behaviors (diet, PA, smoking), perceptions and motivations bivariate correlations and multiple regression analyses were conducted.

RESULT(S): The sample (N=3,397) was 48% male and 28% non-Hispanic black, and most had a high school degree (58%). Respondents who reported performing more PA also indicated smoking less and consuming more fruits and vegetables (FVs; p’s<0.01). The correlates accounted for 3% variance in consumption of FVs, those with lower intakes of FVs indicating poorer perceptions of health, describing their weight status as lower (p’s<0.001). The correlates accounted for 25% variance in smoking status, those with higher levels of smoking indicating lower perceived weight status, being more likely to try to gain weight, and to agree that worrying about their health has led them to change the way they eat (p’s<0.001). The correlates accounted for 2% variance in PA levels, those with higher PA indicating better perceived health status, being more likely to be trying to lose weight, and agree that worrying about their health has led them to change the way they eat (p’s<0.01).
CONCLUSION(S): Self-perceptions and motivations were related to smoking, diet, and PA in different ways. We will describe these findings in reference to evidence across the three behaviors in order to inform multi-lifestyle health promotion.

O.161 Healthy behaviors feel good: associations between physical activity, eating behavior, sleep and affective well-being during academically challenging times
Flückiger L, Lieb R, Mata J

PURPOSE: This longitudinal study investigated the role of daily physical activity, eating behavior, and sleep quality for affective well-being during a stressful examination period. Associations between single health behaviors and affective well-being have been shown in previous cross-sectional studies. This study extends these findings by simultaneously assessing three health behaviors longitudinally.

METHOD: Eighty-two first-year university students (M age = 23 years) completed 32 online questionnaires on consecutive days during their examination period in which participants took six exams. Each day participants reported their affective well-being, physical activity, snacking behavior (high fat salt, low fat salt, high fat sweet and low fat sweet snacks), and sleep quality over the last 24 hours.

RESULT(S): Multilevel regression analyses with physical activity, snacking behavior, and sleep quality as predictors showed that participants reported higher affective well-being on days with increased physical activity (p < .001) and higher sleep quality (p < .001). Affective well-being was also higher on days on which participants reported increased consumption of fatty, salty snacks (p = .002); no other relationship between affective well-being and snacking behavior was significant.

CONCLUSION(S): Results of this study indicate that university students who show lower affective well-being when they are more sedentary and sleep more poorly, actually improve their affective well-being on days with different health behaviors. These findings emphasize the importance of longitudinal studies in a natural context and suggest, that changing ones health behaviors might as well change ones affective well-being - also during a very stressful major examination period.

O.162 The relationship between physical activity level and dietary intake among Flemish adults
Mertens E, Deforche B, Lefevre J, Thomis M, Huybrechts I, Philippaerts R, Clarys P

PURPOSE: The aim of the present study is to evaluate energy intake and consumption from different food groups as a function of physical activity (PA) level.
METHOD: Data were collected by the Flemish Policy Research Centre Sport, Physical Activity and Health between 2002 and 2004. The International Physical Activity Questionnaire and a 3-day diet record was filled in by 737 Flemish adults (18-75 yrs). To investigate the consumption of 23 food groups according to PA level (METminutes; first to third tertile), multivariate covariance analyses were used, controlling for age, BMI and body fat percentage.

RESULT(S): The highest PA group had a higher energy intake compared with the other groups (p<0.05). The highest PA group seemed to consume more fruit and milk products in comparison with the lowest PA group (p<0.01) and more fish in comparison with the second PA group (p<0.05). The second PA group consumed more cheese compared with the highest PA group (p<0.05) and more drinks compared with the lowest PA group (p<0.05). The lowest PA group reported the highest consumption of spices and herbs in comparison with the highest PA group (p<0.01) and consumed more nuts, seeds and snacks compared with the second group (p<0.05). Consumption from the remaining food groups did not differ between the three PA groups.

CONCLUSION(S): We can conclude that the most physically active adults do not always have a more healthy dietary intake than less active adults. When promoting a healthy lifestyle it remains necessary to focus on both physical activity and dietary intake.

O.163 The influence of dietary habits and physical activity on bone mass in Flemish children
Sioen I, Michels N, Polfliet C, De Smet S, Van Cauwenberghe E, Roggen I, De Henauw S

PURPOSE: This study aimed analysing how children’s bone mineral content and density (BMC and BMD) are associated with dietary habits (dairy consumption and vitamin D intake) and physical activity (PA). Moreover, the interaction between diet and physical activity on bone mass was studied.

METHOD: Participants were Flemish children (6-12 years). Body composition and bone mass was measured with dual-energy X-ray absorptiometry (DXA), dietary habits with a food frequency questionnaire and PA with an accelerometer (minimum 3 days, 8 hours per day). In total, 272 children underwent a DXA scan and 264 had complete FFQ data. Only 202 children had matching accelerometer data, due to the limited number of accelerometers. Regression analyses were used to study the associations between diet, PA, BMC and BMD, always correcting for age, sex, puberty stage and fat mass.

RESULT(S): PA (moderate, vigorous and moderate plus vigorous activity) was positively associated, while sedentary activity was negatively associated with BMC and BMD. Also dairy consumption was positively associated with bone mass, but vitamin D showed no association. Moderation effect through sex was only present for sedentary activity on the BMC outcome. Only for boys, the association with BMC was significant. No moderation effect from diet and PA (p>0.05) on bone mass was found.
CONCLUSION(S): Already at young age, PA and dairy consumption positively influence bone mass according to this study. Promoting PA and dairy consumption in young children will therefore positively influence their bone health and help to maximize peak bone mass, an important protective factor against osteoporosis later in life.

O.164  Pilot results of the Texas! Grow! Eat! Go! intervention study on children’s weight-related behaviors and weight status

PURPOSE: The Texas! Grow! Eat! Go! (TPEG) intervention study is a 5-year randomized controlled trial with 4 treatment groups with the aim of decreasing childhood obesity among 3rd grade students. The purpose of this presentation is to present the results from the pilot test assessing the combined effects of 2 school-based interventions: Learn! Grow! Eat! Go! (a school-garden and nutrition program) and Walk Across Texas (family-focused physical activity program) on children’s diet and physical activity behaviors and body mass index (BMI).

METHOD: The interventions were implemented for 5 months in 3rd grade classrooms at one low-income school serving mostly Hispanic children (n= 55; 63% Hispanic; 95% low-income). Pre- and post-test data were collected from children. Child measures were developed specifically for this study population and included behavioral outcomes (i.e. diet, physical activity, and gardening), psychosocial variables related to these three behaviors, knowledge, and demographic data. Height and weight data (to calculate BMI) were collected as well.

RESULT(S): Results indicated increased fruit and vegetable consumption, decreased intake of sugar sweetened beverage consumption and an increase in physical activity. 14% percent of children changed from an “unhealthy weight” into the “healthy weight” category (using the CDC growth charts, which account for gender and age).

CONCLUSION(S): These promising pilot results indicate that the combined Learn! Grow! Eat! Go! and Walk Across Texas interventions are effective in changing the targeted behaviors. The full study was started in the fall of 2012 and will test impact of these interventions when implemented for a full school year.
Sedentary behavior: Measurement and epidemiology

O.165 Using tri-axial accelerometry and a posture-recognition algorithm to identify and quantify sedentary and life-style behaviours in free-living conditions

PURPOSE: Developing methods for monitoring physical activity (PA) in free-living conditions is essential to study the relationships between PA -or the lack of PA- and health. Accelerometers enable continuous measurements of PA levels over extended periods of times. However, they often fail to capture low-intensity activities and underestimate PA levels for cycling. In order to overcome these limitations we developed a classification algorithm capable of identifying 8 types of PA from 3-axial accelerometry data.

METHOD: Data from 63 subjects (n=29 with BMI<25, n=17 with 25<BMI<30; n=17 BMI>30) wearing a 3-axial accelerometer (MotionPOD-TM, Movea) while performing standardised activities in the laboratory were used to calibrate the algorithm. First, advanced signal processing was used to determine the sensor orientation. Then, a machine learning approach based on hidden Markov models was applied to identify 8 types of PA (lying down, slumped, sitting, standing, pacing, walking, running, cycling). The algorithm was then tested on data from another 20 subjects performing a set of predefined PA types in a real-life setting, at their own pace.

RESULT(S): The algorithm performed well. Correct classification rates were: 97.1% for lying, 66.2% for sitting, 69.5% for slumped, 77.9% for walking (14% recognised as pacing), 48.8% for pacing, 94.8% for running, and 67.7 % for cycling (except downhill: 10.2%).

CONCLUSION(S): This new tool opens the way to more detailed analysis of accelerometry data collected in free-living conditions, especially in regards to low intensity or sedentary behaviours. It will also be useful to improve PA energy expenditure calculations with activity-specific considerations.

O.166 Differences in the estimation of time spent in sedentary behaviour, light and moderate-to-vigorous physical activity in toddlers, according to different epoch durations
Costa S, Barber SE, Cameron N, Clemes SA

PURPOSE: To investigate time spent in sedentary behaviour (SB), light and moderate-to-vigorous physical activity (MVPA) in 2-3 year old South Asian (SA) and White British (WB) children and both parents, and the relationship between parental and offspring activity behaviours.

METHOD: Eighteen toddlers (2.86±0.60 years; 10 girls) were video-recorded during semi-
structured activity sessions. Videos were coded second-by-second according to the Children’s Activity Rating Scale (CARS) direct observation system, resulting activity scores were averaged for each epoch duration, and time periods with complete matching 5-, 10- and 15-second epochs were selected for analyses. Bland-Altman plots and paired t-tests were used to test differences in estimated SB, light and MVPA time (according to CARS) between each epoch duration. Bonferroni corrections were applied for multiple comparisons.

RESULT(S): In total, 12,915 seconds were included in the analyses. In relation to 5-second epochs, 10- and 15-second epochs significantly underestimated both time spent in SB (mean difference: -29.44 and -49.17 seconds respectively; p<0.0001) and time spent in MVPA (mean difference: -20 and -29.17 seconds respectively; p<0.0001). Time spent in light PA was significantly overestimated by 10- and 15-second epochs (mean difference: +49.17 and +78.33 seconds respectively; p<0.0001) in relation to 5-second epochs.

CONCLUSION(S): Considering the differences found, accelerometry cut-points derived for longer epochs will tend to overestimate light PA, and underestimate time spent in SB and MVPA in 2-3 year olds. Future research with such young children should use epochs ≤5 seconds to get a more accurate representation of their activity behaviours.

**O.167 MET values of common daily sitting, standing and light intensity physical activities: Does the 1.5 MET threshold for sedentary behaviour have any practical utility?**

**Mansoubi M, Pearson N, Yates T, Biddle SJH**

PURPOSE: Sedentary behaviour is defined as any waking behaviour characterized by an energy expenditure of <1.5 METs while in a sitting or reclining posture. However, the utility of this definition is poorly understood. For example, sitting based activities have previously been coded with MET values from 1.0-2.5, but some standing activities have been coded with MET values of <1.5. This study examined the energy cost (METs) of common sitting, standing and light physical activity tasks.

METHOD: Twenty-seven adults spent 10 minutes in four sitting-based activities (e.g. typing), standing, walking at 0.4, 0.6, 1, 1.3, 1.6, 1.9, 2.3, and 2.6 km/h. Activities were completed on the same day in a random order following an assessment of resting metabolic rate (RMR). A portable gas analyser was used to measure oxygen uptake, and data were converted to units of energy expenditure (METs).

RESULT(S): Average MET values for standard screen-based sitting tasks were: 1.4 (SD: 0.16) METS (TV), 1.5 (SD: 0.17) (PSP), and 1.6 (SD: 0.14) (typing). The more active, yet still seated, games on the Wii yielded an average of 2.2 (SD: 0.35) METS. Standing yielded an average of 1.6 (SD: 0.21) METS. Walking MET values increased incrementally with speed from 2.3 to 3.3 (SD: 0.42- SD: 0.51) METS.

CONCLUSION(S): The suggested 1.5 MET threshold for sedentary behaviours may lead to
some sitting-based activities being classified as a non-sedentary. Further work is required on the assessment of sedentary behaviour and how this impacts on associations with health outcomes.

O.168 The prevalence and correlates of sitting among 27,637 European adults - A comparison of 32 Eurobarometer-participating countries
Bennie J, Chau JY, van der Ploeg HHP, Stamatakis E, Bauman A

PURPOSE: Although prolonged sitting may be independently associated with increased chronic disease risk, few studies have assessed its prevalence concurrently in several countries. The aim of this analysis was to assess the prevalence of sitting in 32 European countries.

METHOD: Nationally representative population samples (n range=304-1,102) from 32 European countries participated in face-to-face interviews during November and December 2005 in the Eurobarometer Study. Usual weekday time spent sitting was assessed using the International Physical Activity Questionnaire (short-version). Daily sitting time was compared among countries, and by age, gender, years of education and physical activity.

RESULT(S): Data were available for 27,637 adults aged 15-98. Overall, mean reported sitting time was 309min/day (±184 min/day). Countries reporting the lowest sitting included Portugal, Malta and Romania (means 191-235min/day, ±164-192min/day) whereas adults in The Netherlands, Denmark and Czech Republic recorded the highest sitting (means 375-407min/day, ±188-202min/day). Males reported higher sitting than females (mean 319min/day, 95% confidence intervals [CI] 316-322min/day vs. 301min/day CI: 298-304min/day). Adults aged 15-24yrs reported the highest sitting when compared to older age groups (mean 362min/day CI: 356-368min/day vs. Means 306-313 min/day CI: 295-311min/day). Those with >19yrs of education reported sitting more than adults with fewer years of education (mean 334min/day CI: 276-281min/day vs. 278min/day CI: 330-338min/day). There was a linear trend for an inverse association between physical activity and sitting time.

CONCLUSION(S): Weekday sitting time and its demographic correlates varied considerably across European countries. Sitting is prevalent across Europe and merits attention by preventative interventions.
**Psychosocial determinants of physical activity and nutrition**

**O.169 Predictors of children’s lunchtime and after-school physical activity**
Stanley RM, Ridley K, Dollman J

PURPOSE: While numerous studies have investigated the correlates of children’s habitual physical activity, few have explored the primary correlates of physical activity (PA) occurring at different times of the day. Using a context-specific approach, this study investigated the primary correlates of children’s lunchtime and after-school PA.

METHOD: Cross-sectional data were collected from 423 South Australian children aged 10-13.9 years (200 boys; 223 girls). Lunchtime and after-school PA was assessed using accelerometers. Context-specific correlates were assessed using a purposely developed Youth Physical Activity Survey for Specific Settings. Correlated Component Regression for linear regression models was conducted to derive predictors of context-specific PA and to determine the percentage of variance explained by the prediction equation.

RESULT(S): The boys’ lunchtime PA model contained six predictors and explained 25% of the variance. For girls, the model contained nine predictors and explained 17% variance. Enjoyment of walking around at lunchtime was the strongest negative predictor for both boys’ and girls’ lunchtime PA. The model of boys’ after-school PA explained 20% of variance from 14 predictors across intrapersonal, sociocultural and physical environmental domains, and 7% of girls’ after-school PA was explained by the context-specific correlate, “I do an organised sport or activity after-school because it gets you fit”.

CONCLUSION(S): Using a context-specific approach has enabled the identification of unique features of lunchtime and after-school PA behaviour for boys and girls. Messages and interventions developed for promoting lunchtime and after-school physical activity need to be tailored for each context and gender rather than using a “one size fits all” approach.

**O.170 Urban form characteristics and cognitions: do they interact for leisure-time walking?**
Beenackers MA, Kamphuis CBM, Prins RG, Mackenbach JP, Burdorf A, van Lenthe FJ

PURPOSE: This cross-sectional study uses an adaptation of a social-ecological model on the hierarchy of walking needs to explore direct associations and interactions of urban form characteristics and individual psychosocial cognitions for leisure-time walking.

METHOD: Questionnaire data (n=736) from adults (25-74 years) and systematic field observations within 14 neighbourhoods in Eindhoven (the Netherlands) were used. Multiple multilevel logistic regressions were used to relate the urban form characteristics
(accessibility, safety, comfort, pleasurability), and individual psychosocial cognitions (attitude, self-efficacy, social influence, intention) to two definitions of leisure-time walking, i.e. any leisure-time walking and sufficient leisure time walking according to the Dutch physical activity norm, and to explore their interactions.

RESULT(S): Leisure-time walking was associated with psychosocial cognitions but not with characteristics of the urban environment. For sufficient leisure-time walking, positive urban form characteristics contributed towards leisure-time walking only in residents with a less positive attitude towards physical activity. Contrary, a good accessibility of the neighbourhood was more important for leisure-time walking in those residents who experienced a more positive social influence to engage in physical activity compared with those who reported less social influence.

CONCLUSION(S): This study showed some evidence for an interaction between the neighbourhood environment and individual psychosocial cognitions in explaining leisure-time walking. The specific mechanism of interaction may depend on the specific combination of psychosocial cognition and environmental factor. The lack of association between urban form and leisure-time walking could be partly due to the little variation in urban form characteristics between neighbourhoods.

O.171 Why do people high in self-control eat more healthily? Social cognitions as mediators
Hankonen N, Kinnunen MI, Absetz P, Jallinoja P

PURPOSE: Trait self-control and social cognitions both predict dietary behaviors, such as fruit and vegetable and fast food consumption, but their interrelationships and mediational effects have rarely been examined. We hypothesized that the effect of self-control on healthy diet is explained by more proximal diet-related social cognitive factors.

METHOD: 854 men (age M = 20) conducting their compulsory military service filled in questionnaires on trait self-control and social cognitive factors (as outlined by the Health Action Process Approach (HAPA): self-efficacy, outcome expectations, risk perception, intention, and planning) on entering service, and a food frequency questionnaire after eight weeks. Fruit and Vegetable Index and Fast Food Index, developed in previous research, were used as outcomes. Structural equation modeling was used as the analytical method.

RESULT(S): Higher self-control was related (p<.001) to later higher fruit and vegetable consumption and lower fast food consumption, as well as more positive cognitions regarding healthy diet (especially self-efficacy and planning). The mediation hypothesis received partial support: the effect of self-control on diet was fully mediated only for fruit and vegetable consumption. For fast food consumption, the effect of self-control was only partially mediated by the HAPA variables. The specific indirect effects for the two dietary behaviors differed.

CONCLUSION(S): Young men high in trait self-control eat more fruit and vegetables, because
they have higher self-efficacy, more positive taste expectations, stronger intentions and more plans, compared to those low in self-control. Fast food consumption might be more influenced by automatic-impulsive processes, that are not outlined by HAPA that focuses on reflective regulation.

O.172 Autonomous regulation of eating behaviour is related to weight stability over 3 years in a cohort of middle-aged women
Leong SL, Sharples H, Madden CEL, Gray A, Horwath CC

PURPOSE: The relationship between women’s degree of autonomy in regulating their eating behaviour and obesity has not previously been examined in a nationwide sample. The objective was to investigate prospectively how autonomous and controlled forms of eating behaviour regulation, as described by the Self-Determination Theory, were related to 3-year weight change in adult women, in particular weight stability which has been linked to positive health outcomes.

METHOD: A sample of 1601 New Zealand women aged 40-50 years randomly selected from the nationwide electoral rolls was recruited in 2009 to participate in a prospective study. At baseline, participants completed Pelletier’s (2004) Regulation of Eating Behaviour Scale. Demographic information, height and weight were also collected using mailed questionnaires at baseline and 3 years later. Logistic regression was used to examine the effect of autonomous and controlled eating behaviour regulation on weight stability over 3 years (stable: within 3% loss or gain; unstable: > 3% loss or gain).

RESULT(S): Forty percent of women remained within 3% of their baseline weight. After adjusting for confounders, for every 10-unit increase in baseline autonomous regulation, logistic regression indicated an 11.3% increase in the odds of being weight stable at 3 years. (95% CI: 1.2, 22.5, p= 0.028). Controlled regulation was not significantly associated with weight stability (p= 0.195).

CONCLUSION(S): Autonomous regulation of eating behaviour predicted weight stability over 3 years, suggesting that interventions designed to improve autonomy in regulating eating behaviour may help middle-aged women remain weight stable.
Parenting and family environment influence on food intake

O.173 Socioeconomic patterning of obesity risk predictors in early childhood: findings from the Melbourne Infant Feeding Activity and Nutrition Trial (InFANT) Program
Campbell KJ, Cameron AJ, Ball K, Salmon J, Crawford DA, Hesketh KD

PURPOSE: Overweight and obesity are increasingly common among very young children (2 to 3 years), and body weight at this age is strongly related to later adiposity. Modifiable early life risk factors for child overweight at age 3 have been reported in a number of studies and include: paternal BMI; maternal pre-pregnancy BMI; excess gestational weight gain; smoking during pregnancy; child birth weight; breastfeeding duration; timing of introduction of solids; and sleep duration. Risk for later adiposity appears to be cumulative. Few studies have examined the clustering of these risks by socioeconomic position.

METHOD: The InFANT Program was a cluster-RCT obesity prevention intervention involving 542 parents and their infants (mean age 3.8 months at baseline) from 62 randomly selected first-time parent groups (clusters) in Melbourne, Australia. Here we analyse baseline and nine month postpartum correlates of proposed predictors of obesity risk according to socioeconomic position, as defined by maternal education (university versus not university educated).

RESULT(S): Socioeconomic patterning was observed with lower educated women more likely to record: increased pre-pregnancy weight, excess gestational weight gain, and reduced breastfeeding duration (all p<0.0001); earlier introduction of solids (p=0.003); and smoking during pregnancy (p= 0.015).

CONCLUSION(S): Most of the acknowledged modifiable risk factors for child adiposity were socio-economically patterned, underscoring the importance of refining family-based obesity prevention interventions to effectively reach lower educated families. Intervening before conception would enable a focus on healthy parent and gestational weight gain; and smoking cessation. Early intervention could also provide anticipatory information/support for decisions regarding breastfeeding and the introduction of solids.

O.174 Characteristics of home meal preparation involvement and their importance for diet quality among Canadian children
Chu YL, Storey K, Veugelers P

PURPOSE: The purpose of this study is to examine associations between various characteristics of meal preparation and diet quality in children. This study examines meal preparation characteristics including types of meals (breakfast, lunch, or dinner) that children help prepare, food preparation tasks performed, and types of foods prepared.
METHOD: A provincially representative sample of grade 5 students (n=2,240) from 143 schools in Alberta, Canada was surveyed. Children were asked questions about types of meals they helped prepare, food preparation tasks (chop or cut food, use the microwave) performed, and types of foods (fruits, vegetables, convenience foods) used. Diet quality was measured using the Diet Quality Index (DQI-I) calculated based on self-reported dietary intake in the Harvard Food Frequency Questionnaire. Random effects models with children nested within schools were used to test for associations.

RESULT(S): Approximately half (56%) of the surveyed children reported helping with meal preparation at least once weekly, while 22% reported never helping. Frequency of involvement was positively associated with diet quality for all meal occasions. Children who helped prepare vegetables and fruit more often had higher DQI-I scores, while children who helped prepare convenience foods more often had lower DQI-I scores.

CONCLUSION(S): Characteristics of meal preparation are associated with dietary outcomes. Encouraging participation in meal preparation may lead to the development of healthy eating behaviors in children. Incorporating a hands-on approach where children are equipped with the skills to prepare simple and healthy meals can be a way to enhance the effectiveness of nutrition education.

O.175 Families’ health behavior – Development and validation of the Family Health Climate Scale
Niermann C, Krapf F, Reiner M, Woll A

PURPOSE: A vast amount of studies on family factors affecting individual health behavior have focused on the influence of individuals on another. The Family Health Climate (FHC), in contrast, aims to describe a feature of the family as a whole. It addresses the shared perceptions of dealing with health and health related issues in the daily routine. A questionnaire was developed and validated to measure the FHC for nutrition (FHC-NU) and activity behavior (FHC-PA).

METHOD: Three studies were conducted: Study 1 (n=384) explored the factor structure and optimized the psychometric quality. Using an independent sample, Study 2 (n=403) confirmed the factor structure. The construct validity was tested in Study 3 (n=212 family triads) by correlating the FHC to self-determined motivation of a healthy diet and physical activity as well as the families’ food environment and joint physical activities.

RESULT(S): Exploratory four (FHC-NU) and three (FHC-PA) factor models (Study 1) demonstrated an acceptable fit in Study 2 [FHC-PA: chi²(df)=179.77(74), p<.01; CFI=.97; RMSEA(95%CI)=.06 (.05 to .07); FHC-NU: chi²(df)=241.21(113), p<.01; CFI=.97; RMSEA(95%CI)=.05(.04 to .06)]. An individual’s perception of FHC correlated significantly with his or her intrinsic motivation for healthy eating (.54, .49, .65, p<.01, mothers, fathers, children, respectively) and for physical activity (.60, .50, .51, p<.01). Furthermore, parental perceptions of FHC-NU correlated with household soft drink availability (.27, -.32, p<.01) and of FHC-PA with joint physical activities (.41, .36, p<.01).
CONCLUSION(S): By these studies a valid FHC Scale was developed. The results demonstrate the high relevance of the perceived FHC for an individuals’ health behavior.

O.176 Does maternal use of overt and covert control practices on preschool children’s quality of diet change as children age? A longitudinal analysis
Jarman M, Inskip H, Ntani G, Cooper C, Robinson S, Barker M

PURPOSE: Parental exercise of control over children’s eating habits is an important influence on young children’s quality of diet, but it is not known how these practices change as children age. We assessed maternal use of overt and covert control practices and their effect on children’s quality of diet when children were 2-5 years old and again two years later.

METHOD: At Time 1, 348 mothers completed a food frequency questionnaire describing their child’s diet and a questionnaire about their use of overt and covert control practices in feeding their child; demographic data were also collected. This was repeated with 228 of the mothers at Time 2.

RESULT(S): Mothers who used more covert, but not overt, control over their children’s eating habits had children with better quality diets at both time points (p=0.02). However, there was only a moderate association between use of covert control at Time 1 and Time 2 (r=0.5), suggesting that mothers who used covert control initially tended to use less covert control as their child aged. Analyses of 9 maternal factors showed that mothers who had been employed since the birth of their child were more likely than others to reduce their use of covert control techniques over 2 years (p=0.02), independent of confounders.

CONCLUSION(S): Maternal use of covert control practices remains an important predictor of better quality of diet as children age. Mothers who return to employment after the birth of their child appear more likely to reduce their use of these techniques over time.

O.177 Nutritional implications of parent-child food-purchasing interactions recorded via micro camcorder
Calloway E, Ranjit N, Sun M, Sweitzer SJ, Romo-Palafox MJ, Briley ME

PURPOSE: This paper investigates food-purchasing interactions between parents and their young children. Past research has relied on recall-based measures. This study used child-worn micro camcorders to record child food-requests and parent food-offers. It is hypothesized: 1) child requests will promote unhealthy food-purchasing; 2) parent offers and responses will promote healthy food-purchasing.

METHOD: Parent-child food-purchasing interactions (n=134) were the unit of analysis, recorded from nine parent-child dyads. Children (age 2-5) wore a micro camcorder during
one food-shopping trip. Aspects of food-purchasing interactions were recorded including child requests, parent offers, refusals, or yields. Healthy, neutral, and unhealthy foods were defined. Z-tests were used to determine difference in proportions.

RESULT(S): Most (n=106, 79.1%) Food purchasing interactions concerned either healthy or unhealthy foods. Children requested unhealthy food 29 of 73 requests (39.7%) and parents offered unhealthy food 16 of 61 offers (26.2%) (p=0.10, z=1.648, CI=0.296, -0.026). Parents offered healthy food 33 times (54.1%) and children requested healthy food 28 times (38.4%), (p=0.07, z=1.817, CI=0.012, -0.326). Parents responded healthfully (refusing unhealthy or yielded to healthy requests) and unhealthfully to 75.4% (n=43) and 24.6% (n=14) of requests (p<0.0001, z=-8.905, CI=0.866, 0.642), respectively. Children yielded to all except four offers. Parents offered or yielded to 76 healthy foods (56.7%) and 30 unhealthy foods (22.4%), (p<0.0001, z=-8.013, CI=0.651, 0.483).

CONCLUSION(S): Parents were significantly more likely to promote healthy food purchases. Children refused very few offers and requested many healthy foods. Parents should increase amount of healthy offers and time spent in the produce section to encourage healthy requests.

O.178 Clarifying parental feeding practices concepts: a Delphi study
Gevers DWM, Kremers SPJ, De Vries NK, Van Assema P

PURPOSE: Inconsistencies in operationalization and measurement of parental feeding practices cause difficulties in interpreting research. Conceptual models have been proposed in order to guide future research, but fundamental to the inconsistencies in measurements is the lack of clarity about what is being understood by different feeding practices concepts. The purpose of this study was to clarify these.

METHOD: A three round Delphi study among an international group of experts was conducted (n=64). During the first round, participants were asked to write down descriptions of feeding practices and the names of concepts. The description had to fall within the scope of that concept. During the second and third round, participants were asked to select one concept per description of a feeding practice and indicate the extent to which the practice fell within the scope of the concept.

RESULT(S): Round one produced over one hundred different concept names and more than four hundred descriptions of feeding practices. Round two started with 116 descriptions of feeding practices and 20 concept names. On 40 descriptions, consensus was obtained after round two. Of the remaining 76 descriptions, 44 reached consensus during round three (preliminary result). Both widely studied concepts such as availability and rules, and relatively unexplored concepts such as discussing, educating, and visibility were identified.

CONCLUSION(S): The scope of parental feeding practices, including unexplored practices, has been established and experts agreed on the concepts for a considerable number of specific feeding practices. Consequently, the current study provides an important basis for the development of instruments.
“Parent provides, child decides”: a comparison of (non-) responsive child feeding practices of mothers and fathers

Mallan K, Thorpe K, Nicholson J, Daniels L

PURPOSE: Non-responsive feeding practices have been implicated in the development of childhood obesity, however most research has considered only mothers’ role in child feeding. This study compares the feeding attitudes and practices within mother-father dyads.

METHOD: First-time mothers and their children were participants from a childhood obesity prevention randomised controlled trial (N=698) which began when infants were approximately 4 months (SD=1) of age (Time 1 assessment) and included follow up assessments at child age 14 (Time 2) and 24 months (Time 3). Primary outcomes for this study were maternal feeding practices collected via self-report questionnaire at Time 3. Fathers of the children in the trial were invited to participate in a separate questionnaire-based study on child feeding practices approximately nine months after Time 3 (mean child age=33 months, SD=5; 58% girls). Complete data from 70 mother-father-dyads were available (control: n=37; intervention: n=33). Paired samples t-tests and correlation analyses were used.

RESULT(S): Mothers’ perceived responsibility for child feeding was significantly higher, yet fathers were more concerned about the child becoming overweight, used more restriction and more pressure, all p values <.001. Fathers were also less willing to let the child decide how much to eat, p<.001.

CONCLUSION(S): These results suggest that the patterns of feeding practices vary substantially between mothers and fathers. Fathers felt less responsible for child feeding but were paradoxically more concerned about child weight and used more non-responsive feeding practices. The implications are in line with recent calls to target fathers for child obesity prevention and treatment interventions.
The association between the physical environment of elementary schools and active transport
Van Kann DHH, Kremers SPJ, Bartelink NHM, Gubbels JS, de Vries SI, De Vries NK, Jansen MWJ

PURPOSE: Active school transport can make a major contribution to daily physical activity. Theory-based ecological models might be helpful in understanding the relation between the school environment and active transport. This cross-sectional study operationalized four theory-based clusters of neighborhood characteristics in order to examine their association with active transport among 5-12 year old children living in deprived areas in the Netherlands.

METHOD: This study included 3438 elementary school children. Characteristics of the physical environment were observed using the ‘Environmental Scan for Active Transport to School’ (ESATS). All ESATS-items were clustered into the four features: functional, safety, aesthetic, and destination. Due to moderation by class (class 1-5 / 6-8), stratified multilevel regression analyses were performed. Active transport was used as dependent variable and all ESATS clusters and local SES-score were included as fixed factors.

RESULT(S): For children in the classes 1 till 5, all clusters were non-significant. So, none of the environmental clusters was associated with active school transport in this category. For older children (classes 6 till 8) the aesthetics cluster was manifesting the strongest association with active transport (β=.09, p<.01).

CONCLUSION(S): The association between local school environment and active school transport seems to differ for younger and older elementary school children. Since aesthetical neighborhood characteristics are associated with active school transport, they could be indicated as important potential aspects to intervene on.

Does the location of outdoor physical activity differ by mode of travel home from school in adolescents? The PEACH project
Southward EF, Page AS, Lachowycz K, Cooper AR

PURPOSE: Walking to/from school contributes to daily moderate-vigorous physical activity (MVPA) but it is not known whether differences extend beyond the journey. We investigated whether after-school moderate-vigorous physical activity (MVPA) occurred in different outdoor locations depending on travel mode.

METHOD: Participants (n=546; 11 yrs) wore accelerometers and GPS receivers after school (15:00-22:00), recording data at 10 second intervals. A Geographic Information System was used to isolate the journey home from school from other activity outdoors. Each non-
journey data point was assigned to either greenspace (parks and private gardens), roads/pavements or built surfaces. ANOVA was used to investigate differences in MVPA by mode of travel and land use.

RESULT(S): Walkers acquired more minutes of MVPA than car users in greenspace (3.1 ± 4.3 vs. 1.7 ± 3.2 minutes; p<0.001), on roads and pavements (2.6 ± 3.0 vs. 1.1 ± 2.0 minutes; p<0.001), and on built surfaces (3.3 ± 3.8 vs. 1.7 ± 3.6 minutes; p<0.001). When journeys were removed, walkers still acquired more minutes of MVPA in all locations, but the differences failed to reach statistical significance. When subcategories of greenspace were explored it was found that walkers acquired more MVPA in parks than car users (9% vs. 4%), whereas car users acquired more MVPA in private gardens (28.5% vs. 21%).

CONCLUSION(S): Adolescents who walk home from school acquire significantly more total outdoor MVPA than car users. Most, but not all, of this is due to the journey itself. There is evidence that time in parks contributes more MVPA in those who walk.

O.182 Parents’ environmental perceptions, physical activity and children’s independent mobility
Santos P, Pizarro A, Mota J, Marques E

PURPOSE: Children’s independent mobility (IM) is considered as an independent correlate of physical activity (PA). Research suggests that, compared with previous generations, children today have less IM. Aspects of the local neighborhood environment may cause parents to restrict their children’s IM, with negative consequences on PA levels. The aim of the study is to examine relation of parental perception of neighborhood safety and parents’ PA level to IM among children.

METHOD: Participants were 354 pupils, aged 11.63 year-old (44.1% boys) from public schools in Porto (Portugal). IM was assessed using a questionnaire during the 2010/2011 academic year. Categorical (nonlinear) principal components analysis (CATPCA) was used to determine the underlying dimensions of the IM items. This cross-sectional study used a self-administered questionnaire to ask parents (mother, father or other) about their perceptions of neighborhood safety and about their PA level. Multivariate linear regression analysis (age- and sex-adjusted) was used to determine the influence of parental PA and neighborhood safety perception, on children’s IM.

RESULT(S): Parental PA levels and the perception of sidewalk and street safety were significant predictors of children IM, accounting for 13.0% of the variance (p<.001). The strongest predictor of IM was the parental perception of sidewalk and street safety (Beta = 0.132) while the dimension fear of strangers, crime and traffic safety was not a significant contributor.

CONCLUSION(S): Parental perception of neighborhood safety and parents’ PA level was associated with children’s IM.
**O.183 Influence of the centre-based childcare environment on the physical activity levels of preschool-aged children: a feasibility study**

Vanderloo LM, Tucker P, Johnson A, van Zandvoort M, Burke SM, Irwin JD

**PURPOSE:** This study sought to: (1) measure the physical activity (PA) levels of a sample of preschoolers; (2) assess which attributes (e.g., space, equipment, policies) within childcare influence PA; and, (3) pilot the methodology to ensure the feasibility of undertaking a full-scale study. This is the first study conducted in Canada to evaluate the influence of centre-based childcare on the PA behaviours of preschoolers.

**METHOD:** Thirty-one preschoolers (mean age = 4.10 years) from five childcare centres across London, Canada participated in this feasibility study. Actical® accelerometers were worn by participants for one day during childcare hours to assess activity levels using a 15-second epoch length. The Environment and Policy Assessment and Observation instrument was used to conduct a full-day evaluation of the childcare environment. Descriptive analyses were used to examine accelerometry data and linear regression tests were performed to describe the relationship between PA and various environmental attributes.

**RESULT(S):** On average, participants engaged in 11.45 minutes of moderate-vigorous PA and 132.61 minutes of total PA. Sedentary opportunities, portable and fixed play equipment, and staff behaviours accounted for 49.3% of the variability in moderate-vigorous PA (and 14.1% in total PA), with sedentary opportunities, fixed play equipment, and staff behaviours displaying an inverse relationship.

**CONCLUSION(S):** Results indicate the childcare environment’s critical role in promoting PA among preschoolers. This research highlights the importance of early intervention among preschoolers with regards to increasing PA while in care, and identifies specific factors within this environment that can be altered in service of increasing preschoolers’ activity levels.
Food labeling and portion size

O.184 The unit size bias of food: two experimental studies on its impact on social consumption norms of impulsiveness and portion size appropriateness
van Kleef E, Borgijink J, van Trijp H

PURPOSE: In deciding how much to eat, people are influenced by environmental cues. The unit size bias is the phenomenon that smaller units of food reduce consumption as people believe that a unit of food is the optimal amount to consume. As such, it has been used as a key explanation of the ‘portion size effect’; the increase in consumption when larger portions are served. Less is known about underlying processes explaining this bias and its effect on food intake. Hence, the purpose of two between-subjects experiments was to examine whether altering the unit size of chocolate while keeping portion sizes equal impacts normative judgements of eating behaviour.

METHOD: In study 1, females (n=118) watched a movie displaying a woman eating 50 grams of chocolates either in small or large unit size (i.e. 5 small versus 1 large chocolate). In study 2, participants (n=124) ate a similar amount of chocolate in either small or large unit size during a supposed taste test. Subsequent ratings of perceived (study 1) and own (study 2) consumption included measures of portion appropriateness, (perceived) impulsivity and excessive consumption.

RESULT(S): Despite consuming similar amounts of chocolate, both studies show that consumption of small chocolates is seen as more impulsive, excessive and less appropriate than consuming large chocolates.

CONCLUSION(S): Both studies indicate biased perceptions making eating smaller units appear more irresponsible and impulsive. This suggest an additional factor explaining consumption effects in earlier studies. As such, the results underscore the importance of unit size in developing effective interventions influencing food intake.

O.185 Adult consumers display poor recall of front-of-package nutrition labels following product selection
Graham DJ

PURPOSE: To assess consumers’ memory of Front-of-Package (FOP) nutrition label presence and type following a grocery selection task.

METHOD: 64 parent/child pairs from Minneapolis/St. Paul, Minnesota, U.S. participated in a food-selection task. Pairs were randomly assigned to one of three FOP label conditions: 1) Multiple Traffic Light (MTL) labels, which indicated numerically and with color-coding the amounts of saturated fat, sodium, and sugar each product contained; 2) monochromatic
labels (designed to look like the Nutrition Keys [NK] labels currently used by the U.S. food industry) containing the same numeric pieces of information, without color-coding; or 3) no FOP labels. In a laboratory designed to replicate a grocery-store aisle, participant pairs were instructed to select products that they would actually take home with them upon study completion. Parents completed a post-task survey including questions about whether they had seen any MTL or NK labels while selecting products. ANOVA compared label recall by group.

RESULT(S): There was a significant overall effect of study condition on accuracy of label recall (p<.001). 74% of participants in the no-label condition correctly recalled that the products they viewed did not contain FOP labels; less than 46% of participants who saw one of the two FOP label types correctly recalled that they had seen a label, and only 17% of these participants correctly identified which of the two types had appeared on the products they had seen.

CONCLUSION(S): Current FOP label appearance (size, location, etc.) may require modification to be more memorable to consumers.

O.186 Traffic lights and health claims: a comparative analysis of the nutrient profile of packaged foods available for sale in New Zealand supermarkets
Rosentreter S, Eyles H, Ni Mhurchu C

PURPOSE: Multiple Traffic Light (MTL) nutrition labels provide simple colour-coded information on the nutrient content of packaged foods. In 2011, MTL labels were recommended for introduction in Australia and New Zealand, but a final decision on front-of-pack label format has been deferred to late 2012. Over the last decade, Food Standards Australia New Zealand also developed a nutrient profiling standard calculator (NPSC) to determine eligibility of foods to carry health claims. The purpose of this study was to assess the application of MTL and NPSC to foods and their agreement in classification of foods.

METHOD: MTL and NPSC criteria were applied to selected packaged food products available in New Zealand supermarkets in 2011: 157 breakfast cereals; 128 cereal bars; 40 pizzas; 69 sausages and hotdogs; and 13 burgers. A points-based system combined MTL criteria into an overall score to enable comparison of food classification by the two systems.

RESULT(S): Based on NPSC criteria, 156 (38%) New Zealand packaged food products were eligible to carry a health claim and thus classified as ‘healthy’; 251 were ‘less healthy’. Based on MTL criteria most ‘healthy’ products (61%) would also receive one red light. Using the MTL score, only 14% of products were classified as ‘healthy’. Percentage agreement between the two systems was 73%.

CONCLUSION(S): More than half of New Zealand packaged foods are ‘less healthy’ according to criteria underpinning two front-of-pack labelling systems. A number of foods eligible to carry health claims would display at least one red traffic light if MTL were introduced.
Efficacy of textual warnings on the emotional impact of unhealthy food
David IA, Araújo RL, Gomes FS, Gleiser S, Mocaiber I, Oliveira L, Pereira MG, Volchan E

PURPOSE: Health warnings for tobacco control effectively contribute to raise awareness on the harms of tobacco use. However, the use of warnings for unhealthy food is less studied. In Brazil, a norm from the National Agency for Sanitary Surveillance (ANVISA) provides that advertising of unhealthy foods and beverages (high in sugar, sodium, saturated and/or trans fats) should be followed by textual warnings on the risks related to these products. We investigated the efficacy of textual warnings proposed by ANVISA in modulating the emotional impact of unhealthy food images.

METHOD: Undergraduate students (n=56) evaluated the emotional content of unhealthy food images, mimicking advertising, in two affective dimensions: hedonic valence and arousal. The presentation of each image could be preceded by either neutral or warning phrases. At the end, participants rated their hunger state, and their waist perimeter was measured by trained personnel.

RESULT(S): When images were preceded by warning phrases, the arousal ratings inversely correlated with the waist perimeter (r = -34; p < 0.01). This correlation was not significant when images were preceded by neutral phrases (r = -0.06; p = 0.63). Hunger ratings positively correlated with hedonic valence ratings when images were preceded by neutral phrases (rho= 0.30, p < 0.05), but not when preceded by warnings (rho = 0.10, p = 0.47).

CONCLUSION(S): Textual warnings can weaken the emotional impact of unhealthy food. The results provide evidence that favors the use of textual warnings as a public policy tool to curb unhealthy eating-related epidemics.
**O.188** Association between diet quality and body composition in Otago adolescents  
Wong JE, Parnell WA, Howe A, Lubransky A, Black K, Skidmore P

**PURPOSE:** Diet quality indices have not been developed or used to examine the association between dietary patterns and body composition in New Zealand adolescents. This study aimed to examine the potential associations between diet quality, assessed by the New Zealand Diet Quality Index for Adolescents (NZDQI-A), and several measures of body composition in a cohort of New Zealand adolescents aged 15 to 18 years.

**METHOD:** 681 high school students (56% male, mean age 16.1±1.5 years) completed an online food frequency questionnaire and had weight, height, waist circumference measured, plus body composition by foot-to-foot bioimpedance analysis. Diet quality was scored using the NZDQI-A which is based on intake variety and adequacy for five major food groups (fruits, vegetables, bread and cereals, milk and products, meat and alternatives). Generalised estimating equations were used to examine associations between diet quality and body composition in models adjusted for sex, age, ethnicity and socioeconomic status.

**RESULT(S):** Higher NZDQI-A scores were significantly associated with lower body fat percent ($\beta = -0.19; 95\% \text{ CI} = -0.35 \text{ to } -0.04, P<0.05$), fat-to-lean mass ratio ($\beta = -0.26; 95\% \text{ CI} = -0.46 \text{ to } -0.05, P<0.05$) and lower Fat Mass Index ($\beta = -0.23; 95\% \text{ CI} = -0.45 \text{ to } -0.004, P<0.05$) after multivariate adjustment.

**CONCLUSION(S):** Diet quality as measured by the NZDQI-A was only associated with measures of body fatness but not measures of overall body size. Therefore, a more direct body fatness measure should be used for more accurate ascertainment of body composition in examining the diet-body composition associations.

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**O.189** Health-related quality of life among treatment-seeking overweight children and adolescents: comparing a clinical sample with youth from the general population being or feeling overweight versus normal-weight  
Finne E, Reinehr T, Schaefer A, Winkel K, Kolip P

**PURPOSE:** Health-related quality of life (HRQoL) is usually impaired in obese children and adolescents, especially in clinical samples. Less is known about HRQoL of moderately overweight youth. Moreover, some findings signal perceived weight as being a particularly critical factor associated with HRQoL. We aimed to distinguish effects of treatment-seeking status and perceived weight from those of objective weight status in overweight children and adolescents.
METHOD: We compared HRQoL (self- and proxy-versions of KINDL-R) in a sample of treatment-seeking overweight youth (N=137, M age±s.e.=11.24±0.15 years) with HRQoL in a representative population sample (N=6354, 12.75±0.03 years), subdivided into groups by objective and perceived weight. Hierarchical linear models were used to compare HRQoL subscale scores between groups, adjusting for sociodemographic covariates and clustering of the population sample.

RESULT(S): Treatment-seekers showed significantly lower social well-being (effect sizes: d=0.30-0.40), and lower parent-reported self-esteem (d=0.30-0.37) than other overweight youth and those feeling ‘too fat’. Self-reported self-esteem, however, was higher in the clinical sample than in the population. For physical well-being, female patients reported higher scores than other overweight girls, while male patients scored lower than all population groups (d=0.50-0.72). In general, HRQoL impairments were primarily due to perceived, rather than actual, overweight status.

CONCLUSION(S): Treatment-seeking status of overweight youth was associated most notably with impaired social well-being, which may therefore be the main motive for seeking treatment. Other HRQoL domains were not consistently impaired. Our results further indicate that perceived rather than objective weight impacts HRQoL in youth with a modest excess weight.

O.190 Behavioral predictors of four-year BMI change among a cohort of undergraduate college students
Boulos RJ, Hyatt RR, Kanarek RB, Saltzman E, Economos CD

PURPOSE: Assess behavioral predictors of four-year BMI change among undergraduate students.

METHOD: During their freshman and senior years, undergraduate students (n=330) at a Massachusetts university self-completed health behavior surveys that included questions about exercise, diet, and stress-related coping. Each year, researchers measured height and weight; body-mass-index (BMI: weight(kg)/[height(m2)]) was calculated and categorized as underweight (<18.5), normal weight (18.5-24.9), overweight (25.0-29.9), or obese (≥30.0). Sex-specific paired t-tests were used to assess changes in health behaviors and BMI; linear regressions were used to identify behavioral predictors of BMI change.

RESULT(S): Most seniors maintained their freshman year weight status (89%); a greater percentage of males entered a higher weight status category (7% vs. 3%), and a greater percentage of females entered a lower weight category (8% vs. 4%). Males’ mean BMI increased 0.4 units (95%CI: 0.1, 0.8), and females’ mean BMI decreased 0.4 units (95%CI: -0.6, -0.2). Both genders decreased their fruit/vegetable consumption by 0.5 servings/day (P<0.05). Certain stress-related coping behaviors during freshman year predicted a higher BMI senior year (i.e., among males, sleeping more: β=2.10, P<0.05; among females, eating more: β = 0.51, P=0.003). Decreases in BMI were predicted by increases in weekly physical activity for males (β=-0.002, P=0.04), and fruit/vegetable consumption for females (β=-0.104, P=0.01).
CONCLUSION(S): Even among normal weight students, changes in physical activity and fruit/vegetable intake over a four-year period predicted changes in BMI; the way in which students coped with stress also influenced future BMI. University programming that supports the practice of health-promoting behaviors may help students maintain a healthy body weight.

O.191 Longitudinal associations between depressive symptoms and body mass index during 20 years of follow-up
Konttinen H, Kiviruusu O, Huurre T, Haukkala A, Aro H

PURPOSE: Purpose: Although it has been proposed that the positive relationship between depressive symptoms and obesity is bidirectional, studies have rarely addressed this question in a longitudinal setting. The present study examined the reciprocity of the associations between depressive symptoms and body mass index (BMI) during 20 years of follow-up at three time points.

METHOD: Methods: Participants of a Finnish cohort study in 1989 at 22 years (N=1656) were followed up at ages 32 (N=1471) and 42 (N=1334) by means of postal questionnaires. BMI was calculated on the basis of self-reported weight and height, and depressive symptoms were assessed using the short form of the Beck Depression Inventory (BDI). Latent growth models (LGM) and cross-lagged autoregressive models were used to determine prospective associations between depressive symptoms and BMI.

RESULT(S): Results: LGM analyses indicated that men with higher initial levels of depressive symptoms experienced a faster rate of increase in BMI (β=0.21, p<0.01). Among women, growth trajectories of BMI and BDI were positively correlated. In cross-lagged models, depressive symptoms at 32 predicted greater BMI at 42 (β=0.10, p<0.001) among men, while women with higher BMI at 32 were more likely to have greater depressive symptoms at 42 (β=0.08, p<0.05).

CONCLUSION(S): Conclusions: Elevated depressive symptoms predicted weight gain in men, while there was some evidence for higher BMI predicting later depressive symptoms in women. More emphasis should be placed on depressive symptoms in weight control programs as well as reducing weight-based stigmatization and discrimination in the society.

O.192 The relation between children’s stress and body composition with lifestyle as moderator – The ChiBS survey
Vanaelst B, Michels N, Clays E, Herrmann D, Huybrechts I, Sioen I, Vyncke K, De Henauw S

PURPOSE: Stress has been hypothesised to be involved in obesity development, also in children. More research is needed into the role of lifestyle factors in this relationship.

METHOD: 355 Belgian children (5-10y) participating in the baseline ChiBS survey (‘Children’s
Body composition and Stress’) were included in this study. The following variables were studied: psychosocial stress (i.e. stressful events, emotions and behavioural/emotional problems, salivary cortisol), stress-related lifestyle factors (snack consumption frequency, screen exposure time and sleep duration) and body composition parameters (BMI z-score, waist to height ratio (WHtR)). Using linear regression analyses (adjusted for sex, age and socio-economic status), the relation between stress and body composition and, more importantly, the possible moderating or mediating role of lifestyle factors was tested.

RESULT(S): No relationship was observed between body composition and negative emotions, conduct and emotional problems and salivary cortisol. However, negative life events were positively and happiness was negatively associated with BMI z-score and WHtR. Peer problems and WHtR were positively related in girls only. These relations were not significantly reduced after correction for lifestyle factors. Nevertheless, all lifestyle parameters moderated one or more stress – body composition relationships, resulting in even more significant relations after subgroup analysis.

CONCLUSION(S): Childhood stress was positively related to both overall and central adiposity measures with lifestyle factors acting as moderators but not as mediators. Thus, lifestyle could be a vulnerability factor in stress-induced adiposity, creating a perspective for multi-factorial obesity prevention, targeting stress and lifestyle factors in parallel.

O.193 Food insecurity, obesity, and diagnosed mood disorders among Canadian adults
Loopstra R, Tarasuk V

PURPOSE: Studies have found food insecurity and obesity to be positively related, but only among women. Mood disorders (e.g. depression) are associated with obesity and highly prevalent among food insecure individuals, especially women. These conditions could play a role in the observed relationship between obesity and food insecurity, but have rarely been considered. This study explores this possibility among Canadian adults.

METHOD: Using 2011 Canadian Community Health Survey data from 30365 adults, sequential logistic regression models related the odds of obesity to severity of adult food insecurity, first adjusting for education, income, immigrant status, and age, followed by adjustment for diagnosis of mood disorders, and accounting for possible differences by parenthood.

RESULT(S): Food insecurity was not associated with obesity among men. Among women, the relationship differed by motherhood. For women with children, severe food insecurity was associated with obesity (AOR: 2.33 (1.33-4.10). Subsequent adjustment for mood disorders reduced the AOR to 1.96 (1.11-3.46). Moderate food insecurity was not related to obesity after adjustment for mood disorders (AOR: 1.39 (0.92-2.09). Among women without children, the relationship between severe food insecurity and obesity was borderline non-significant (AOR=1.43 (0.98-2.09) and adjustment for mood disorders resulted in no evidence of a relationship (OR=1.13 (0.76-1.67). Moderate food insecurity also did not
remain significantly associated with obesity after adjustment for mood disorders (AOR=1.37 (0.99-1.89).

CONCLUSION(S): Only severely food insecure women with children had significantly greater odds of obesity once mood disorders were taken into account, suggesting factors other than the experience of food insecurity may underlie its relationship with obesity.

O.194 Dieting status influences the association between dietary patterns and body composition in Otago adolescents
Howe A, Black K, Wong JE, Lubransky A, Parnell WA, Skidmore P

PURPOSE: The consideration of dietary patterns, multiple body composition measures, and dieting status may offer new insight to address inconsistencies in the literature between food choice and obesity in adolescents.

METHOD: Information on food consumption and current dieting status was collected, using a web-based survey, in 681 adolescents (mean age 15.8 (SD 0.9) years) recruited from 11 schools in Otago, New Zealand. In addition, waist circumference, weight, height, and bio-electrical impedance analysis were measured. Principal components analysis (PCA) was used to determine dietary patterns. Body Mass Index (BMI), waist circumference, waist-to-height ratio, percent body fat, fat-to-lean ratio, fat mass index, and fat-free mass index were examined as outcomes. Generalized estimating equations were used to examine associations between dietary patterns and body composition.

RESULT(S): PCA produced three dietary patterns: ‘Treat Foods’, Fruits and Vegetables’, and ‘Basic Foods’. A SD increase in ‘Basic Foods’ was associated with a 3.58% decrease in fat mass index (95%CI -6.14, -0.94) in the total sample. For boys only the ‘Fruits and Vegetables’ pattern was negatively associated with fat mass index (β=-4.90%, 95%CI -7.33, -2.41). The association between ‘Treat Foods’ and BMI and waist circumference in dieters was negative, while the associations among non-dieters were positive.

CONCLUSION(S): In this cohort, significant associations were related to all body composition measures except BMI in boys. As an interaction between dieting status and ‘Treat Foods’ existed, future studies should also investigate the role of dieting when investigating food choice and body composition.
Physical activity interventions in adults

O.195 Impact of a tailored, Internet-based intervention on metabolic risk among college adults
Morrell JS, Olfert M, Byrd-Bredbenner C, Quick V, Kattelmann K, Dent A, Carey GB

PURPOSE: To assess metabolic outcomes from a 10 week web-delivered, tailored intervention designed to prevent excessive weight gain among college students, 18-24 years.

METHOD: Undergraduates (n=360, 68% women) recruited at three geographically distinct campuses for the 15-month study were randomly assigned to Intervention (Intv) or Control (Cont). The online intervention, Project Y.E.A.H. (Young-adults Eating and Active for Health), was delivered through mini-educational modules, goal-setting interface, and email reminders staged to participant’s readiness to improve three targeted behaviors: fruit/vegetable intake, physical activity, and stress management. Clinical, anthropometric, and biochemical measures were obtained in the fasted state at 0, 3 and 15-months. Metabolic syndrome (MetS) was evaluated by five criteria: abdominal obesity, hyperglycemia, hypertension, high triglycerides and/or low HDL-C. Analysis of covariance or Fisher’s Exact tests determined treatment differences.

RESULT(S): Body mass index (BMI), body fat %, or number of MetS criteria were not different between groups at baseline. At 3 months, mean number of MetS criteria was modestly lower in Intv vs. Cont (0.6+/-0.1 vs. 0.9+/-0.1, p<0.05), but BMI and body fat% were not significantly different between groups. Intv had lower rates of hyperglycemia (4% vs. 13%, p<0.01) and hypertension (3% vs. 8%, p=0.06) as compared to Cont. At 15 months, rates of hypertension remained lower in Intv vs. Cont (5% vs. 11%, p<0.05), but number of MetS criteria did not differ between Intv and Cont (0.7+/-0.1 vs. 0.8+/-0.1, p=0.8).

CONCLUSION(S): Findings suggest modest metabolic improvements may be associated with web-based interventions targeting healthy lifestyle behavior change among young adults.

O.196 Effectiveness of a health promotion intervention for construction workers on physiological and behavioral outcomes: results of a randomized controlled trial
Viester L, Verhagen EALM, Bongers PM, van der Beek AJ

PURPOSE: The aim of the present study is to evaluate the effectiveness of an individually tailored intervention among blue-collar construction workers on weight-related and energy-related behavioral outcomes. The overall program objective was prevention and reduction of overweight and musculoskeletal disorders among construction workers.

METHOD: The effectiveness of the ‘VIP in construction’ intervention was evaluated in a
randomized controlled trial. The research population consisted of consenting workers of a construction company. Primary outcome measures were body weight, body mass index (BMI), and waist circumference. Secondary outcome measures were physical activity, dietary intake, blood pressure, and blood cholesterol. Linear and logistic regression analyses were applied. The outcome measures at 6-month follow-up, which was directly following the intervention period, and 12-month follow-up were dependent variables, adjusting for their baseline levels.

RESULT(S): Workers were randomized to an intervention (n=162) or control group (n = 154). After 6 months a statistically significant intervention effect was found on body weight (B - 0.88, 95%CI: -1.65;-0.11), BMI (B -0.28, 95%CI: -0.51;-0.04), and waist circumference (B:-1.51, 95%CI: -2.72;-0.31). At 12 months, these differences were no longer statistically significant. At 6 months vigorous physical activity increased, but this was not statistically significant (OR: 1.74; 95%CI: 0.97;3.12). For sugar-sweetened beverages an intervention effect was found at 6 months (B -2.48, 95%CI: -2.49;-2.47). No intervention effects were found for the other outcome measures.

CONCLUSION(S): Intervention participants showed positive changes in vigorous physical activity and dietary behavior compared to controls; this translated into effects on weight-related outcomes.

O.197 The impact of different types of feedback on physical activity outcome parameters of Flemish employees
Van Hoye K, Boen F, Lefevre J

PURPOSE: The SenseWear™ Armband (SWA) is a multisensor activity-monitor used in daily life to assess an individual’s physical activity level. This study wants to analyze the impact of different types of feedback on physical activity (PA) outcome parameters of Flemish employees.

METHOD: 320 employees (age, 41.0 ± 10.7 years) participated and were randomized into one of four intervention groups after baseline measurement: (1) a minimal intervention group received no feedback (MIG, n=56); (2) a pedometer group was provided only information on their daily step count (PG, n=57); (3) a display group received feedback on calories burned, steps taken and minutes of PA by means of the SWA display (DG, n=57); (4) a coaching group received the display and had weekly meetings with a Coach (CoachG, n=57). A repeated measure ANOVA analyzed the difference scores of the 4-week intervention compared to baseline.

RESULT(S): After the intervention, only the CoachG had significantly increased their total energy expenditure (mean diff=88 kcal/day, p<0.005), active energy expenditure (mean diff=117 kcal/day, p<0.001), and minutes of PA/day (mean diff=17 minutes/day; p=0.0003), compared to baseline measurement. A significant increase was found for daily step count for the PG (mean diff=865 steps/day; p=0.0257) and the CoachG (mean diff=1708 steps/day; p<0.001).

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CONCLUSION(S): Participants having a weekly meeting with a coach have a greater increase in PA outcome variables compared to baseline measurement than employees receiving no feedback or getting feedback by means of a technological device. This study provides valuable insights in the efficacy of different types of feedback in changing the PA behavior.

O.198 ‘Walking every step together’ – Social support explains intervention effects of a structured walking intervention in a community-based senior organization
Pelssers J, Delecluse C, Opdenacker J, Schotte A, Boen F

PURPOSE: ‘Every step counts!’ was a ten-week structured walking intervention in a community-based senior organization. In participating meetings points of the organization, participants were offered an individualized walking program. It prescribed weekly walking schedules. These were structured according to principles of training progression. Weekly group walks formed a substantial social part of the intervention. The intervention was effective in promoting physical activity, fitness and aspects of well-being (Pelssers et al., in press). Present study was conducted to test whether experienced social support during the program constituted a substantial predictor of the intervention effects.

METHOD: 269 intervention participants (age = 69.49) completed pre-intervention (week 1) and post-intervention (week 10) measurements. These measurements assessed motivational concepts (e.g., the quality of motivation (BREQ-2) and various forms of social support (e.g., support from friends). Outcome measures included: fitness (based on a six-minute walking test; 6MWT), physical activity (Godin-LTEI), anxiety (STAI) and subjective health. Linear regressions on outcome measures were performed.

RESULT(S): Experienced social support predicted improvements in fitness, physical activity, anxiety and subjective health. The more participants felt supported by their friends, the more they increased in walking fitness and anxiety was reduced. Feeling more connected to the intervention leader was associated with more pronounced increments in fitness, while feeling supported by other participants was related to more pronounced increments in physical activity and subjective health.

CONCLUSION(S): As hypothesized, experienced social support explained the improvements in fitness, physical activity and aspects of well-being. Therefore, social support should be considered as an important determinant in intervention design and effectiveness.
POSTER SESSIONS
Measurement and monitoring of dietary behaviour and relationships with health

P001  (e-)training: a vital component in the standardization of international nutrition studies
Huybrechts I, Nicolas G, Crispim S, Niekerk M, Freisling H, Knaze V, Casagrande C, Slimani N

PURPOSE: Although the EPIC-Soft® 24-h dietary recall (24-HDR) programme, used as reference methodology in EPIC and recommended for pan-European dietary surveys, maximizes a structured and standardized recall approach, trained/experienced interviewers are needed to ensure good quality of open-ended interviews. The purpose of this presentation is to report on the experiences of training the trainers for conducting standardized repeated EPIC-Soft 24-HDRs in the pilot study of the pan-European monitoring surveys (PILOT-PANEU-project) and to notify the importance of e-training tools to facilitate/support such trainings.

METHOD: PILOT-PANEU is the pilot phase of the EFSA-initiated “EU Menu” study, a planned pan-European dietary survey. Staff members (in charge of the local EPIC-soft training) of 5 different countries (Bulgaria, Finland, Hungary, Poland and Portugal) attended the 3-day train-the-trainers course at IARC. An e-training approach was pilot tested during this course using the GoToWebinar system.

RESULT(S): Although three training days were the minimum requirement to train-the-trainers who need to organize their local EPIC-soft training in a standardized way, suggestions were made to decrease cost and burden for attendees and course organizers. The e-training system was evaluated positively by all attendees and recommended for future train-the-trainer courses. Via e-learning tool attendees were able to access and follow the presentations and make exercises at their own convenience and place. More details on limitations and opportunities of the e-training module experienced during the train-the-trainer course will be presented during the presentation.

CONCLUSION(S): The PILOT-PANEU EPIC-soft train-the-trainers course underlined the importance of the e-learning module for future pan-European dietary surveys.

P002  Who to ask about dietary intake and when? Agreement between parental and child reporting of fruit, vegetable and energy-dense snack food intake
Pearson N, Tolfrey K

PURPOSE: Diets rich in fruits and vegetables and low in consumption of energy-dense (ED) snack foods are beneficial to children’s immediate and long-term health. Measuring children’s food intake accurately is problematic and is often reported by parents. However,
there is little research comparing concurrent parent- and child-reporting of food intake. This study aimed to examine the agreement between parent- and child-reported food intake according to time of day.

METHOD: Children (8-10 years) and their parents (n=143 matched pairs) completed parallel 24-hour food recalls assessing fruit, vegetable and ED snack food intake at different times of the day. To examine levels of agreement, Cohen’s kappa was used.

RESULT(S): The results indicated weak to moderate agreement between parent- and child-report of food intake that differed according to time of day. For example, a Kappa coefficient of 0.21 was found for reporting of fruit at breakfast and of 0.51 for reporting of fruit at lunch. Furthermore, a Kappa coefficient of 0.42 was found for reporting of vegetables at lunch and of 0.24 for reporting of vegetables at dinner. Agreement between parent- and child-reporting of ED snack foods was low to moderate at all times of the day (0.25 to 0.36).

CONCLUSION(S): The agreement between parent- and child-report of food intake is weak to moderate and may depend on the type of food in question and the time of day the food was eaten. Such factors should be taken into consideration when considering research methods for studies including children’s food intake.

P003 Assessing fruit and vegetable consumption in limited resource Spanish-speaking audiences: findings from a food behavior checklist validation study
Banna JC, Townsend MS

PURPOSE: To assess validity and reliability of items on a food behavior checklist related to fruit and vegetable (FV) intake in low literate, low-income Spanish speakers. This study addressed the need for a FV evaluation tool with a low respondent burden suitable for use in a group setting, and explored two methods of measuring FV quantity consumed.

METHOD: Participants (n=90) completed three dietary recalls and ten FV items that included “cups” and “servings” measuring quantity consumed. Item responses and nutrient intakes from recalls were used to estimate convergent validity. Correlation coefficients between item responses on two occasions in another group (n=71) indicated test–retest reliability; Cronbach’s a coefficient indicated internal consistency.

RESULT(S): The fruit “cups” and “servings” items and showed statistically significant correlations with recall variables (0.23 and 0.28 with recall fruit intake, respectively), as did the sub-scale; vegetable quantity items and sub-scale did not. Spearman’s correlation coefficients for test-retest reliability were 0.52 and 0.63 for fruit and vegetable sub-scales, respectively. The internal consistency was 0.74 for fruit and 0.78 for vegetable. One “citrus consumption” item was selected for deletion; other marginal items were retained.

CONCLUSION(S): For fruit, “servings” may be more appropriate in terms of reflecting intake than “cups”. Lack of correlation between vegetable items and nutrient intake indicated that
participants may have had difficulty estimating vegetable consumption, particularly regarding mixed dishes and vegetables added to food. Additional qualitative testing is recommended. These scales may be used with this or similar audiences to evaluate nutrition education interventions aimed at increasing FV intake.

**P004 Adolescents overestimate effect energy drinks**
Mensink F, Peters S

PURPOSE: Main questions: 1) Which effects do adolescents experience after consuming energy drinks? 2) Do they expect a bigger effect from energy drinks than other caffeine containing drinks?

METHOD: A representative sample of 755 Dutch adolescents aged 11-18 was sent an online questionnaire. Results are described using percentages.

RESULT(S): 58% had consumed energy drinks in the past. On average adolescents consume them on 1.8 days a week and when they do, they consume 1.2 drinks. Mostly (83%), they are bought in the supermarket or drugstore. 38% drank them at school; 55% during free time. 63% expects ‘energy drinks’ to give the highest energy boost compared to 12% ‘coffee’ and 10% ‘sport drinks’. Reasons to consume them are flavour (75%), energy boost (21%), becoming less tired (14%), staying awake (14%) and being able to ‘keep on going’ (14%). 15% consumes energy drinks because peers consume them. 47% doesn’t experience effects, 28% doesn’t feel tired anymore, 15% feels more alert, 14% is more able ‘to keep on going’. 75% experiences side effects like hyperactivity (32%), insomnia (22%), jolt and crash (18%). Other side effects are headache (9%), palpitations (7%), irritability (6%) and shakiness (4%).

CONCLUSION(S): Adolescents overestimate the effects of energy drinks while caffeine content of coffee is similar. Reported side effects can be partly attributed to caffeine and behavioral changes based on overestimating the effects. We suggest children younger than 12 should be advised against consuming energy drinks. Adolescents aged 13-18 should limit consumption to a maximum of 1 caffeine containing drink a day.

**P005 Construction of a new Nordic diet score for investigating diet in relation to aspects of pregnancy health**
Hillesund ER, Bere E, Haugen MM, Øverby NC

PURPOSE: Recently there has been increasing interest in the New Nordic Diet (NND) and its possible environmental and health benefits. To be able to relate NND adherence to health aspects of pregnancy we constructed a diet score from a food frequency questionnaire (FFQ) filled in during pregnancy in the Norwegian Mother and Child Cohort Study (MoBa).

METHOD: The NND score was constructed from ten subscales summarizing meal pattern, intake of fruits, root vegetables, kale vegetables, potatoes, oatmeal porridge, wild foods
Development of a short dietary risk assessment tool for use in populations of Australian toddlers aged 1 - 3 years
Bell L, Golley R, Magarey A

PURPOSE: Adequate early-life nutrition is essential for life-long health. Toddlers are vulnerable to poor nutrition as they begin to exert their independence in food choices and demonstrate fussy eating behaviours. Identifying toddlers at nutritional risk requires assessment of dietary intake, ideally using a short, simple tool to minimise participant and researcher burden. We aimed to develop a short toddler dietary risk assessment tool.

METHOD: Principal component analysis was applied to three days dietary data of 14 (n=552) and 24 (n=493) month old children from two Australian studies, NOURISH and SAIDI. Two distinct patterns were identified at both ages representing 1) ‘core’ (fruit, vegetables, dairy, meat and water) and 2) ‘non-core’ (sweetened beverages, spreads, high-fat potato products, snack products, processed meat, chocolate, ice-cream) foods and beverages.

RESULT(S): Based on these dietary patterns a 19-item parent-administered Toddler Dietary Questionnaire (TDQ) was developed to assess toddler’s (12-36months) intake over the previous 7 days. Three sections capture intake of 1) ‘core’ foods, 2) ‘non-core’ foods, and 3) usual bread (type), milk and non-milk beverage intake. Consumption frequency is assessed using four categories; 1) nil, 2) once, 3) 2-4 times, 4) ≥5 times, and quantities consumed using three categories; representing 1) small, 2) medium, 3) large portions. Intake is evaluated using a scoring system to derive a dietary risk score (range 0-100; higher score=higher risk).

CONCLUSION(S): The TDQ is a short assessment tool that provides information on Australian toddlers, aged 1-3 years, dietary risk allowing identification of high-risk children requiring intervention. Testing of tool properties is currently being undertaken.
P007  Is a web, smartphone or paper based food record more accurate or acceptable?  
Hutchesson MJ, Callister R, Collins CE

PURPOSE: Innovative tools to assess dietary intake are becoming increasingly available for self-monitoring, but their accuracy is not well established. This study aimed to evaluate and compare the acceptability and accuracy of three different 7-day food record methods (online accessed via a computer [C], online accessed via a Smartphone [S] and paper-based [P]) in young women.

METHOD: Young women (n=18, Mean±SD Age: 23.4±2.9 yrs, BMI: 24.0±2.2kg/m2) completed the food records in random order, over three 7-day periods, with 7-day washout periods between each method. Total energy expenditure (TEE) was derived from resting energy expenditure (REE) measured by indirect calorimetry and physical activity level derived from accelerometers. The accuracy of the three food record methods was assessed by calculating the absolute (EI-TEE) and percentage difference (EI/TEE x 100) between self-reported energy intake (EI) and TEE.

RESULT(S): TEE was 9133±1263 kJ/d and self-reported EI was 7235±1042kJ/d for S, 7000±1198kJ/d for C and 7032±1473kJ/d for P. The absolute and percentage differences between EI and TEE were consistent across the three food records - S: -1905±1560kJ/d (80±15%); C: -2133±1628kJ/d (78±16%); P: 2101±2143kJ/d (79±21%). Half the participants preferred C, 44% S and 6% P, while 89% least preferred P and 11% S.

CONCLUSION(S): The accuracy of food records completed online via computer or smartphone was consistent with the traditional paper-based approach. Given young women favored online recording modes, the use of these tools in dietary interventions to promote self-monitoring of food intake and to assess dietary intake in research studies should be considered.

P008  Assessing the nutritional quality of packed lunches among young children  
Farris A, Serrano EL

PURPOSE: Children spend a substantial portion of their waking hours in school, where they consume approximately one-third to one-half of their daily calories. While US school lunches are guided by standards, 40% of children who bring packed lunches are not. Few studies have been conducted in the US to specifically assess the dietary quality of packed lunches, especially through observations rather than proxy (i.e. parent) self-report. The purpose of this study was to assess the nutritional quality of packed lunches versus school lunches.

METHOD: Children from elementary schools in a rural and diverse socio-economic region of the US were observed on five consecutive school days. One-Way ANOVA tests were used to evaluate nutritional differences, including macro-nutrient and micro-nutrient composition.
RESULT(S): A total of 456 observations were made, with 46% of these being packed lunches. Children with a packed lunch had higher intakes of calories (p<0.01), fat (p<0.01), saturated fat (p<0.01), while school lunch had higher intakes of vitamin C (p<0.05), calcium (p<0.01), and sodium (p<0.01). Children with a packed lunch were less likely to have fruits (44% vs 56% provided by school lunch) and or vegetables (31% vs 69% provided by school lunch).

CONCLUSION(S): Recent and important policy revisions have been made to the National School Lunch Program to improve the nutritional quality of school lunch meals. Further research is warranted to explore motivators for packing lunch rather than participating in the National School Lunch Program and barriers to packing healthier items.

**P009**  
Adolescents’ diet quality estimated with an FFQ and with multiple 24-hour recalls  
Melo Rodrigues PR, Gomes Souza RA, Cnop ML, Brito AP, Pereira RA

PURPOSE: To assess the validity of an FFQ to estimate the adolescents’ diet quality.

METHOD: Cross-sectional study with students from a public school in Niterói, Brazil (n=106; 12-18-years old). FFQ was applied in personal interviews with food photographs support. Three non-consecutive 24-hours recalls – 24hR (one weekend day) were applied in a 30 days span. Diet quality was assessed by the Revised Healthy Eating Index – (R-HEI) adapted for the Brazilian population for FFQ and 24hR data. Differences between FFQ and 24hR R-HEI and its components mean scores were evaluated using the Wilcoxon signed-rank test. Agreement between both estimates was assessed by intraclass correlation coefficient (ICC) and Spearman’s correlation coefficient (CC-Spearman).

RESULT(S): R-HEI, “total vegetables”, “saturated fat”, “total fruit”, “whole fruit”, “whole cereals”, “Sodium” and “SoFAAS” mean scores estimated from FFQ and 24hR data were statistically different, with ICC and CC-Spearman indicating low agreement and correlation. Furthermore, despite non-different means, there was low agreement for “dark-green & orange vegetables” and “total grains”. The best agreement (ICC=0.54) and correlation (r=0.35, p<0.01) were observed for “milk & dairy”, however, there was significant difference between mean scores estimated by the two methods. Finally, no differences were observed between scores estimated for “meat, eggs & legumes” and “oils, nuts, seeds & fat fish”, which presented reduced discrimination with limitations to estimate ICC and CC-Spearman.

CONCLUSION(S): There was low agreement between the IQD-R estimated by FFQ and 24hR.

**P010**  
Snackimpuls: a smartphone application to study snacking behavior in daily life  
Wouters S, Thewissen V, Lechner L, Jacobs N

PURPOSE: A pilot study to examine feasibility and reliability of the smartphone application
Snackimpuls. Implicit determinants such as fleeting emotions and self-esteem are crucial in predicting unhealthy eating. Traditional questionnaires fall short to grasp these daily life dynamic psychological processes. Snackimpuls was specifically developed to gain insight in implicit determinants of between-meal snacking and their dynamic interplay in daily life.

METHOD: Snackimpuls is based on the Experience Sampling Method, a validated structured self-assessment diary method, and was used to collect multiple assessments (10 times a day for 7 consecutive days) of current emotions (positive affect, negative affect, agitation), self-esteem and between-meal snack intake.

RESULT(S): The pilot sample consisted of 8 women and 4 men from the general population. Mean age was 43.6 years (SD: 10.9, range: 25-60). The multiple assessment approach resulted in 584 valid observations which is 69.5% of the maximum number of beeps. Emotions and self-esteem were assessed using a 7-point Likert scale. The mean score of positive affect (5.33; SD: 0.71), negative affect (1.23; SD: 0.28), agitation (2.13; SD: 0.69) and self-esteem (6.14; SD: 0.55) is consistent with previous studies. The reliability coefficients of these constructs, which ranged from good to very good (Cronbach’s α between 0.79 and 0.94), are also in accordance with previous research. If respondents snacked, they consumed on average 172 Kcal per beep. Respondents considered Snackimpuls (very) user-friendly (82%).

CONCLUSION(S): This pilot study suggests feasibility and reliability of the Snackimpuls smartphone application to assess implicit determinants of snacking behavior in the realm of daily life.

P011  Micronutrient intake and obesity in adults from the Brazilian national dietary survey
Estima C, Araujo M, Sichieri R

PURPOSE: Assess the association between micronutrient consumption and obesity in a representative sample in Brazilian adults.

METHOD: 13,569 households in Brazil, along the five regions and 27 states, were selected using a two-stage cluster sampling design. Body weight and height of 21,003 adults, 20 – 59 years old, were measured and categorized them into non-obese and obese (Body Mass Index ≥ 30 kg/m2). Food records of two non-consecutive days were used to estimate food intake. Energy and intake of calcium, potassium, phosphorus, iron, zinc, selenium, thiamin, riboflavin, pyridoxine, vitamins A, B12, C, D, E and sodium were estimated by the U.S. National Cancer Institute Method and were adjusted by energy intake. Balanced Repeated Replication method was used to estimate standard errors and p-values. Analyses were designed by sex, urban/rural location and considered the sample design effect.

RESULT(S): In men, the prevalence of obesity was 13% in urban area and 7% in rural area, while in women the prevalence was similar in both settings, 17%. Out of 60 comparisons
tested in 15 micronutrients, seventeen were statistically significant. Obese men and women from urban area consumed more pyridoxine and sodium compared to non-obese. Obese women living in urban area reported more zinc, pyridoxine, vitamin E and sodium consumption, whereas in rural area obese women consume more pyridoxine compared to non-obese.

CONCLUSION(S): Micronutrient intake was quite similar among obese and non-obese adults in Brazil, suggesting that environmental, individual and behavioral aspects more than diet quality may explain the prevalence of obesity in Brazil.

P012 The level of agreement on food preparation and family meals in young adolescent/parent dyads
Ciccone J, Woodruff S

PURPOSE: Recently, public health messaging has included having more family meals and involving adolescents with meal preparation in order to improve healthful diets. Interventions regarding meal preparation/cooking and family meals in adolescents are limited yet suggest positive effects on food behaviour. For that reason, the Kinect-Ed program was created to motivate young adolescents (YA; grades 6-8) to help with meal preparation through an informational/motivational presentation (by Sandi Richard, a Food Network host) and cookbook Anyone Can Cook Dinner, with the additional goal of improving family meal frequency, attitudes, and behaviours. To date, the level of agreement between YA/parent responses regarding family meals and meal preparation has not been thoroughly explored. Therefore, the purpose of this study is to evaluate the level of agreement between YA/parent dyad responses of the Kinect-Ed program.

METHOD: Participants include YA/parent dyads from the Niagara Catholic District School Board, Ontario, Canada. Three surveys (parent and YA pre-test, YA post-test, and a parent interview script) will be used to assess the level of agreement of five major outcomes (i.e., family meal frequency, food preparation frequency, cooking self-efficacy, food preparation techniques, and family meal attitudes and behaviours).

RESULT(S): Results pending data collection in January-February, 2013.

CONCLUSION(S): If the level of agreement in YA/parent dyads is high, either YAs or parents can be surveyed in future research. Alternatively, if the level of agreement is low, future researchers can explore the areas of low agreement to further understand what can be improved to increase food preparation and family meal frequency.
P013 Evaluation of innovative technologies for measuring diet in nutritional epidemiology
Illner A-K, Freising H, Boeing H, Huybrechts I, Crispim S, Slimani N

PURPOSE: The use of innovative technologies is deemed to improve dietary assessment in various research settings. However, little is known about their relative merits in epidemiological studies, which may be partially driven by current misconception that they are always methodologically new.

METHOD: A systematic inventory on dietary assessment technologies was performed, using PubMed and Web of Science (time period of publication: 1995-2011). Technologies were compared with conventional methodological counterparts (i.e. Food Frequency Questionnaires/FFQs, food records/FRs, 24-hour dietary recalls/24-HDRs) regarding strengths and weaknesses.

RESULT(S): Six main technology groups were identified (‘Personal Digital Assistant/PDA-’, ‘Mobile-phone-’, ‘Interactive computer-’, ‘Web-’, ‘Camera- and tape-recorder-’ and ‘Scan-and sensor–based’ technologies). Compared to conventional FRs, PDA and Mobile-phone devices offer the possibility for ‘real-time’ recording at eating events, but their validity to estimate individual dietary intakes was low to moderate. In 24-HDRs, there is still limited knowledge regarding the accuracy of fully automated approaches; and methodological problems, such as the inaccuracy in self-reported portion sizes might be more critical than in interview-based applications. In contrast, measurement errors in web-based and paper-based FFQs are most likely similar, suggesting that the underlying methodology is unchanged by the technology.

CONCLUSION(S): Most of the innovative technologies were seen to have overlapping methodological features with the conventional methods. Their main potential to enhance dietary assessment is through more cost- and time-effective and less burdensome ways of data collection, though the inherent bias related to self-reported dietary intake will not be resolved. More research is therefore crucial to investigate their validity.

P014 Error associated with self-reported energy intake (food records) differs based on the conditions during which intake is recorded
Apolzan JW, Champagne CM, Redman LM, Delany JP, Ravussin E, Martin C

PURPOSE: To examine the accuracy of food records compared to two gold standards: 1) food provision from a metabolic kitchen, and 2) total energy expenditure by doubly labeled water adjusted for body composition changes (the energy balance method).

METHOD: Overweight (25<BMI<30 kg/m2) adults (N=34) were randomized to three groups: calorie restriction (CR), CR plus exercise, and weight maintenance. Energy intake (EI) was assessed by 7-day food records and doubly labeled water (DLW; baseline period 1) and during food provision (baseline period 2). Measurements were repeated at months 1, 3 and 6. Participants were trained to count calories and estimate portion size during the study. The discrepancy between self-reported EI and food provision and EI estimated by DLW was
expressed as a percent.

RESULT(S): Group results were similar and collapsed. Alpha was 0.01. Compared to food provision at baseline period 2, food record error (mean±SEM) did not differ over time and was not different from zero at any timepoint (baseline=1.6±2.0%, month 1=−3.0±2.6%, month 3=−4.3±1.9%, and month 6=−0.2±1.7% (p-values≥0.03). Compared to EI by DLW, food record error differed over time (p<0.001); significant improvements occurred from baseline period 1 (-31.1±4.9%) to month 3 (-3.2±2.9%), though error at month 1 (-14.2±4.9%) and month 6 (-19.1±4.5%) did not differ from baseline (p=0.03 and 0.12, respectively).

CONCLUSION(S): In free-living conditions, food record error can be temporarily reduced with training. During controlled feeding, food records can be accurate, suggesting that free-living error may be due to failure to report intake and error from the energy balance method.

P015 Towards a comprehensive web-based dietary research infrastructure to support international monitoring and epidemiological nutritional studies


PURPOSE: The double nutritional disease burden observed worldwide requires standardized methodologies to measure/follow-up dietary exposures and to evaluate diet-disease associations to support public health actions across countries. Through different EU-funded projects, a standardized computerized 24-hour dietary recall program (EPIC-Soft®) has been successfully developed, validated and used in international epidemiological studies and monitoring surveys. However, beside this standardized methodology for collecting dietary information across countries, it is equally important to provide a comprehensive framework and technical and managerial infrastructures to support international studies.

METHOD: To respond to these needs, a centralised web-based platform, the dietary e-Standardised Methodologies Platform (e-SMP), is under development at IARC. It comprises 4 main modules: 1) maintenance of the EPIC-Soft® databases, 2) interview collection using EPIC-Soft®, 3) management of collected interview data, and 4) administration. The step-wise approach used to develop the platform includes 4 successive phases, 1) conceptual design; 2) evaluation by internal and external end-users; 3) development of the applications and the web-platform; 4) evaluation of the applications and web-platform internally, by end-users and in real study conditions.

RESULT(S): Although the development of e-SMP is still ongoing, the overall general and detailed concepts have been developed as well as a first release focusing particularly on the “Interview Management Application” and other facilities to support international studies, in terms of implementation, data collection and management.
CONCLUSION(S): This platform should facilitate the standardization of dietary methodologies between countries/projects. Communication and data synchronisation/exchange will also be facilitated and e-training facilities will be provided to the platform users.

P016 Food and beverage portion sizes in Australian children: a secondary analysis of 1995 and 2007 national data
Collins K, Watson J, Collins CE

PURPOSE: To evaluate whether child and adolescent portion sizes of selected foods has changed from 1995 to 2007 in a national population sample in Australia. Similar analyses have rarely been conducted internationally.

METHOD: A time-series study in nationally representative population samples of children aged 2-16 years who participated in the 1995 National Nutrition Survey (n=2198) and the 2007 Australian National Children’s Nutrition and Physical Activity Survey (n=4799). Median portion size data, derived from 24-hr recalls, was compared for commonly consumed foods and beverages using Mann-Whitney U Tests.

RESULT(S): Across all age and sex categories portion size increased by 1-125g in 15% of items, decreased by 2-500g in 24% and remained stable in others. There was a decrease in portion size for packaged foods such as yoghurt and potato crisps by 25-100g and 4-5g respectively (p<0.05), in most age groups. Beverages and dairy foods remained constant or decreased, while portion size of fruits remained constant or increased. Meat-based dishes increased by 5-125g with processed meats increasing by up to 48% (p<0.05). Portion size of vegetables decreased with median portion sizes for the majority of fruit and vegetables not meeting Australian recommended serving sizes.

CONCLUSION(S): Portion sizes of vegetables and packaged snacks have decreased while processed meats have increased in Australian children and adolescent over 12 years. Portion size data and trends can assist in refining dietary recommendations targeting children. Health promotion initiatives and public policy are needed to strengthen efforts to improve child and adolescent dietary patterns.

P017 Identification of lifestyle patterns associated with high sensitivity CRP levels in children. The healthy growth study

PURPOSE: To examine the association of lifestyle patterns developed by combining single lifestyle factors [dietary intake, physical activity (PA), sedentary behaviour, sleep duration] with high sensitive C-reactive protein (hsCRP), a marker of low-grade inflammation, in children.
METHOD: Complete socio-economic, demographic, blood [serum hsCRP (enzyme-linked immunosorbent assay measured with CRP sandwich ELISA-kit, R&D Systems, Minneapolis USA)], clinical (pubertal stage) and lifestyle (dietary intake, PA-levels, sleeping habits) data were collected from a representative sample of 1270 children (50.3% girls, 9–13 years old) in Greece. Principal component analysis was used to identify lifestyle patterns. Children who were ill during the previous week of examination were excluded. High hsCRP-levels were defined as hsCRP>2.1mg/l.

RESULT(S): At bivariate level, hsCRP was inversely correlated with the lifestyle pattern characterized by more time of moderate-to-vigorous-PA (MVPA) and more frequent eating occasions (Spearman’s rho=-0.076;p<0.01). In multivariate regression analysis, this pattern was inversely associated with hsCRP (β=-107.913;p=0.007), after controlling for potential confounders (age, gender, Tanner stage, mean parental education level). Children whose lifestyle conformed most to this pattern, i.e. third and fourth quartiles, were respectively 31.9% (p=0.019) and 33.7% (p=0.012) less likely to have high hsCRP-levels. Children in the third and fourth quartiles had 69.19min/day of MVPA and 5.24eating occasions/day, and 135.34min/day of MVPA and 5.07eating occasions/day, respectively.

CONCLUSION(S): A lifestyle pattern of more than 60min/day of MVPA and 5 eating occasions/day was associated with reduced likelihood of high hsCRP-levels and hence low-grade inflammation in children. Future public health initiatives should target lifestyle patterns instead of single factors for the prevention of cardiometabolic risk-factors.
**Nutrition interventions in children and adolescents**

**P018**  
**Recruitment and retention of urban children into a school-based randomized clinical trial**  
Scheck JM, Eliasziw M, Guillot A, Au LE, Chomitz VR, Economos CD

**PURPOSE:** Researchers are increasingly using schools to recruit schoolchildren as research subjects. We describe the successful recruitment and retention of urban schoolchildren from racially and socioeconomically diverse communities participating in a vitamin D supplementation trial.

**METHOD:** Children in 4th-8th grade from five schools in three communities were recruited for participation in a 1-yr double-blind, randomized trial designed to determine vitamin D supplementation levels needed to achieve adequate serum 25-hydroxyvitamin D. Recruitment of participants was conducted by presentations in the schools and informed consent forms (in one of five native languages) sent home. Retention methods included monthly phone calls, follow-up letters, and gift cards for each completed visit. The percentage of children who completed study visits with blood draws at 3, 6, and 12 months was calculated and demographic characteristics among completers at each visit were compared.

**RESULT(S):** The recruitment presentation to 1822 children yielded an enrollment of 311 (17%) study participants (11.9 ± 1.5 yrs, 52% female, 62% racial/ethnic minorities, 45% overweight/obese, 70% qualified for free/reduced price school meals). A total of 84%, 75%, and 68% of children completed the 3-, 6-, and 12-month blood draws, respectively. Overall, 87% children completed a blood draw at 1 or more follow-up visits. The two most common reasons for dropout were missed appointments (14%) and relocation (6%). There were no significant differences in demographic characteristics among completers between visits and non-completers.

**CONCLUSION(S):** Recruitment and retention of urban children to a school-based randomized vitamin D supplementation trial represents a highly feasible and practical alternative to a clinical setting.

**P019**  
**The effect of the Kinect-Ed program on young adolescent food preparation and family meals**  
Ciccone J, Woodruff S

**PURPOSE:** Recently, public health messaging has included having more family meals and involving adolescents with meal preparation in order to improve healthful diets. Interventions regarding meal preparation/cooking and family meals in adolescents are limited yet suggest positive effects on food behaviour. For that reason, the Kinect-Ed program was created to motivate young adolescents (YA; grades 6 to 8s) to help with meal
preparation through an informational and motivational presentation (by Sandi Richard, a Food Network host) and cookbook Anyone Can Cook Dinner, with the additional goal of improving family meal frequency, attitudes, and behaviours. Therefore, the purpose of this study is to evaluate the Kinect-Ed presentation.

METHOD: Participants for this study will be YAs (n=250) from the Niagara Catholic District School Board, Ontario, Canada. YA pre- and post-tests will be used to assess the five major outcomes (i.e., family meal frequency, food preparation frequency, cooking self-efficacy, food preparation techniques, and family meal attitudes and behaviours) as a result of the in school presentation and cookbook.

RESULT(S): Results pending data collection in January-February, 2013.

CONCLUSION(S): If the Kinect-Ed program is found to be successful it will be used as a tool to improve food preparation and family meal frequency in young adolescents across Canada.

P020 Healthy eating program and healthy body concept-the example of an elementary school in Taiwan
Chiu T, Lin L-F, Lee F-H

PURPOSE: School-age children often have poor diets. Their diets generally lack fruit and vegetables and contain an excess of foods that are high in fat. Childhood obesity has reached epidemic proportions, with greater numbers of people becoming affected earlier in their lives. The aim for this study was to discover the effect of healthy eating program and healthy body concept in elementary children.

METHOD: This study includes 147 overweight and obesity elementary children in in one of the Taichung elementary school in Taiwan. Through healthy eating program including: balance healthy diet, healthy body concept, food choices, and healthy eating experience sharing. Children's body mass index and healthy eating behavior questionnaire were taken for the study result analysis.

RESULT(S): After three months of program following, the healthy eating concept score were increases (60 points to 71 points); children can choose right foods, and healthy eating behavior score were increased (49 points to 63points); children’ BMI were significantly decreased (109 children), average decrease from BMI 25.1 to BMI 24.5. Average body weight loss were 1.9kg. Eighty five percent of children strongly suggested school continue the healthy eating program.

CONCLUSION(S): School-based healthy eating provide a great opportunity to enhance the future health and well-being of children because they can reach almost all children and may enhance learning, enhance health during critical periods of growth and maturation, lower the risk for chronic diseases in adulthood, and help to establish healthy behaviors at an early age that will lead to lifelong healthy habits.
P021  Impact of a nutrition award scheme, Start Right-Eat Right, on the food intake of children attending long day care
Bell L, Hartley J, Hendrie G, Golley R

PURPOSE: With increasing numbers of children attending child care where they consume half their daily food intake, these settings offer a unique opportunity to intervene to improve children’s nutrition. Start Right-Eat Right (SRER), a nutrition incentive award scheme, has shown improvements in Long Day Care Centre’s (LDCC) nutrition policies, menus, and nutrition environments. We aimed to determine whether these translate to improvements in children’s dietary intake.

METHOD: Twenty South Australian LDCC’s undertook SRER training (9 hours). Pre- and post-intervention, centre nutrition policies, menus and nutrition environments were assessed by observation and record auditing and children’s (2-4 years) dietary intake (morning/afternoon tea, lunch) measured using the plate wastage method.

RESULT(S): Preliminary menu analysis (n=17) showed significant improvements in the number of serves provided to children per day of vegetables (0.5±0.5, p<0.001) and meat (0.4±0.4, p=0.001). Non-significant improvements were observed for fruit (0.7±0.2 v 0.8 ±0.4), dairy (2.2±0.8 v 2.6±0.5), cereals (2.7±0.7 v 2.4±0.4), and fats and oils (1.1±0.6 v 1.1±0.2). All centres met 100% of nutrition policy, menu and meal time environment criteria for award status post-intervention compared to none pre-intervention (average 34/60 items met). Dietary data will be analysed at the food and nutrient level. Food group servings provided to and consumed by children will be compared (pre- v post-) using independent t-tests. Nutrient intakes (group level) will be descriptively compared to Australia and New Zealand Nutrient Reference Values.

CONCLUSION(S): These findings will provide insight into the SRER’s effectiveness in improving children’s dietary intake whilst informing future interventions in the early childcare setting.

P022  Changes in adolescents’ intake of sugar-sweetened beverages, fruit and vegetables: result at 20-month assessment of the HEIA study – A comprehensive,multi-component school-based randomized trial
Hausken SES, Bjelland M, Bergh IH, Grydeland M, Klepp K-I, Andersen LF, Totland TH, Lien N

PURPOSE: Purpose The purpose of the study was to evaluate the effect of an intervention program on adolescents’ intake of soft drinks with sugar, squash with sugar, fruit and vegetables. Further, to explore whether potential effects varied by gender, weight status and parental education level.

METHOD: Methods In total, 1418 11-year-olds participated in the pre-test and the 20 month
post assessment of the HEIA study. Intakes of soft drinks and squash were collected assessing frequency and amounts (dl/week), while consumption of fruit and vegetables was assessed by frequency (times/week). Covariance analyses (ANCOVA) were conducted testing for moderation by gender, weight status and parental education.

RESULT(S): Results In the total sample, significant differences were found between the intervention group and the control group in fruit consumption ($p < 0.001$) and intake of squash ($p = 0.02$). The intervention group consumed fruit more frequently, and had a lower intake of squash, compared to the control group. No differences were found between the groups for soft drinks and vegetables ($p > 0.4$). Analyses of moderating effects by adolescents’ gender, weight status and parental education revealed an interaction for parental educational level only ($p = 0.06$); the total amount of squash consumed was lower for the intervention groups who had parents with low and medium educational level compared to the control groups ($p = 0.02$).

CONCLUSION(S): Conclusions The preventive initiatives appeared to change adolescents’ intake of fruit and squash with sugar. Children of parents with low and medium educational level reduced the intake of squash the most.

P023 Using exploratory process evaluation to aid in the design of a complicated school lunchroom intervention

Thomas L, Fontaine Hill T, Wansink B, Just D, Dollahite J

PURPOSE: The ‘Smarter Lunchroom Makeovers’ (SLMs) intervention is a middle-school cafeteria based randomized controlled trial. The intervention utilizes the principles of behavioral economics, to help improve food choices by making small environmental changes. In addition, electronic messages are employed to engage parents. Process evaluation is being used to define components of the intervention, establish barriers and facilitators, and determine acceptability and feasibility, with the ultimate goal of informing study design. We report initial process evaluation for 13 middle schools in New York State.

METHOD: Semi-structured interviews were performed with participating local coordinators, school food service directors, and cafeteria managers ($n=15$) to capture challenges associated with various components of implementation of cafeteria changes, including: training, plate waste studies, staff, maintenance, and potential sources of contamination.

RESULT(S): Analysis revealed a perceived need for training targeted directly to front-line cafeteria staff (in addition to supervisors) to increase buy-in with implementation of changes. It elucidated areas of actual and potential intervention contamination, including concerns over new federal school meal regulations. Furthermore, the role of communication among all levels of staff involved in the intervention was seen as key to successful delivery.

CONCLUSION(S): This exploratory process evaluation has been instrumental in determining initial barriers and facilitators associated with consistent intervention delivery. These findings will inform study design, and ultimately have implications for quality of delivery and
maintenance of the intervention. They may provide useful insight for designing school-based, and other interventions.

**P024** Measuring the effectiveness of the youth expanded food and nutrition education program: questionnaire development and validation


**PURPOSE:** To describe the development and preliminary validation of EFNEP Youth Quest questionnaire, an impact assessment tool designed for Youth Expanded Food and Nutrition Education Program (EFNEP)

**METHOD:** The targeted audience was low-income children, in 3rd-5th grade. Questionnaire development included six phases: preliminary curricula content analysis, conceptualization, construction, expert reviews, cognitive interviews, and revisions. The selected measures were: outcome expectations, self-efficacy, intentions and knowledge related to nutrition, physical activity and food safety. Content validity and face validity were assessed through expert reviews (n=5) and cognitive interviews (n=14), respectively. Data from 452 children was collected for factor analysis, internal consistency and item difficulty analysis. Test-retest reliability was also assessed (n=75). Predictive validity of the nutrition and physical activity scales were assessed using direct measures of food intake (n=62) and physical activity (n=47).

RESULT(S): Content analysis, expert reviews and cognitive interviews were used for questionnaire development and to confirm the content and age appropriateness of the questionnaire. Factor analysis revealed interpretable factors for each of the content domains and served as strategy for item reduction. Internal consistency for most of the final psychosocial scales was acceptable. Kappa statistics for test-retest reliability ranged between 0.06-0.70. For predictive validity, 3 out of the 12 hypothesized correlations were significant.

**CONCLUSION(S):** Although further work is needed, the preliminary results of this study suggest that EFNEP Youth Quest could be used for evaluating Youth EFNEP programs. This study could serve as framework for designing similar assessment tools for different age groups.

**P025** Promoting fruit and vegetable consumption among New York City children: a process evaluation of cooking sprouts

Williamson I, Leung MM, Calancie L, Navder K

**PURPOSE:** Innovative strategies promoting fruit and vegetable consumption among urban
children are necessary to effectively combat poor dietary habits. The purpose of this study was to assess acceptability and perceived impact of Cooking Sprouts, a Saturday cooking and gardening program for children residing in Brooklyn, New York City, conducted in Summer 2012.

METHOD: Study participants comprised of 13 youth (mean age = 8.7 years) attending Cooking Sprouts, their parents (n=14) and staff members (n=14). Individual interviews were conducted upon conclusion of the program with youth participants and staff members; parents completed a brief survey. Inductive and deductive processes were used to identify codes.

RESULT(S): Cooking Sprouts participants rated fruits an average of 4.6 on a 5-point Likert scale (1 = hate, 5 = love), and vegetables an average of 3.8. 100% of participants believed that staff introducing them to new foods increased their desire to try them. Learning to plant, harvest, and chop were among their favorite program activities. 74% of parents reported seeing an increase in their child’s interest in fruits and vegetables as a result of Cooking Sprouts, and 100% of staff members reported an increase in participants’ self-confidence related to cooking and trying unfamiliar fruits and vegetables.

CONCLUSION(S): Study results suggest that cooking and gardening programs may be a useful method for improving attitudes related to fruit and vegetable consumption among urban elementary school children. Further research will be conducted in the coming season to assess changes in children’s perceptions and behaviors before and after participation.

P026 Increasing fruit and vegetable consumption and offerings to Somali children: the FAV-S Pilot Study
Hearst M, Kehm R, Sherman S, Lechner KE

PURPOSE: To determine the feasibility, acceptability and impact of a parent-centered intervention to increase fruit and vegetable servings and consumption among Somali children.

METHOD: Study participants with children aged 3-10 years were recruited from a large low-income housing complex with a high population of Somali immigrants, Minneapolis. A Somali community health worker (CHW) organized groups of 3-4 women to participate in two educational sessions including topics of health and nutrition, serving size and label reading. The third session was an interactive cooking session to increase skills in preparing fruits and vegetables and increasing the numbers of vegetables included in traditional Somali dishes. The final session was a trip to the grocery store to identify fruits and vegetables, determine ripeness and exploring frozen and canned fruits and vegetables for halal (permissible), low sodium and low sugar products. Surveys were completed pre and post intervention. Surveys were read aloud in Somali by CHW.

RESULT(S): The intervention successfully recruited 25 low-income Somali women (median age=41), was feasible and well accepted. Comparing pre- and post-intervention surveys,
mothers reported providing their children significantly more frequent servings of fruits and vegetables at dinner, lunch, snack and breakfast. There was no significant change in parent-reported intake of fruits and vegetables by their children although trends were evident.

CONCLUSION(S): The FAV-S study was feasible, acceptable and demonstrated potential for increasing fruit and vegetable servings and consumption among Somali children. A larger scale randomized trial with adequate power is needed to assess the full impact of this intervention.

P027 Results from a fruit and vegetable school intervention – Who increased intake of fruits?
Lehto RL, Ray CM-L, Roos EB

PURPOSE: The aim of this study was to assess which personal and intervention-related factors contributed to the change in fruit intake during a school intervention. Studies on the subject are few.

METHOD: The study is part of an international school intervention program Pro Greens, here using only Finnish data. Study population was 387 11-year-old Finns in the intervention group of a multicomponent school intervention to promote FV intake during a whole school year (2009-2010). The measurement of fruit intake (by FFQ) was done before and after intervention. Studied factors were the degree of implementation of the intervention, parental education level, sex, age, and appreciation of the intervention.

RESULT(S): When looking at the factors separately, girls and those who had more intervention in their class increased their intake of fruits more than others. Among boys only, those who liked the intervention increased their intake more than others. Parental education level and age were not associated with the change in fruit intake. When adding all the factors in the model, only the degree of implementation of the intervention remained associated with the increase in fruit intake.

CONCLUSION(S): In this study, the degree of implementation of the intervention was the most important factor predicting the change in fruit intake. The degree of implementation varied a lot among teachers. Research is needed on what factors affect the amount of implementation by teachers.

P028 Impact of an environmental intervention on nutrition practices in Georgia child care centers
Evers S, Maalouf J, Griffin M, Lyn R

PURPOSE: An estimated 61% of US children 5-years of age and younger are in some form of child care. Children consume a large proportion of their daily energy intake in CC facilities. Previous studies have shown that children in child care do not meet dietary intake
recommendations. The purpose of this study is to evaluate the impact of a wellness policy initiative that included caregiver training, on the nutrition practices of 24 CC centers in Georgia.

METHOD: A pre/post-test design using paired t-tests assessed changes to micro- and macro-nutrient content of 5-day menus on a baseline and quarterly basis. Analyses assessed the percentage of centers meeting ½ the target nutrient recommendations for child care. Menus were analyzed qualitatively using a menu rubric based on Dietary Guidelines for Americans.

RESULT(S): Baseline data showed that children were served a mean of 883 kcal over three eating occasions (breakfast, lunch and afternoon snacks). Menu analysis pre/post indicated statistically significant positive findings around vegetables served (p=0.016), types of milk served (p<0.001), lean protein (p<0.001), fried/pre-fried meats (p<0.001), percent of calories from fat (p=0.008), percent of calories from saturated fat (p=0.018), total fat (p=0.012), and saturated fat (p=0.017). Centers did not meet guidelines for sodium and fiber. Results from a second cohort of 40 CCs including comparison centers will also be available for presentation.

CONCLUSION(S): Findings suggest that adoption of nutrition policies and increased engagement and training/education for staff have potential to positively impact nutrition environments and behaviors in child care centers.

P029 Effects of a nutrition and media literacy pilot intervention on children’s fruit and vegetable intake
Grassi E, Evans A, Messina L

PURPOSE: The purpose of this pilot study was to evaluate the effectiveness of a school-based media education intervention on the promotion of fruit and vegetables consumption to prevent childhood obesity.

METHOD: The target population for the study was 10 years old Italian children and their parents. The study utilized a quasi-experimental design, involving an intervention group (27 children and one of their parents) and a control group (33 children and one of their parents), with pre, immediate post and delayed post-test (after 3 months upon completion of the intervention) measuring: the children’s fruit and vegetables consumption, motivation, self-efficacy and parental social support related to fruit and vegetables consumption; parent motivation and social support related to their children fruit and vegetables intake; availability and accessibility of fruit and vegetables at home. The 10 weeks long intervention included sessions on: health education, media literacy, and a health communication media-based campaign workshop during which the children created posters, newsletters and video commercials on fruit and vegetables targeted to their parents.

RESULT(S): To test the intervention effect on the changes in outcomes of all variables, independent sample T-test analyses were calculated. The intervention was effective in increasing children’s fruit and vegetable intake (p<.05) and all psychosocial determinants (p values ranging from 0.00 to 0.04) both at immediate post-test and at delayed post-test.
Parents reported increased emotional social support (p<.05) at delayed post-test.

CONCLUSION(S): These results indicate that a nutrition and media literacy intervention may be an innovative and promising methodological approach to promote children’s healthy nutrition.

P030 The healthy home offerings via the mealtime environment (HOME) plus trial design and baseline data for 160 families

PURPOSE: To describe baseline data for HOME Plus, a randomized controlled trial to reduce childhood obesity by promoting healthful snacks and family meals and reducing children’s sedentary behavior.

METHOD: HOME Plus has two conditions (intervention (n=81) and newsletter control (n=79), including 8-12 year old children (age- and gender adjusted body mass index (BMI) >50th percentile; 75 boys and 85 girls) and their parents (152 mothers and 8 fathers) in a staggered cohort design. Dietary intake (24-hour recalls), family meal frequency, mealt ime behaviors, screentime (psychosocial surveys); home food availability (home food inventory); foods served at meals and snacks (two screeners); and height and weight (measured by staff) data were collected in participants’ homes. The primary outcome measure is change in BMI-z at 12 months between conditions.

RESULT(S): At enrollment, children’s mean age was 10.4 years (SD=1.4), 66% were white, and 45% were overweight (BMI >85th percentile). Mean parent age was 41.4 years (SD=7.7), 76% were white, and mean BMI was 28.6 kg/m2. These characteristics did not differ by condition. Fewer than two family dinners per week was reported by 19% of parents, 29% ate fast food for family dinner 2+ times per week, 31% usually ate dinner while watching TV, only 53% knew the difference between portion and serving size. Other baseline screentime, intake, food offerings and availability data will be presented.

CONCLUSION(S): The HOME Plus obesity prevention intervention targets more frequent family meals and snacks with nutritious food offerings and reasonable portion sizes and reductions in sedentary behavior in children and their families.

P031 Improving school meals through a combination of legislation and practical tools – SkolmatSverige [School Food Sweden]
Patterson E, Lilja K, Elinder LS

PURPOSE: Sweden is one of very few countries where school lunches are guaranteed by law to be free to all primary school children and, since 2011, “nutritious”. However, the practical implications of the new legislation were initially unclear, and no surveillance system was put
METHOD: We designed the instrument with the help of reference groups representing (non-commercial) stakeholders (spring 2010); we performed a pilot test (autumn 2010); after revisions we performed a national test in 191 schools (spring 2011) to gather baseline data (before the new legislation began to apply). Food-based criteria to assess adequacy of vitamin D, iron, fat quality (saturated:unsaturated) and fibre were developed and validated twice. Reliability and feasibility were also examined. A function to deliver immediate tailored feedback to schools with suggestions for improvements was tested.

RESULT(S): Just 6% of schools met the nutritional requirements for all four selected nutrients and many existing guidelines were not being followed. The instrument was launched March 2012.

CONCLUSION(S): The new legislation sends a powerful signal about the importance of nutritious school meals and is expected to impact favourably on children’s diet and health. This practical tool will facilitate its implementation. The unique database of school meal quality that is created allows us to study the impact of this change as well as the importance of school meals.

P032 The effects of a nutrition education program on healthy diet knowledge, attitude and behavior of adolescence in the junior high school in Taiwan

Lee F-H, Chiu T-I, Lin L-F

PURPOSE: In recent years, there has been a growing importance of issue concerned with students’ healthy weight promotion in Taiwan. The main purpose of this study was to explore the effectiveness of a nutrition education program about healthy diet compared with one control group.

METHOD: A quasi-experimental research design was conducted. The research target contained 138 students as the experimental group and 129 students as the control group from the seventh grade students of two urban junior high schools in central Taiwan. Students of the experimental group received a nutrition teaching courses including food combining, calories number and healthy eating in four units and the control group did not receive these instructions during the experimental period. Both groups were pre-tested before the intervention and post-tested one month later and the obtained data was statistically analyzed by using paired t-test and t-test. In order to evaluate the effectiveness of the program, a questionnaire including the Scale of Healthy Diet Knowledge (Kuder-Richardson reliability = 0.57), Attitude (Cronbach’s α= 0.61), and Behavior (Cronbach’s α= 0.54) was designed.

RESULT(S): The results on the experimental group showed that the knowledge, attitude and
behavior scores of the posttest significantly increased than the pretest. For the healthy diet knowledge, attitude and behavior on the posttest, the experimental group exhibited significantly higher than the control group, with no significant difference between the two groups on the pretest.

CONCLUSION(S): The results indicated that the nutrition education program had positive effects on students’ knowledge, attitude and behavior in junior high school.

P033  Study design for a motivational interviewing intervention for the prevention of obesity in adolescents attending dental practices: an exploratory cluster RCT
Murphy M, Porter J, Yusuf H, Ntouva A, Kolliakou A, Newton T, Watt RG

PURPOSE: Motivational Interviewing (MI) is a promising method for achieving behaviour change. However, it has been under-utilised in primary dental care and there is a lack of published methodologies upon which to base the MI design. Furthermore, its effectiveness has not been comprehensively assessed for reducing sugar consumption in adolescents. Therefore, we undertook a study to test the feasibility of a MI intervention aimed at reducing soft drink consumption in adolescents attending primary dental care. Here, we present the study design for the development and testing of the intervention.

METHOD: We sampled dental practices in three areas of North Central London. Ten dental practices were recruited and randomised into control or intervention. Participants in control settings received the standard behaviour advice routinely provided in dental settings, while those at intervention settings additionally received brief MI sessions. These were designed using input from academics, focus groups with dental teams, and a young people’s research forum. The intervention consisted of 3-4 short sessions and a maintenance phase that were delivered by trained researchers through the use of age-specific resources. Process evaluation was planned using qualitative and quantitative methods to assess intervention fidelity and its feasibility in the dental care setting. In addition, we identified challenges of recruiting and delivering an intervention to adolescents.

RESULT(S): N/A (protocol paper)

CONCLUSION(S): By focussing on the protocol and implementation barriers, this study contributes to the limited available practical knowledge and identifies methodological considerations for undertaking a MI intervention for dietary change in primary dental care settings.
Personal and environmental determinants of physical activity in children and adolescents

P034 Parents’ perceptions of residential neighborhood, children’s sedentary behaviors, and outdoor play in school children
Padez C

PURPOSE: Recent studies have pointed to associations between parental perceptions of neighborhood advantage or disadvantage and their children’s health. This study investigates the links between parents’ perceptions of their social and built residential environment and overweight/obesity among Portuguese school boys and girls.

METHOD: A cross-sectional study of children 3.0–10.0 years old was performed between March 2009 and July 2010. 952 girls and 933 boys living in Coimbra were observed; children’s weight and height were measured and their parents filled out the “Environmental Module” standard questionnaire of the International Physical Activity Prevalence Study (IPS, 2002). Age and sex-specific BMI cut-off points, defined by IOTF, were used to define overweight/obesity. Environmental characteristics were combined into two neighborhood dimensions, which were used as predictors in logistic regression models.

RESULT(S): Girls had higher values for overweight and obesity than boys. Parental perceptions of both the social and built neighborhood dimensions were significantly associated with girls’ obesity. The odds of being obese increase with negative perceptions of the physical environment (OR = 1.47; p<0.005) and perceptions of an unsafe, dangerous environment (OR = 1.339; p<0.005). These relations were not evident for boys.

CONCLUSION(S): It is possible to revert and control the prevalence of childhood obesity via environmental interventions addressing the built environment – improving urban design and promoting mixed land uses – as well as the social environment, especially, safety. Furthermore, the increased environmental susceptibility found in girls makes those potential interventions even more relevant, given the patterns of higher prevalence of obesity in girls.

P035 Physical activity and sedentary time according to season in different European regions. The HELENA study
Gracia Marco L, Ortega F, Ruiz JR, Williams CA, Androutsos O, Valtueña J, Moreno L, Sjöström M

PURPOSE: 1) To examine the effect of seasonality on physical activity (PA) and sedentary time (ST) in European adolescents participating in the HELENA study; 2) to investigate whether the association between seasonality and PA was influenced by geographical location (Central-North of Europe vs. South of Europe).
METHOD: Complete data were collected from 2173 adolescents (998 males; 12.5-17.5y). PA and ST were measured by accelerometers over seven days. ANCOVA was conducted to analyse the differences in PA and ST across seasons [age, family affluence scale and registered time of PA (except for the average PA)] were included as covariates. In addition, “center” was entered in the model as a random factor in the analyses for the whole sample.

RESULT(S): Girls had lower levels of moderate to vigorous PA (MVPA) and average PA, and higher ST in winter compared to spring (all p<0.05). Stratified analyses showed differences in PA and ST between winter and spring in girls from Central-North of Europe (p<0.05 only for ST), but not in those from South of Europe. There were no differences between PA and ST across season in boys.

CONCLUSION(S): Winter is related with less time spent in MVPA, lower average PA and higher time spent in sedentary activities in European adolescent girls, compared to spring. These differences seem to mainly occur in Central-North of Europe rather than South of Europe. The potential role of seasonality should be considered when designing interventions for the promotion of PA and the limitation of ST, especially in girls.

P036 Perceptions of the built environment in relation to physical activity and sedentary time in normal weight and overweight Portuguese adolescents
Pizarro AN, Ribeiro J, Mota J, Santos P

PURPOSE: Research on associations between obesity and built environment is still in its infancy. Examine associations between environment perceptions, sedentary time and moderate to vigorous physical activity (MVPA) in different weight status adolescents might improve knowledge in the field.

METHOD: Waist to height ratio of 0.5 defined overweight. Physical activity (PA) was measured with an accelerometer for 7 days and Evenson’s cut-points defined PA intensities. Perceptions of the environment were obtained by questionnaire based on 6 dimensions: aesthetics, personal safety, traffic safety, environment nuisance, social norm and space to play at home answered in a 4 point likert scale.

RESULT(S): Data suggests a significant negative relationship between perceptions of personal safety and sedentary time with worse perceptions of safety predicting higher levels of sedentary time in both normal weight (β=-2.79, p<0.05) and overweight adolescents (β=-6.31, p<0.05). The results of the regression for MVPA in overweight adolescents indicated that two predictors explained 5% of the variance. It was found that better perceptions of aesthetics (β=1.72, p<0.05) and social norm (β=1.26, p<0.05) significantly predicted more time in MVPA. On the other hand in the normal weight group MVPA time was predicted by better general nuisance (β=1.63, p<0.05) as well as personal safety (β=1.15, p<0.05).

CONCLUSION(S): Personal safety is of great concern for adolescents and interventions designed to improve safety may be relevant to decrease sedentary time and increase MVPA.
Aesthetics and social norm also should be taken into account in interventions intended to decrease the obesity epidemic among adolescents.

**P037** The 2010 Vancouver Winter Olympics and children’s steps/day  
Craig CL, Bauman A, McKay H

PURPOSE: There has been much speculation that hosting Olympic games encourages individuals, particularly children, to be active. The Canadian Physical Activity Levels Among Youth study (CANPLAY) provides an opportunity to examine physical activity levels pre and post the 2010 Olympics.

METHOD: A nationally representative sample of children 5-19 years were recruited by random digit dialing. Children in about 6000 families annually were asked to wear the pedometer for up to 7 consecutive days and log the steps daily. Data collected between August 2007 and July 2011 were included and the month of receipt was classified into pre- (August-November), post- (April-July) and Torch Relay/Olympic Games (December-March) months. The mean steps/day and 95% confidence intervals were computed by time period within year, for Canada and the host province of British Columbia (BC).

RESULT(S): Overall, 19,682 children participated (1,375 in BC) Participation was lower among 15-19 year-olds than others. Mean steps/day were higher among boys than girls and among younger than older age groups. Except August-November 2007 (12,462 steps/day, 95% CI 12,114-12,809 steps/day), mean steps/day were highest in April-July in all years and ranged from 11,516 steps/day (95% CI 11,503-11,878) in 2011 to 12,544 steps/day (95% CI 12,118-12,989) in 2009. This pattern did not differ between the Olympic year and earlier or later years for Canada or for BC.

CONCLUSION(S): This study does not support the hypothesis that the Vancouver Winter Olympic games encouraged physical activity among Canadian children.

**P038** Environment and physical activity in oriental adolescents  
Lee L-L, Mantzou E, Kanaka-Gantenbein C, Chrousos GP

PURPOSE: To identify the relationships between the characteristics of adolescents’ local community environments and their physical activity habits in an oriental area. Investigations of whether adolescents who live in “walkable” communities are more physically active are also a main focus of the present study.

METHOD: Participants and communities will be selected in Taiwan, a small but relatively diverse environment. A matched-community cross-sectional observational design will be used in this study. Recruitment will be conducted from administrative units selected to vary in walkability and socioeconomic status. Adolescents will also wear accelerometers and complete a survey that includes environment and other physical activity variables.
Adolescents within selected neighbourhoods will be selected using simple random sampling.

RESULT(S): Previous study conducted by the International Physical Activity and the Environment Network led by Professor James Sallis has generated evidence in identification of the relationship between environment attributes and physical activity in older people and adults. We have opportunity to participate this international collaboration study to further identify the relationships between the characteristics of adolescents’ local community environments and their physical activity habits in Taiwan. Evidence of whether adolescents who live in “walkable” communities are more physically active is also a main focus of this study.

CONCLUSION(S): The use of geographic information system in demonstrating characters of physical activity environment, such as walkability, playability, pedestrian accessibility and street connectivity will be the first attempt and international comparisons with the use of outcomes generated by the present study will contribute to providing scientific evidence in policy making.

P039  Group cohesion and positive youth development in sport
Bruner MW, Eys MR, Wilson KS, Côté K

PURPOSE: Previous research demonstrates that the cohesion of a group can influence the perceptions of its individual group members. The purpose of this study was to examine group cohesion and perceptions of positive youth development (PYD) in sport using a multilevel approach.

METHOD: Male and female adolescent athletes (N = 435) from 37 high school sport teams completed measures of cohesion (Youth Sport Experience Questionnaire; YSEQ; Eys et al., 2009) and PYD (Youth Experience Survey-Sport; YES-S; MacDonald et al., 2011). The YSEQ assessed perceptions of team task and social cohesion while the YES-S assessed five PYD subscales (personal and social skills, initiative, cognitive skills, goal setting, and negative experiences). A multilevel analysis was performed for each PYD subscale in which both task and social cohesion were included at level one (group-mean centered) and at level two as the average for each team.

RESULT(S): Higher perceptions of team task cohesion predicted greater PYD in the form of greater personal and social skills, initiative, goal setting, and less negative experiences. Higher perceptions of team social cohesion also predicted greater PYD as indicated by higher levels of personal and social skills, cognitive skills, and goal setting and lower levels of negative experiences. Team means for cohesion predicted negative experiences only. Cohesion accounted for variance at both the individual and team levels ranging from 3.2% (cognitive skills) to 13.6% (personal and social skills).

CONCLUSION(S): Results indicate the influential role a cohesive sport team has on youth personal development in sport.
The relationship between parental and kids' physical activity in 3 to 6 year-old kids
Zhou Z, Wang K

PURPOSE: The purpose of this study was to examine parent-child physical activity correlations in 3 to 6 year-old kids family.

METHOD: The valid sample of 46 families (24 boys and 22 girls) were recruited with kids aged 3-6 years in preschools in the Beijing, CHINA. All kids and their parents were asked to wear RT3 tri-axial accelerometer on the waist over hip. The monitors were set to capture data at 1 minutes epochs. Participants were instructed to wear the RT3 continuously during the 24 hour day, except while bathing or swimming for a week (including both weekend days), their physical activity were recorded in kcal.

RESULT(S): Result showed that there were significant associations between father' and son' PA on the weekend and after-school periods (r = 0.46, P<0.05; r = 0.50, P<0.001). Father' and daughter' PA were significantly correlated during the weekend (r = 0.40, P<0.05), but not during the after-school period. However, there were not significantly correlated between mother' and son' PA during any of the segmented times. There was a significant correlation between mother' and daughter' PA on weekend and after-school periods (r =0.55, P<0.001; r= 0.59, P<0.01).

CONCLUSION(S): The study on patterns of parent-kid activity suggest that parents' PA is related to their children. Parents promoting PA among their kids would be useful family based interventions.

Is change in the supportiveness of the school environment between primary and secondary school associated with a decline in children’s physical activity levels? Findings from the PEACH project
Coombes E, Jones AP, Cooper AR, Page AS

PURPOSE: Children’s physical activity levels are known to decline with age, with the transition from primary to secondary school being a key period for change. We evaluated whether a change in the supportiveness of the school environment between primary and secondary school is associated with a decline in activity levels.

METHOD: Data were analysed from 638 UK children from 23 schools in the PEACH project. Participants wore an accelerometer (GT1M) for 5 weekdays during their primary school final year (aged 10-11yrs) and again a year later during their secondary school first year. School environment supportiveness was evaluated using a Geographical Information System to calculate the availability of greenspace, roads and destinations within the school travel corridor and neighbourhood. We then examined change in the amount of moderate to vigorous physical activity (MVPA) undertaken at primary school compared to secondary in
relation to change in school environment supportiveness.

RESULT(S): We found a decline in MVPA in the evenings after school (4pm-10pm) at secondary school compared to primary (-16.8 mins, p<0.001). This decline was greatest for children who transitioned from a supportive primary school to a less supportive secondary school (-23.9 mins, p<0.001). Children who transitioned to a more supportive school environment had the most protection from reduced MVPA (-8.2 mins, p=0.097).

CONCLUSION(S): These findings suggest that attending a secondary school with a supportive environment minimises the decline in MVPA seen in early adolescence. Targeting the provision of greenspaces and child-friendly destinations around secondary schools may help maintain MVPA levels into adolescence.

P042 The association between parenting style and minority preschoolers physical activity level
Alhassan S, Nwaokeleme O, Mendoza A, Greever C

PURPOSE: Parenting style has been associated with eating habits and obesity risk in children. However, remarkably little is known regarding the association between parenting style and minority preschool-age children physical activity (PA) levels. Therefore, the purpose of this study was to examine the association between the parenting style of minority preschool-age children and their PA levels.

METHOD: Participants were Hispanic (n=54; age, 4.2±0.8 yrs) and African-American (n=46; age, 3.9±0.8 yrs) children participating in a six-month PA intervention. Parental laxness and over-reactivity were assessed using the Parenting Scale. Children’s PA levels were assessed for five consecutive days (Monday – Friday) using the Actigraph accelerometer. Spearman correlation and t-test were used to analyze the data.

RESULT(S): Study participants spent 74.5±29.9% and 6.7±3.4% of their preschool day engaged in sedentary PA (SPA) and moderate-to-vigorous PA (MVPA), respectively. Significant racial differences were observed for percent of time spent in SPA (African-American, 72.8±6.3%; Hispanic, 75.9±6.5%) and MVPA (AA, 7.6±3.7%; Hispanic, 5.8±3.0%). Parental over-reactivity score was significantly lower in African-American compare to Hispanic participants. Parental over-reactivity was significantly negatively correlated to percent of time spent engage in MVPA in all participants. In the African-American participants, parental over-reactivity was significantly positively correlated to the children’s percent of time spent in light PA. No other significant associations were found.

CONCLUSION(S): This study provides preliminary evidence that parental over-reactivity (i.e., displays of anger, meanness, and irritability) is associated with minority preschool-age children percent of time spent in MVPA.
P043  A pilot study of attractive features in children’s active video games  
Lau PWC

PURPOSE: The purpose is to explore the features that may affect children’s preference to active video game (AVG) to understand what types of AVG can attract children’s attention before applying it on intervention.

METHOD: Two AVG consoles were examined in this study: Wii boxing, Wii fit-plus obstacle run; EyeToy knockout, and Eyetoy Keep-ups. Thirty-five children aged 9-12 years were recruited in two primary schools in Hong Kong. Participants were asked to try out four selected AVGs with three minute for each. Then they were invited to participate in a 45-minute semi-structured focus-interview with an open-ended questionnaire, including demographics information, children’s non-active video experience and AVG experience, the features of a successful AVG in terms of the 16 selected AVG items based upon the literature search, and ratings to the selected AVG according to their preferences.

RESULT(S): The 16 features of a successful AVG were described including graphics, character, color, sound, control, pace, genre, story, consistency, feedback, goal, challenge, concentration, physical exertion, cognitive effort, and motivation. The following are the most influential features to their preference to an AVG based upon the interview and rating: control, feedback, goal, graphics, character, color, consistency, challenge. Overall score of item 1 to 16 items for Wii boxing, Wii fit-plus obstacle run; EyeToy knockout, and Eyetoy Keep-ups were 2.46, 2.69, 2.29 and 2.55 out of a 5-point scale. And the strengths and weaknesses of each AVG were elaborated, respectively.

CONCLUSION(S): Researchers should focus on the type of AVG to understand the features in order to attain the intervention effectiveness.

P044  Online registration of exposure, minor and major bicycle accidents in adolescents. A retrospective and prospective study  
Hanssen M, de Geus B, Meeusen R

PURPOSE: Bicycling has the potential to improve fitness, diminish obesity, and reduce noise, air pollution, and greenhouse gases associated with travel. But, before promoting cycling as a means to commute to school, the built environment should be safe(r), especially for youth. For the implementation of safety measures, a complete and accurate recording of minor and major accidents and the recording of the cycling exposure is essential. Analysis of bicycle accidents should not be restricted to police and hospital data, because only 7%-30% of accidents are recorded in these retrospective studies. Therefore the first purpose of this research project is to monitor and get insight in minor and major bicycle accidents, using a retrospective and prospective study design within the same area, focusing on adolescents. A second purpose is to record exposure data (e.g. cycling frequency, time, distance) to enable calculation of the incidence rate of bicycle accidents in adolescents.
METHOD: The study population will consist of 1000-1225 students from 4th-6th year of secondary school (15-18 yr-old), living and studying in Flanders (Belgium). To get insight in minor and major bicycle accidents retrospective and prospective questionnaires will be used. Exposure data and a detailed analysis of the built environment and accident locations will be collected with travel diaries and GPS tracers, during one year follow-up. The questionnaires and exposure sheets will be integrated in an online and email data collection system so that the project stays attractive for adolescents.

P045 The influence of home environment on motor skills and daily physical activity in toddlers

PURPOSE: This study was to investigate the association of home environment with motor skill ability and daily physical activity in toddlers.

METHOD: Toddlers aged 2 years (n=22) and 2.5 years (n=27) were included in this study. Children’s motor skills were assessed using Peabody Developmental Motor Scales, Second Edition. Physical activity was objectively measured using Actigraph accelerometers over a 7-day period. The mean time of physical activity (PA) and moderate-to-vigorous physical activity (MVPA) per day were calculated. In addition, the quality and quantity of motor opportunities in the home was assessed using a subjective questionnaire, Affordances in the Home Environment for Motor Development.

RESULT(S): With increasing age, toddlers showed better gross motor and fine motor skills as well as increased time spending in PA and MVPA (all p<0.05). For 2-year-olds, home environment was moderately correlated to children’s gross motor competency (r=0.54, p<0.05) but not to their PA or MVPA. For 2.5-year-olds, however, home environment, especially the indoor space, was significantly associated with children’s MVPA and PA (r=0.54, 0.57 respectively) but not with motor competency. Age of walking onset was significantly related to the amount of MVPA and PA in 2-year-olds (r=-0.48) but not in 2.5-year-olds.

CONCLUSION(S): From 2 to 2.5 years of age, children’s daily physical activity increases along with advancing motor skills. Environmental affordance of the home plays different roles in influencing children’s motor behaviors during early development. Motor opportunities provided in the home may facilitate motor development in early childhood but promote engagement in daily physical activity in later periods.

P046 Using GPS to define children’s routes to school: when should we bother?
Harrison F, Burgoine T, Corder K, Jones AP, van Sluijs E

PURPOSE: The school journey may make an important contribution to children’s PA and
provide exposure to food and PA environments. Typically GIS have been used to model assumed routes to school in studies, but these may differ from those actually chosen. We aimed to identify the characteristics of children and their environments which make the modelled route more or less representative of that actually taken. We compared modelled GIS and actual GPS routes in a free-living sample of children using varying travel modes.

METHOD: Participants were 175 13-14yr old children taking part in the SPEEDY study who wore GPS units for up to 7 days. Actual routes to/from school were extracted from GPS data, and shortest routes between home and school were modelled in a GIS. Differences between them were assessed according to length and percentage overlap using multilevel ordinal regression models.

RESULT(S): GIS routes underestimated route length by 21.5% overall, ranging from 8.4% among walkers to 23.4% for bus users. Percentage overlap ranged from 0-100% with a mean of 48.1%. Living in a village raised the odds of increased differences in length (OR 3.36 (1.32-8.58)), while attending a more urban school raised the odds of increased percentage overlap (OR 7.78 (3.89-15.56)).

CONCLUSION(S): Depending on the exposure and setting, GIS routes may describe actual environmental exposures to an acceptable level. They appear most accurate among urban populations living close to school, and travelling by foot. For samples with different characteristics, the additional expense of acquiring GPS data may be worthwhile.

P047  Overweight vs. normal weight: the difference in conscious and unconscious associations with physical activity

ten Hoor G, Plasqui G, Vreugdenhil A, Kok G

PURPOSE: It is known that people are not always able to explain the reasons for a specific behavior. To create a new, tailored, and effective physical activity (PA) program for obese youngsters, it is necessary to investigate their PA preferences on both an unconscious and conscious level.

METHOD: In a cross-sectional, observational study, 120 youngsters (60 overweight, 60 normal weight; 8-18 year) were asked to complete two implicit association tasks (computerized reaction time sorting-tasks) to determine their unconscious preference of PA vs. non-PA, and strength exercises vs. aerobic exercises. Questionnaires were used to determine their reasoned reactions.

RESULT(S): First analyses showed that non-overweight youngsters have a more positive association with PA, and aerobic exercises than non-PA and resistance exercises respectively. Overweight youngsters prefer non-PA over PA and have a negative or no associations with PA, strength-, and aerobic exercises.

CONCLUSION(S): Specific forms of PA might be more suitable for overweight youngsters.
**P048 The influence of physical education class context on physical activity in Mexican children**

Galaviz K, Gharib H, Barquera S, Lévesque L

**PURPOSE:** The physical education (PE) class environment has been shown to influence physical activity (PA) levels in school-aged children; however, this relationship has not been documented in Mexican children. The purpose of this study was to assess the influence of PE class factors on children’s PA during class. It was hypothesized that class context and professor behaviour would influence children’s PA.

**METHOD:** This cross-sectional study included 250 students in grades 3-5 from 20 public schools in Mexico City. The System for Observing Fitness Instruction Time (SOFIT) method was used to measure children’s PA (time spent laying, sitting, standing, walking and vigorously active), class content (time spent in management, knowledge lesson, fitness, skill practice and free play), and teachers’ behaviour (time spent promoting or demonstrating fitness, instructing, managing and observing) during class. Multiple linear regressions using the backward method were conducted.

**RESULT(S):** Boys represented 50% of the sample. The mean time spent in moderate-to-vigorous PA was 12 minutes (SD=6). The regression model with child gender, class context and professor behaviour variables as predictors accounted for 41% of the variance on children’s PA (R2=.41, p<.01). Time spent in free play (β=.63, p<.01), in fitness practice (β=.47, p<.01) and child gender (p<.01) were the only significant predictors of children’s PA during the PE class.

**CONCLUSION(S):** The context of the PE class, but not professor behaviour influences children’s PA. These findings will inform school-based strategies implemented in Mexico City by endorsing improvements in time spent promoting fitness and free active play during the PE class.

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**P049 Neighborhood environment and children’s physical activity in Hong Kong: application of the nominal group technique**

He G, Huang WYJ, Wong SH

**PURPOSE:** Neighborhood environment is shown to be consistently related to children’s physical activity (PA) in western countries. However, little is known about environmental attributes associated with children’s PA in Hong Kong which is an ultra-dense city. This study aimed to qualitatively investigate PA-related neighborhood environment from children’s perspectives using the nominal group technique (NGT).

**METHOD:** Five NGT groups were conducted among 34 children aged 10-11 years from four types of neighborhoods varying in socio-economic status and walkability in Hong Kong. In each NGT group, environment items were generated by children in response to the question “What neighborhood environment do you think would increase or decrease your willingness to do PA?” Items were prioritized based on the votes that they received from children as an
indicator of their importance to PA.

RESULT(S): Sixteen unique environment items, which were perceived by children as the most important factors influencing their PA, were identified. Items perceived as facilitators of children’s PA included “Sufficient lighting”, “Bridge or tunnel”, “Few cars on roads”, “Convenient transportation”, “Subway station”, “Recreation grounds”, “Shopping malls with air conditioning”, “Fresh air”, “Interesting animals”, and “Perfume shop”. Conversely, items perceived as barriers included “People who make me feel unsafe”, “Crimes nearby”, “Afraid of being taken or hurt at night”, “Hard to find toilet in shopping mall”, “Too much noise”, and “Too many people in recreation grounds”.

CONCLUSION(S): Specific PA-related environmental factors, which are unique in an ultra-dense city, were identified from Hong Kong Children. The findings could be used to develop validated questionnaires for future study.

P050 Age-related changes in children’s physical activity and sedentary behaviors over a two-year period in Hong Kong
Wong SH, Huang WYJ, He G

PURPOSE: This study aimed to determine two-year changes in accelerometer-assessed physical activity (PA) and sedentary time (ST) and to examine the socio-demographic factors associated with these changes among Chinese children in Hong Kong.

METHOD: Grade 1–3 schoolchildren were recruited in 2009 in a longitudinal study Understanding Children’s Activity and Nutrition (UCAN). At baseline (T1), one-year (T2) and two-year (T3) follow up, children’s PA and ST were assessed by wearing an ActiGraph monitor for eight consecutive days. Data from those children who provided accelerometer data at all the assessment points were analysed (127 boys and 107 girls). Tracking was assessed using partial Pearson correlations between baseline and follow-up measures, controlling for baseline age and body mass index (BMI). Generalized Estimating Equation (GEE) was conducted to assess the anthropometric and socio-demographic factors associated with changes in total physical activity (TPA), moderate-to-vigorous PA (MVPA) and ST.

RESULT(S): MVPA declined over a two-year period and tracked moderately from T1 to T2. ST increased from T3 to T1 and tracked moderately over the two-year follow-up for boys. The declines in TPA were greater among girls and overweight and obese children. The decrement of MVPA was more pronounced among older children measured at baseline, girls, overweight children and those with less educated parents. In addition, the increases in ST were greater among older children at baseline and girls.

CONCLUSION(S): MVPA decreased and ST increased over a two-year period among grade 1–3 Chinese children in Hong Kong. Interventions to promote an active lifestyle should be implemented in the early childhood.
P051 The preliminary study on correlates of lunch time physical activity during school days among adolescent girls: a social ecological perspective
Sun SL, Ha AS, Sit CHP, Burnett AF

PURPOSE: Evidences suggest lunch time during school days is a crucial time segment for moderate to vigorous physical activity (MVPA) among adolescent girls. Little study has employed social ecological perspective (SEP) to investigate correlates of lunch time PA (LTPA) among adolescent girls worldwide. The purpose of this study was to examine the contributions of correlates to LTPA among adolescent girls from SEP.

METHOD: This study was a cross-sectional design. 98 girls (Mage = 13.20± 0.92) were recruited from a secondary school. Participants completed a questionnaire to measure self-efficacy, enjoyment for PA, friends support, PE teachers’ support, school facilities and policy for LTPA opportunity. PA levels were assessed by wearing accelerometers seven days. LTPA was extracted according to the school schedule. Bivariate correlation was used to determine correlates those significantly associated LTPA, the correlates were entered in the linear multiple regression model to analyze the contributions.

RESULT(S): Only age was included in the model of MPA and MVPA during lunch time. The model accounted for 15.4% (β= -0.41, p<0.01) and 16.3% variance (β= -0.42, p<0.01) to MPA and MVPA during lunch time. Ages, enjoyment for PA and friends’ support were included in the final model of VPA during lunch time. The final model explained 29.1% variance. Age, enjoyment for PA, and friends’ support accounted for 13.4% (β= -0.38, p<0.01), 13.3% (β= 0.39, p<0.01) and 2.4% (β= 0.26, p<0.05) variance to VPA during lunch time.

CONCLUSION(S): Age, enjoyment for PA and friends’ support should be considered in designing programs for promoting adolescent girls’ LTPA during school days.

P052 Psychosocial and environmental correlates of sedentary and physical activity behaviours in Spanish children
Aznar Lain S, Queralt A, Molina-García J

PURPOSE: To examine psychosocial and environmental correlates of sedentary behaviour and moderate-vigorous physical activity (MVPA) in Spanish children.

METHOD: The study involved a total of 420 children (222 girls, 198 boys) aged 8-10 y, from the community of Madrid, Spain. All eligible schools were stratified according to location (urban, suburban and rural) and the socioeconomic profile of the uptake area (high, middle and low). The study sample was randomly selected using a two-stage cluster sample procedure, with schools in Madrid as primary sampling units. The secondary units were the children within the schools, and equal numbers of children were sampled randomly from each school. Sedentary behaviour and physical activity were objectively measured using accelerometers. Perceived competence, parental and peer support to physical activity,
physical environment and neighbourhood location were assessed by questionnaire. Regression analysis was performed to identify correlates of sedentary behaviour and MVPA.

RESULT(S): Parental support was positively associated with weekend MVPA in boys, while perceived competence was positively associated in girls. Perception of competence was negatively correlated with sedentary behaviour in both boys and girls. With regard to the girls, parental support and neighbourhood location were also negatively associated with sedentary behaviour.

CONCLUSION(S): Psychosocial and environmental variables were significant correlates of sedentary and physical activity behaviours in Spanish children.

P053 Environmental correlates of walking in a sample of Polish adolescents
Salonna F, Mitáš J, Fromel K, Groffik D

PURPOSE: The wide ranging physical and mental health benefits of physical activity during adolescence are well established and walking has been identified as one of forms of physical activity not to show a significant decrease in participation levels during transition from the primary to secondary school. This study investigated the relation of adolescents walking behaviour to neighbourhood design and recreational environmental design.

METHOD: This study is based on cross-sectional analyses of self-reported survey data. The sample consisted of 942 Polish adolescents (44.9% boys; mean age 15.8). Self-completion questionnaires were administered in classroom at randomly selected schools in Silesia and Malopolska Provinces (south Poland) during late 2012 and beginning of 2013. To measure the neighbourhood design and recreational environmental variables, modified version of Neighborhood Environment Walkability Survey – Abbreviated (NEWS-A) was used. To quantify the walking behaviour a part of International Physical Activity Questionnaire (IPAQ) was used. To assess the relation of adolescents walking behaviour to neighbourhood and environmental variables logistical regression models were computed separately for both genders.

RESULT(S): Regression analyses showed that environmental variables were related to walking behaviours although these relation were much more visible among girls. Walking for transport was associated with Land-use mix access, Street connectivity (only among girls) and Walking/cycling facilities. Recreational walking was associated with Aesthetics and Land-use mix access among girls whereas no association was found among boys.

CONCLUSION(S): Walking behaviours may take different forms depending on socio-demographic factors (e.g. gender or geographical location). Public health interventions need to adapt to match the variety of opportunities for walking.
P054  Perceived distance to sports facilities and objectively measured physical activity in Portuguese adolescents
Autran R, Pina F, Mota J, Rech CR, Santos P

PURPOSE: There is a need to understand the relations between places where people live and Physical Activity (PA) to better inform policies to promote higher PA participation. The aim of this study is to investigate the possible association between perceptions of distance to sports’ facilities (SF) and objectively measured PA among Portuguese adolescents.

METHOD: Data were obtained from 193 adolescents (54.9% girls) aged 14 to 18 years-old attending public schools in Porto municipality (Portugal). Census tracts were classified in three classes of socioeconomic status (SES) using Principal Components Analysis. The residences of the adolescents were georeferenced and overlaid with SES map. The PA was measured with accelerometers (Actigraph GT1M) during 7 consecutive days, considering 8 hours per day. PA intensity levels (moderate, vigorous and total PA) were classified using Evenson (2008) cut-points. Perceptions of distance to diverse SF (soccer field, recreation facilities, bike lane, urban parks etc.) were assessed with NEWS-Y survey. Partial correlate analyses were conducted to examine association between SF perceptions and PA adjusted to SES neighbourhood level.

RESULT(S): We found a positive association among recreation places and vigorous PA (r=0.22; p<0.01) and total PA (r=0.22; p<0.05). The proximity of urban parks (r=0.18; p<0.05) and bike lane (r=0.20; p<0.05) was associated with vigorous PA. We found no association with moderate PA and distance to SF perception.

CONCLUSION(S): This study suggests that adolescents having a perception of proximity to bike lane, recreation facilities and urban parks have higher level of vigorous PA. Supported by FCT/FCOMP-01-0124-FEDER-014697/PTDC/DES/11807/2009 and by PEst-OE/SAU/UI0617/2011

P055  Neighbourhood social capital as a moderator between cognitions and sports behaviour among Dutch adolescents
Prins RG, Beenackers MA, Boog M, van Lenthe FJ, Brug J, Oenema A

PURPOSE: This study aimed 1) to identify individual and social environmental correlates of compliance with the “fitnorm” (i.e. participating in sports at least three times per week) and 2) to examine whether neighbourhood social capital (NSC) moderates associations of individual correlates with compliance with the “fitnorm” during early adolescence.

METHOD: Cross-sectional analyses on data from the last wave of the YouRAction trial were conducted. Adolescents (n=811) completed a questionnaire asking for sports participation, perceived NSC, cognitions (attitude, subjective norm, perceived behavioural control and intention toward sport participation) and demographics. Ecometric methods were used to aggregate perceived NSC to the neighbourhood level. Multilevel logistic regression analyses (neighborhood and individual as levels) were conducted to examine associations of
cognitions and NSC with compliance with the fitnorm. Interaction terms between NSC and cognitions were added to examine moderation. Simple slopes analyses were conducted to decompose interaction effects.

RESULT(S): Preliminary results show that NSC is positively associated with compliance with the fitnorm (OR:5.0; 95%CI:1.0-24.6). Of the individual level cognitions, attitude (OR:1.3; 95%CI:1.0-1.6) and intention (OR:1.4; 95%CI:1.2-1.7) were positively associated with compliance with the fitnorm. NSC interacted with attitude and intention in such a way that when more NSC was present, the associations between the cognitions compliance with the fitnorm became stronger.

CONCLUSION(S): Attitude and intention were individual level factors associated with compliance with the fitnorm. On an environmental level, NSC was a potentially important correlate of compliance with the fitnorm; especially for individuals with a positive attitude and high intention towards sports behaviour.

P056 Studying Physical Activity in Children’s Environments across Scotland (SPACES)
McCrorie PRW, MacDonald S, Ellaway A

PURPOSE: Neighbourhood characteristics may play an important role in children’s physical activity (PA) and sedentary behaviour. However, in the UK, there is little knowledge of the extent to which this varies (e.g. by area deprivation or degree of rurality) nationally. This study investigates the effects of neighbourhood features (e.g. access to facilities and greenspace) on objectively measured PA and sedentary levels, using a nationally representative sample of 10-12 year olds from a range of areas in Scotland.

METHOD: Pilot work – A convenience sample of urban (n=15) and rural (n=15) children, from affluent/deprived areas, will be asked to wear two accelerometer devices (activPALTM and ActiGraph) as well as a Global Positioning System (GPS) device (Garmin Foretrex 301) for 7 consecutive days. Geographic Information System (GIS) software will map activity and overlay contextual information (e.g. location of PA facilities and greenspace). This preliminary work will assess the feasibility and acceptability of the proposed protocol. Main study – A nationally representative group of Scottish children (n=200, 10-12 years old), stratified by area deprivation and degree of rurality, will be sub-sampled from the Growing up in Scotland (GUS) study, and asked to follow the protocol developed in the piloting phase.

RESULT(S): We will report on the pilot study, to be conducted in early 2013.

CONCLUSION(S): This study has the potential to shed light on the time-space activities of children in differing socio-economic and geographical contexts, and provide evidence to inform public policy and the design of interventions tailored for particular groups and locales.
P057  GIS analysis of a walking school bus study
Oreskovic NM, Blossom J, Robinson AI, Uscanga DK, Chen T-A, Mendoza JA

PURPOSE: Environmental factors may influence whether children walk to school. A randomized control trial (RCT) in Houston demonstrated that children who participated in a walking school bus (WSB) program, where children walk to school accompanied by an adult(s), walked to school more and had greater physical activity than controls. However, environmental factors have not been described for WSB programs nor have their possible associations with outcomes been studied. We used Geographic Information Systems (GIS) to analyze the surrounding environments of the eight schools participating in the walking school bus RCT.

METHOD: Schools were geocoded with 1600 meter (1 mile) buffers created around each school, using both straight-line distance and street networks. GIS was used to assess the environment for the presence of factors thought to potentially influence walking to school: traffic counts, traffic signals, major roads (total meters), bicycle lanes (meters), police presence, street connectivity (intersections), mixed land-use (dissimilarity index), parks (square meters), and sidewalks (meters). Bivariate analyses (ANOVA) compared the presence of environmental factors in intervention and control schools, with significance set at p=0.05.

RESULT(S): No statistical differences were noted in the environments of intervention and control schools with either type of buffer.

CONCLUSION(S): There were no differences in the environments around schools participating in a WSB RCT. These results inform the positive results observed in the RCT, suggesting the observed benefits were attributable to the intervention rather than more favorable environments at the intervention schools. The results highlight the importance of WSB programs as tools to maximize physical activity in children.

P058  Does urban/rural location moderate associations between the physical environment and children’s active transport?
Hume C, Carver A, Salmon J, Timperio A, Crawford DA

PURPOSE: The purpose of this study was to examine whether urban/rural location moderates associations between the physical environment and children’s active transport.

METHOD: Children aged 5-12 years (n=489; 45% boys) were recruited to this cross-sectional study from socioeconomically disadvantaged areas in urban (33%) and rural Victoria, Australia. Mothers reported the usual frequency (trips/week) and duration (minutes/week) of their child’s active transport (walking/cycling) to/from school and other local destinations. Mothers also reported their perceptions of factors in the neighbourhood physical environment, including the type of street of residence, their perceptions of personal and traffic safety, and perceived access to play destinations in their neighbourhood. Interactions between the neighbourhood physical environment and children’s active transport were
examined using negative binomial regression models.

RESULT(S): Interactions between urban/rural location and both personal safety and traffic safety factors for walking frequency approached significance (p<0.10), as did access to destinations and urban/rural location for cycling frequency. After stratifying the sample based on location, personal safety was associated with greater walking frequency (IRR=1.31, 95% CI: 1.10-1.56, p=.003) among rural children, and traffic safety was associated with lower walking frequency (IRR=0.81, 95% CI: 0.69-0.95, p=.009) among rural children. Access to destinations was not significantly associated with cycling frequency in urban or rural children.

CONCLUSION(S): Both personal and traffic safety were associated with walking frequency among rural children, while no associations were evident among children living in urban areas. Further research is required in order to explore these associations further among rural children.

P059  The perceived distance for home-to-school trip is inaccurate and prevents active transport mode choices among adolescents: intervention is needed
Woods CB, Nelson NM

PURPOSE: Walking is a feasible activity through which individuals can increase their minutes of physical activity. School proximity to residential homes is an important determinant of active commuting. This study tested the accuracy of participant’s perceived distance in comparison to actual distance travelled to school, by mode of commuting, active or passive.

METHOD: Adolescents completed a questionnaire reporting mode and estimating distance and time taken for their usual trip to school. Subsequently, each participant drew the actual route travelled on a detailed street level map.

RESULT(S): Only those who lived within a criterion home-to-school distance (2.4km; N=199, mean age 15.9 ± 0.56, range 15-17 years) were included in the analysis. Passive commuters erroneously thought they travelled further to school than they actually did, and commuted greater distances than their active peers. Neither observation was correct. Active commuters were accurate in their perception of distance travelled to within 113m on average. For passive commuters, the average actual distance (1350m) travelled to school was significantly shorter than their perception of this distance (2700m; U = 2016.500, p<0.001).

CONCLUSION(S): Distance is an important perceived barrier to active commuting and a predictor of mode choice among adolescents. There is a need to develop interventions where accurate estimation of distance is taught through practical experiences as this could ameliorate this barrier and promote active transport choices in this target group.
P060  **How independently mobile are Australian children? Examining associations between independent mobility and physical activity**  
Schoeppe S, Duncan MJ, Oliver M, Badland H

**PURPOSE:** Purpose: To examine levels of independent mobility in children, and associations with moderate-to-vigorous physical activity (MVPA).

**METHOD:** Methods: Australian school children (n = 322) aged 8-13 years were recruited in 2011/2012. Children’s self-reported independent mobility was measured in two ways: (1) unsupervised travel such as walking, cycling or taking public transport to school and leisure-related destinations; and (2) unsupervised outdoor play. Mean minutes of daily MVPA were calculated using accelerometer counts per minute derived from an Actiheart device, worn on four consecutive days. Age and sex were adjusted for in models.

**RESULT(S):** Results: Preliminary findings using descriptive analyses and generalized linear models were conducted on a sub-sample (n = 96) due to survey data still being entered. Children’s independent travel to places such as school, friend’s houses and parks/playgrounds ranged between 30-45% of all usual travels. In contrast, 69% of children played independently outdoors on at least three days a week. Children who engaged in more days of independent outdoor play accumulated more daily MVPA than those engaging in fewer days. However, associations are non-significant to-date, potentially because of using a small sub-sample. Findings from the final analysis on the full sample will be presented at the conference.

**CONCLUSION(S):** Conclusions: Children have more freedom in playing outdoors in the neighbourhood than when travelling to various local destinations. Analysis of the complete dataset can inform the design of interventions to promote children’s independent mobility. Future research should investigate whether the promotion of independent mobility is a viable intervention strategy for increasing children’s physical activity.

P061  **How are active transport and independent mobility on school journeys associated with children’s physical activity in low socioeconomic areas?**  
Carver A, Veitch J, Sahlqvist S, Crawford DA, Hume C

**PURPOSE:** This study aimed to examine active transport (AT) and independent mobility (IM; i.e. walking/cycling without adult accompaniment) to and from school and their associations with children’s physical activity in low socioeconomic areas.

**METHOD:** Participants of this cross-sectional study were 311 children (boys 45%; age 8-15 years) who self-reported their usual travel mode (including multi-modal trips e.g., combining walking with use of public transport) and degree of IM (travelling alone/with friends or siblings in one/both directions) to and from school. Moderate-to-vigorous physical activity (MVPA) was objectively measured using accelerometers. Linear regressions examined
associations between: AT and MVPA on weekdays; degree of IM and AT, adjusting for age, sex, distance to school, accelerometer wear-time/days.

RESULT(S): Overall 25.5% of children used AT on all school journeys. Few children (n=6) combined walking/cycling with motorised modes. AT users (56.8%) made a median number of 8 (range 1-10) active school journeys per week with a median total duration of 50 (range 3-400) minutes. Total duration of active journeys was associated with total MVPA (B=0.08, 95%CI 0.04-0.12) while frequency and duration of these journeys were associated with non-school MVPA (B=0.72, 95%CI 0.26-1.19; B=0.07, 95%CI 0.04-0.10, respectively). Most AT occurred without adult accompaniment (e.g. 24.7% of children walked to school most days, 20.5% did this independently). IM (range 0-4) was associated with frequency of active journeys (B=1.00, 95% CI 0.67, 1.35) but not with total duration of journeys.

CONCLUSION(S): Future public health interventions should promote active transport to/from school as an important source of habitual physical activity among disadvantaged populations.

P062 Commuting to school by bicycle: Prevalence and socio-demographic predictors in a nationwide sample of German adolescents
Reimers AK, Peterhans E, Jekauc D, Wagner MO, Woll A

PURPOSE: To investigate how many adolescents from a nationwide sample in Germany cycle to school and which socio-demographic correlates encourage motorized mode of commuting to school.

METHOD: A nationwide representative sample of 1,828 German adolescents was examined between 2003 and 2006. Mean age was 14.2 years (SD=1.9). Mode of commuting to school was assessed using a reliable self-report measure. Socioeconomic status, migration background and residential area were assessed as socio-demographic variables using a parent-report questionnaire. Logistic regressions were calculated, separately for both sexes.

RESULT(S): Overall only 20.7% of girls and 24.6% of boys cycled to school. The logistic regression showed that in boys, the risk for motorized commuting was significantly influenced by residential area and migration background. In girls only residential area was a significant predictor. Boys with migration background had a 2.2-fold higher risk (95% CI=1.21-3.87) for motorized commuting to school than non-migrants. Boys and girls from cities (♂ OR=1.67, 95% CI=1.14-2.45; ♀ OR=1.90, 95% CI=1.26-2.86) and rural areas (♂ OR=5.15, 95% CI=3.21-8.28; ♀ OR=16.09, 95% CI=7.96-32.56) had a higher risk for passive commuting to school than their peers from medium-sized towns.

CONCLUSION(S): Not once in every four German adolescents went to school by bicycle. Furthermore, migration background and residential area seems to be important predictors for adolescents’ mode of transport to school.
P063  Children, parents and pets exercising together (CPET): an exploratory randomised controlled trial
Morrison R, Reilly JJ, Penpraze V, Westgarth C, Ward DS, Mutrie N, Young D, Yam PS

PURPOSE: The CPET study is the first exploratory randomised controlled trial (RCT) to develop and evaluate an intervention aimed at dog-based physical activity (PA) promotion in families. CPET aimed to assess the feasibility, acceptability and potential efficacy of a theory-driven, family-based, dog walking intervention for 9-11 year olds.

METHOD: CPET was an assessor-blinded RCT. Twenty-eight families were allocated to receive a 10-week intervention (IG) or to a control, no intervention (CG) condition. The primary outcome was change in child PA measured by accelerometry. Secondary outcomes were: changes in PA and sedentary time in parents and dogs and changes in time spent sedentary in children. A qualitative study was conducted with IG participants. Analysis was carried out on an intention to treat basis.

RESULT(S): At follow up, Twelve/Twelve CG families and 13/16 IG families were available for measurement. No significant differences between groups were observed for change in the primary outcome over the course of the 10 week intervention (mean difference in accelerometer count-per-minute (cpm) of 27 cpm, 95% CI (-70, 123), and -3 cpm, 95% CI (-60,54) for IG and CG children respectively, p = 0.62). The qualitative study suggested that the acceptability of the intervention and outcome measures were high.

CONCLUSION(S): CPET results suggest that a family-based dog walking intervention was feasible and acceptable. These preliminary findings will be used to further develop and power a ‘definitive’ RCT aimed at testing the hypothesis that a dog-walking intervention can be used to promote PA among families. Trial Registration number: ISRCTN85939423

P064  Relation between family health status and familial physical activity habit in parent and child: an exercise ecological study in Japan
Egawa K-i

PURPOSE: The purpose of an ecological study was to investigate relationship between family healthy status and familial physical activity habit in parent and child in a Japanese community.

METHOD: Parents of 3- to 14-year child were randomly sampled by child’s age and dwelling area in a rural city of Tokyo. Analyzed population consisted of 798 parents who provided valid responses in a mailed self-administered questionnaire. Parent-reported subjective family health status was rated from 0 mm (poor health) to 100 mm (good health) using a visual analogue scale (VAS). Familial physical activity was distributed ‘not less than once a week (W group: 6.0%)’, ‘not less than once a month (M group: 17.7%)’, ‘several times in a
year (Y group: 25.2%), ‘seldom engaged (S group: 33.0%)’ and ‘not engaged at all (N group: 18.2%)’.

RESULT(S): Median (inter quartile range) of VAS score was 90 (15) in the W group, 85 (15) in the M group, 80 (20) in the Y group, 80 (20) in the S group, and 80 (30) in the N group. VAS score was statistically related to frequency of familial physical activity (P < 0.001).

CONCLUSION(S): The results suggested that family health status related to familial physical activity in the investigated community. Therefore, familial physical activity habit in parent and child would be promising way to promote family health in child bearing generation in Japan.

**P065**  
**Intention to be physically active: relationships with physical self-concept and motivation in Spanish high school students**  
Cuevas R, Contreras O, García-Calvo T

PURPOSE: The aim of the study was to know which are the motivational factors and physical self-concept variables that more strongly predict the intention to be physically active.

METHOD: Using achievement goal theory (Nicholls, 1990) and theory of planned behaviour (Ajzen, 1985) as framework, 270 students (131 men and 139 women; M age = 15.66, SD = 2.26) of seven High Schools of Spain completed a quantitative questionnaire to assess achievement goals 2x2, intrinsic motivation, physical self-concept and intention to be physically active.

RESULT(S): Descriptive statistics, reliability analysis, correlation analysis, and a stepwise linear regression analysis were performed. The results show that the variable that more strongly predicts the intention to be physically active was the intrinsic motivation, followed by sport competence, mastery-approach, physical strength, physical condition, and, negatively, physical general self-concept.

CONCLUSION(S): These data suggest that the intrinsic motivation should be enhanced in physical education classes in order to improve the adhesion to physical activity. Also, the relevant impact of the competence perception in the intention to be physically active was highlighted.

**P066**  
**Maximum likelihood estimates of leisure-time physical activity aggregation in Portuguese families**  

PURPOSE: Familial aggregation in physical activity levels is shown to have a complex network of connections related to parental modelling, support, encouragement, and attitudes/beliefs sharing. Not many studies addressed the effects of genetic factors in this aggregation. We
aim to dissect familial correlation patterns, and estimate the magnitude of genetic factors in leisure-time physical activity (LTPA).

METHOD: Portuguese nuclear families (nf=332), comprising two-generations (parents and siblings, nt=1316) were sampled. Siblings’ age was limited to 10-14 years. LTPA was calculated with the Baecke questionnaire. Family correlation patterns in terms of parental transmission were tested by $c^2$ tests, and genetic factors ($h^2$) adjusted for age, sex, age2, sex*age, sex*age2 were computed within S.A.G.E. v.6.3 software using robust maximum-likelihood estimation techniques.

RESULT(S): Parents-siblings correlations ($r_{po}$) were sex-independent Chi-Square=0.561, $p=0.905$: $r_{po}=0.178\pm 0.038$, $p=0.0001$; siblings correlations ($r_{ss}$) also showed no sex-specificity (Chi-Square=0.561, $p=0.905$): $r_{ss}=0.348\pm 0.049$, $p=0.0001$; parents correlation ($r_{pm}$) was, $r_{pm}=0.295\pm 0.055$, $p=0.0001$. After covariate adjustments, total LTPA variance was portioned into two components: random=$0.209\pm 0.015$, and polygenic=$0.105\pm 0.016$; genetic factors amounted to $0.334\pm 0.049$, $p=1.00e-7$.

CONCLUSION(S): Low-to-moderate significant correlations were found among family members. No sex-specific associations were identified in LTPA vertical transmission from parents to their offspring; the same occurred among siblings. Genetic factors accounted for by a moderate effect in LTPA levels, 33% (1/3 of the total variation).

P067 How to maintain a physically active lifestyle during the transition from elementary to secondary school?
Rutten C, Boen F, Seghers J

PURPOSE: The transition from childhood to adolescence involves an important event and often coincides with the transition from elementary to secondary school. The purpose of this study was to examine which personal, social and physical school- and home-based factors at age 11-12 (6th grade, elementary school) predict pedometer-determined physical activity (PA) at age 13-14 (8th grade, secondary school).

METHOD: A prospective cohort study was conducted including complete data from 472 children and their parents. Children were asked to wear a pedometer for seven days and to complete questionnaires concerning pubertal status, intrapersonal factors (e.g., autonomous motivation to engage in physical education), interpersonal factors (e.g., social support from PE teacher) and the perceived school environment. Parents provided information concerning socio-economic status, PA-related parenting practices (e.g., logistic support) and the home/neighborhood environment (e.g., safety). Children’s height and weight were measured. Analyses were performed using hierarchical regression analyses.

RESULT(S): Contrary to what we expected, pedometer-determined PA increased significantly from elementary to secondary school. Boys ($\beta = -.11$), children with a lower pubertal status at age 11-12 ($\beta = -.09$), children with higher PA levels at age 11-12 ($\beta = .44$), and children with more parental logistic support at age 11-12 ($\beta = .11$) were more physically active at age
13-14. The complete model explained 39.1% of the variance.

CONCLUSION(S): PA at the end of elementary school predicts PA at age 13-14. Furthermore, the results show that parents should be aware of their supportive role (i.e., logistic support) in the promotion of an active lifestyle.

P068 The physical activities regularly in adolescents with an intellectual disability
Yen C-F, Lin J-D

PURPOSE: The aims of the present study were to scrutinize the profiles of physical activities regularity and to exam their determinants for adolescents with an intellectual disability.

METHOD: A cross-sectional survey design was employed in the present study. The study samples choose by multistage sampling from the National Register of the Disabled in Taiwan, those individuals with an intellectual disability whose aged 12-18 years were recruited in the study. Finally, there were 1,419 subjects included in the study. Data was collected by a mail-structured questionnaire that was completed for each individual by their main carers.

RESULT(S): The results found that 39.5% subjects did physical activities regularly, 1.5% were smokers, and there were 0.5% used betel-nut. In daily food intake, the results showed that their intake in vegetable, nutritious milk-products and fruits were lower than the general adolescents. The subjects also consumed sweeter beverage than the same age of general population. The related risk factors of their regular physical activities are aboriginals, obesity, the habits of nutrition supplement intake, general or special health examination, and the use of pneumococcus vaccination (p<0.05). There were non-significance in gender, severe level of disability, household income, family resident and self-percepted health status.

CONCLUSION(S): The study suggests that the health authorities should pay more attention to promote the physical activities regularly for adolescents with an intellectual disability through these risk factors in the future.

P069 Parental and peer support on physical activity of children and adolescents: results from the PESSOA study
Pereira SG, Palmeira AL, Martins SS, Minderico CS, Sardinha LB

PURPOSE: This cross-sectional study investigated how parental and peer support were associated with physical activity (PA) among children and adolescents, examining gender and age differences.

METHOD: Participants were 1876 Portuguese boys and girls, aged 10-17 years old (M = 12.27, SD = 1.29), from fourteen high schools of municipality of Oeiras, Portugal, engaged in
the PESSOA study. Measures included objectively recorded PA (Actigraph GT1M, n=613) and parental and peer support items from the PEACH questionnaire (Page et al, 2009).

RESULT(S): Boys were more active and reported higher levels of perceived tangible parental support and peer support (p<.001). Controlling for gender and BMI categories, the higher levels of moderate to vigorous physical activity (MVPA) were associated with higher peer support (p<.001). We divided the sample in age groups and verified that there is an increase of the association from childhood to adolescence. There was no association between intangible parental support and all levels of PA. Age was negatively correlated with MVPA (p<.001), tangible parental support (p<.001) and intangible parental support (p<.05). In both sexes, peer support revealed more associations with PA than parental support.

CONCLUSION(S): Parental and peer support were associated to MVPA. This association was different by age and gender. Unlike the parental support, the peer support increased with age in both sexes. Boys reported higher levels of parental and peer support.

P070  Relationships between sports club membership and movement patterns in 6-year-old Swedish children
Nyberg G, Ekblom Ö, Hagberg J, Elinder LS

PURPOSE: Sedentary behaviour is related to a number of health outcomes. Sports club membership is often used as a proxy for physical activity and is also frequently promoted as a mean to increase physical activity or decrease sedentary behaviours. However, the influence of membership on movement patterns is not well known and research on correlates of sedentary behaviour is limited. The purpose of this study is to investigate associations between sports club membership and movement patterns in children.

METHOD: The study was conducted as a cross-sectional study with six-year-old children (n=186). Sedentary time and physical activity (PA) were measured by accelerometry, screen time and sports club membership by questionnaire. Associations between sports club membership and the following outcomes; total physical activity (TPA), time spent sedentary and time in moderate to vigorous physical activity (MVPA) were assessed with MANOVA adjusting for gender.

RESULT(S): Children who were members of sports clubs had significantly lower screen time (-17.6 minutes, p=0.04), a tendency for higher TPA (53 counts per minute, p=0.052) and a tendency for lower sedentary time (-10 minutes, p=0.06) compared to children not being members of sports clubs. There was no difference between members/non-members in time spent in MVPA (p=0.52).

CONCLUSION(S): Children who are members of sports clubs have lower levels of sedentary behaviour. Currently, little is known about effective strategies for decreasing sedentary behaviour. Importantly, sports club membership may be a potential component in future interventions for decreasing sedentary behaviour in children.
P071  **Attraction to PA mediates the association of perceived competence and school-aged children’s physical activity in a longitudinal setting**  
Määttä S, Ray C, Roos EB

**PURPOSE:** Perceived competence and attraction to physical activity (PA) are associated with physical activity. However, less is known of the longitudinal associations between perceived competence, attraction to PA, and PA. In this study, it is hypothesized that a child who has a higher perceived competence is more physically active two years later. In addition, attraction to PA is mediated between the association of perceived competence and PA.

**METHOD:** The baseline data was collected from 10-11 years old children in year 2006 (n=745, response rate 65 %) and the follow-up data in 2008 (n=676, response rate 91 %). PA was measured both times and it was a continuous variable including four questions of the school-time and leisure-time PA. Children’s perceived competence in PA measured in 2006 and attraction to PA measured in 2008 were sum variables consisting of several separate questions. Linear regression analysis and a bootstrapping method adjusted with gender, weight status, and PA in 2006 were used for analyzing the associations.

**RESULT(S):** Children who perceived their competence higher in 2006 were more physically active two years later and the association remained when adjusted with PA at baseline. Attraction to PA in 2008 mediated the association between perceived competence and PA. This model accounted for 29 percent of the variance in children’s PA.

**CONCLUSION(S):** Perceived competence is an important predictor for attraction to PA and maintaining PA levels. Interventions designed to strengthening the children’s perceived competence are valuable when promoting PA in children.

P072  **Parents’ perceived barriers to using local park and youth physical activity**  
Geary N, Hipp A, Dodson E, Duling L

**PURPOSE:** Over 25% of U.S. adults and 17% of youth are obese. Obesity is a risk factor for chronic diseases and certain types of cancer. Physical inactivity and obesity disproportionately impact minority and low-socioeconomic populations. This research sought to address whether parents’ perceived barriers to using the local park predicts time youth spend in physical activity (PA).

**METHOD:** Surveys were mailed to a random selection of households living in the West End neighborhood of St. Louis, Missouri. Only households with children were selected (n=146). Poisson regression tested the association between perceived barriers (e.g., no choice of activities and not safe because of crime) and the amount of time youth spent in PA.

**RESULT(S):** 65% of the sample was African American, 62% had a college degree or less, and
52% earn less than $30,000 (U.S) per year. No choice of in-park activities was a significant predictor of time youth spent in PA (RR=.70). The perception of the local park being unsafe had a rate ratio greater than 1 (RR=1.16).

CONCLUSION(S): Children of parents who believed no choice of activities was a barrier were 30% more likely to be physically inactive. Activities, such as Safe Routes to School, may be necessary to increase PA in communities like the West End. Surprisingly, children of parents who perceived the park to be unsafe were more likely to be physically active. One possible explanation may be parents who supervise their children in the local park are more likely to see neighborhood social disorder, thereby increasing perceptions of crime.

P073 Correlates of physical activity in adolescent girls
Lee L-L, Liao Y

PURPOSE: To examine correlates of physical activity in oriental adolescent girls.

METHOD: A questionnaire survey was conducted in a group of first-year junior college students, aged 16 to 17 years. Data of potential correlates of physical activity, such as self-rated health status; exercise self-efficacy; perceived benefit and barriers of exercise; support from tutors, peers, and family; perceived stress and depression were collected via face-to-face interviewing.

RESULT(S): A total of 191 girls with mean age of 16.3 (SD=0.449) was recruited in the present study. Among potential correlates listed, perceived exercise self-efficacy (p=.005) was found to be the only significant factor correlating to total metabolic equivalents (METs) in the group of adolescent girls (p=.049).

CONCLUSION(S): Among adolescent girls, perceived exercise self-efficacy was the unique factor relating to their physical activity, presented as METs in the regression model. Enhancing confidence in involving exercise may perform an important role in designing intervention aiming to improve physical activity.

P074 Parental role in children physical activity: a comparative study
Gobbi E, Brandl-Bredenbeck HP, Carraro A

PURPOSE: The purpose of this study was to explore the phenomenon of physical activity (PA) parenting in a sample of Italian and German children with a social ecological approach.

METHOD: A sample of 71 4th grade children of two primary schools in the North-east of Italy (n = 37) and two in the North-west of Germany (n = 34), and their two parents (n = 142) participated in the research. Participants wore a tri-axial accelerometer for 7 consecutive days, and completed a battery of questionnaires to assess self report PA levels, enjoyment during PA, importance of PA, parental support and perceived parental support, children self-
efficacy and perceived environment accessibility and safety.

RESULT(S): ANOVA analysis showed significant differences between Italian and German children variables. Italian children scored higher on importance of sport while German children scored significantly higher on PA levels, perceived parental support, self-efficacy, equipment accessibility and perceived neighbourhood safety. Positive associations were found between children PA and children personal variables as enjoyment of PA, perceived parental support, self-efficacy in practising sport and their SES.

CONCLUSION(S): Perceived parental support seemed to be a key element in increasing children PA level. These findings further sustain the notion that to increase childhood PA levels it may be necessary to promote PA among parents. Health promotion interventions should also reinforce the importance of environment accessibility and safety.

P075 Differences between 9-11 year old British Pakistani and White British girls in physical activity and behaviour during school recess

Pollard TM, Hornby-Turner YC, Ghurbhurrun A, Ridgers ND

PURPOSE: Previous studies indicate that children and adults of South Asian origin are less active than other ethnic groups in the United Kingdom, but have not investigated whether activity differs within the shared school environment. The aim of this study was to test the hypothesis that British Pakistani girls aged 9-11 years are less active during school recess than White British girls.

METHOD: The proportion of recess spent by 70 White British and 67 British Pakistani girls in activities of different intensities was determined using accelerometry. In addition, 48 White British and 38 British Pakistani girls were observed on the playground using the System for Observing Children’s Activity and Relationships during Play (SOCARP).

RESULT(S): British Pakistani girls spent 2.2% (95% CI: 0.2, 4.3) less of their total recess time in moderate-to vigorous physical activity (MVPA) and 1.3% (95% CI: 0.2, 2.4) less in vigorous physical activity (VPA) than White British girls. Direct observation showed that British Pakistani girls spent 12.0% (95% CI: 2.9, 21.1) less playground time being very active, and 12.3% (95% CI: 1.7, 23.0) less time playing games. Time spent being very active according to direct observation correlated significantly with accelerometer-assessed time spent in MVPA and VPA, and time spent playing games correlated significantly with accelerometer-assessed time spent in VPA, suggesting that observed differences in behaviour contributed to the differences in time spent in MVPA and VPA.

CONCLUSION(S): British Pakistani girls were less active than white British girls during school recess. School-based interventions should address this ethnic difference.
P076  Pupils’ preferences for health-related exercise activities in physical education lessons
Beaumont LC

PURPOSE: The continued concern over young people’s health and physical activity levels highlights the importance of educating young people about how to make healthy lifestyle choices. In UK physical education (PE), health-related exercise (HRE) is the aspect of the curriculum that is concerned with teaching young people knowledge, skills and understanding for lifelong physical activity participation. Previous research has focused on PE teachers’ views about HRE lesson content. As a result, little is known about pupils’ preferences for HRE activities. The purpose of this research was to explore pupils’ preferences for HRE activities in secondary school PE lessons.

METHOD: Forty-seven pupils (35 male, 12 female; 11-16 years) from four secondary schools participated in a qualitative multi-site design that utilised semi-structured interviews. Interview transcripts were transcribed, coded and analysed.

RESULT(S): Circuit training was the most popular HRE activity reported by pupils (25.7%) because it was enjoyable, allowed for the delivery of in-depth HRE content, and provided the opportunity to undertake a variety of tasks within a lesson. Athletic-type activities and the multistage fitness test were the next most popular (21.4% and 17.1%, respectively).

CONCLUSION(S): The results provided an important insight into pupils’ HRE activity preferences. Knowledge of pupils’ preferences for HRE activities provides a basis for future planning and development of meaningful and effective programmes. The development of such programmes across schools in the UK cannot be underestimated given the declining physical activity levels in young people. Practitioners and curriculum planners should consider ‘pupil voice’ when implementing future HRE programmes.

P077  Psychometrics of new scales of parenting practices to encourage or discourage Hispanic preschool children’s physical activity
O’Connor TM, Cerin E, Hughes SO, Robles J, Lee RE, Mendoza JA, Nicklas TA, Baranowski T

PURPOSE: Develop and assess the psychometrics of a new instrument for parenting practices (PP) that encourage or discourage physical activity (PA) in Hispanic preschool children.

METHOD: Cross-sectional study of 240 Hispanic parents who reported their demographics and frequency of using PP that encourage (structure and encouragement) or discourage (promoting inactivity, psychological control, safety concerns) their 3-5 year old child’s PA (38 items). Test-retest reliability was assessed in 20% who completed the questionnaire a second time, 2 weeks later. Confirmatory factor analyses (CFA) assessed the fit of a-priori and revised models.
RESULT(S): 95% of respondents were mothers; 42% had more than a high school education. Child mean age was 4.5 (±0.9) years (52% male). The a-priori 5 sub-factor model had poor fit. Items that did not load well (factor loadings < 0.3) or loaded on multiple factors were dropped. Factors that highly correlated were combined. The final CFA for Encouraging PA PP had one multiple-item scale, encouragement/structure (15 items), and two single-item scales (have outdoor toys; not enroll in sport) (RMSEA 0.060, CFI 0.90, NNFI 0.90). The final CFA for discouraging PA PP had 4 subscales: promote inactive transport (3 items), promote screen time (3 items), psychological control (4 items) and safety (4 items) (RMSEA 0.041, CFI 0.95, NNFI 0.94). Test-retest reliability (ICC) ranged from 0.56-0.85.

CONCLUSION(S): The final models for encouraging and discouraging PA PP had moderate to good fit, with moderate to excellent test-retest reliabilities. This new instrument should be further evaluated to assess its association with children’s PA.

P078 Differences between 9-11 year old British Pakistani and White British girls’ physical activity and sedentary behaviour
Hornby-Turner YC, Summerbell C, Hampshire K, Pollard TM

PURPOSE: British South Asians are less physically active than their White British counterparts. There is self-report evidence suggesting that physical activity levels of British Pakistani girls are particularly low. This mixed-method study aimed to provide objective measurements of physical activity and sedentary time, and self-reported activity behaviour of British Pakistani and White British girls aged 9 to 11 years.

METHOD: Eighty-two British Pakistani and 82 White British girls were recruited from seven primary schools in North-East England. Accelerometry was used to collect objective measurements of physical activity and sedentary time for four days. Three previous day activity recalls were used to collect self-reported activity behaviour.

RESULT(S): British Pakistani girls accumulated: 148 (95% CI: 95, 201) fewer counts per minute, per day; 19 (95% CI: 11, 26) fewer minutes in moderate-to vigorous physical activity and 5% (95% CI: 3, 7) more sedentary time, compared with White British girls. According to activity recalls British Pakistani girls accumulated: 14 (95% CI: 0.4, 28) fewer minutes, per day, in sport and exercise; 24 (95% CI: 13, 37) fewer minutes in outdoor play and 4 (95% CI: 0.1, 8.3) fewer minutes in active modes of school transport. There was no significant difference in screen time.

CONCLUSION(S): British Pakistani girls were less physically active and more sedentary, compared with White British girls, which may contribute to greater risk of type 2 diabetes and cardiovascular disease in British Pakistani women. Interventions are needed to address this ethnic group difference.
P079 Culturally And Linguistically Diverse (CALD) differences in psychosocial correlates of physical activity and sedentary behaviour between Chinese-Australian and Anglo-Australian adolescents
Strugnell C, Renzaho A, Ridley K, Burns C

PURPOSE: Evidence suggests that adolescents from an Asian background tend to engage in lower levels of physical activity (PA) compared to their non-CALD peers. Differences in perceived psychosocial influences on PA participation may help explain these differences. This study examined differences in perceived influences and relationships with objectively measured PA among a sample of Chinese-Australian and Anglo-Australian adolescents (12-16y).

METHOD: Two-hundred and ten Chinese-Australian and Anglo-Australian adolescents (14.0 y ± 1.2) were recruited using a two-step sampling procedure involving 12 separate Chinese-weekend cultural school campuses and two secondary schools in metropolitan Melbourne. Thirty-two psychosocial statements relating to PA were examined using a self-report questionnaire. Daily light intensity physical activity, moderate-to-vigorous intensity physical activity (MVPA) and sedentary time were collected using 7-day accelerometry. Multiple hierarchical linear regression analyses were used to examine the relationship between factorised psychosocial influences, physical activity and sedentary time after controlling for a range of covariates (age, gender and socio-economic status).

RESULT(S): Significant CALD differences on several psychosocial influences were observed, particularly parental support, lack of time and parental educational preference among Chinese-Australian adolescents (P<0.05). Multivariate regression models found the Psychological- Preference/Attitude factor was positively related to daily sedentary time among Chinese-Australian adolescents (B= 9.2, 95% CI: 1.02; 17.35 mins.d-1). No other significant correlations with objectively measured activity were observed. There was considerable variation in the variance explained by the entire factor structure between CALD groups

CONCLUSION(S): These findings help further our understanding of the underlying influences relating to physical activity and sedentary behaviour participation among Chinese-Australian adolescents.
Validation of a scale to measure parent emotion during feeding
Frankel LA, Hughes SO, Chen T-A, Orlet Fisher J

PURPOSE: Questionnaires developed to measure parent-child interactions that may contribute to childhood obesity need to be context specific. Although general emotions have been conceptualized as two separate constructs (positive emotions and negative emotions), a measure of parental emotions during the feeding experience is needed to provide a better assessment of feeding interactions that may influence the development of child eating behaviors. The aim of this study is to develop a measure of positive and negative emotions in the context of parent-child feeding interactions.

METHOD: An expert panel came up with 20 emotional descriptors of the two constructs of interest. Hispanic and black (n=296) parents with preschoolers in Head Start were asked to rank these emotional descriptors on a 5-point Likert scale in response to the following: “How often have you felt this way when FEEDING your child?” The 20 items were categorized as either positive or negative by a panel of 5 experts. Confirmatory Factor Analysis was used to confirm the model with Positive and Negative Emotions as two separate subscales with correlated paths.

RESULT(S): Analyses suggested a good fit with indices as follows: RMSEA = 0.07, CFI = 0.96, chi-square statistic $\chi^2$ (169, n=296) = 413.86, p<.001), TLI = 0.95, SRMR = 0.08.

CONCLUSION(S): Parenting has been posited to be domain specific. The Feeding Emotion Scale is a new measure of parent emotions during feeding to assess the constructs of positive and negative emotions during feeding. This context specific measure may provide a better measure of problematic parent-child feeding interactions.

Scales for a Model of Goal Directed Self Determined Vegetable Parenting Practices (MGDSDVPP)
Baranowski T, Beltran A, Chen T-A, Thompson D, O’Connor TM, Hughes SO, Diep C, Baranowski JC

PURPOSE: Parents of preschoolers often report not being able to get their child to eat vegetables (V). To both design intervention programs and understand why parents might employ effective vegetable parenting practices (EVPP), the Model of Goal Directed Self Determined Behavior (MGDSDB) was selected. This presentation will describe the psychometric characteristics (exploratory factor analysis factor loadings, confirmatory factor analysis fit indices, items, means, standard deviations, Cronbach alphas, and validity coefficients) of new scales in a MGDSDVPP: attitudes, norms, behavioral control, anticipated emotions, self efficacy, barriers, habit, desire (intrinsic motivation), and intention.
METHOD: Intensive qualitative interviews were conducted with parents of preschool children to generate and revise items. An internet survey was conducted. Exploratory Factor Analyses used the scree plot criterion. Confirmatory Factor Analyses tested the fit of the exploratory factors. Classical Test Theory procedures were employed with all scales. Pearson validity correlations were conducted between each scale and composite EVPP and IVPP scales.

RESULT(S): Complete data were obtained from 307 parents of preschoolers. Twenty-six subscales within 10 scales were extracted. Cronbach alphas varied from 0.31 to 0.92, with 16 being 0.70 or higher. Most of the alphas <0.7 had only 3 or 4 items. Almost all items were significantly bivariately correlated with the composite EVPP or IVPP scales.

CONCLUSION(S): Most subscales displayed desirable to acceptable psychometric characteristics. Items need to be added to the subscales with small numbers of items. Alternative items may be needed to predict IVPP among older children.

P082 Predicting use of ineffective vegetable parenting practices with the model of goal directed self determined behavior
Baranowski T, Beltran Al, Chen T-A, Thompson D, O’Connor TM, Hughes SO, Diep C, Baranowski JC

PURPOSE: Parents of preschoolers often report not being able to get their child to eat vegetables, and may be using ineffective vegetable parenting practices (IVPP). To understand why parents might employ IVPP, the Model of Goal Directed Self Determined Behavior was employed. This paper presents modeling of IVPP using scales from a Model of Goal Directed Self Determined Vegetable Parenting Practices (MGDSVPP).

METHOD: An internet survey assessed parent agreement with items. Block regression procedures were used with composite IVPP scale. Backward deletion was employed for variables with p<0.10.

RESULT(S): Among 307 respondents with complete data, technical school graduates were least likely to use IVPP. No other demographic characteristics were related to IVPP. With all variables tested, Intention to actively involve the child was positively related, while Controlling intentions were negatively related, to IVPP. Other significant positively related final model predictors included desire (intrinsic motivation) and Habit for controlling vegetable practices. Other significant negatively related final model predictors included autonomy, negative response negative behavior emotions, perceived behavioral control of negative parenting practices and perceived negative effects of vegetables. The final model’s adjusted R squared was 0.404.

CONCLUSION(S): This was the first report of psychometrically tested scales to predict use of IVPP. Further research is needed to assess the predictiveness of these scales of parenting practices in longitudinal samples; in targeting variables in vegetable parenting practices interventions; and in assessing impact of intervention programs.
P083  Predicting use of effective vegetable parenting practices with the model of goal directed self determined behavior
Diep CS, Baranowski T, Beltran A, Chen T-A, Thompson D, O'Connor T, Hughes S, Baranowski J

PURPOSE: Vegetable intake should be established early in life, but many parents of preschoolers report not being able to get their child to eat vegetables. The Model of Goal Directed Self Determined Vegetable Parenting Practices (MGDSDVPP), based on the Model of Goal Directed Behavior and Self-Determination Theory, is useful for understanding and predicting parenting practices to encourage a preschooler’s vegetable intake. The purpose of this study is to present modeling of effective vegetable parenting practices (EVPP) using MGDSDVPP's construct scales.

METHOD: Parents (n = 307) completed an internet survey on MGDSDVPP items. Path analysis was conducted using attitudes, norms, perceived behavioral control, anticipated emotions, competence/self-efficacy, desire, autonomy, relatedness, habit, intention, perceived barriers, and the composite score of EVPP scales.

RESULT(S): Paths between 1) perceived behavioral control and desire, 2) competence/self-efficacy and desire, 3) anticipated emotions and desire, 4) competence/self-efficacy and intentions, 5) habit of active child involvement in vegetable selection and intention, 6) habit of active child involvement in vegetable selection and EVPP, 7) habit of positive vegetable environment and EVPP, 8) habit of positive vegetable communications and EVPP, and 9) perceived barriers and EVPP were all statistically significant. The final model's R squared was 0.485.

CONCLUSION(S): This was the first study to test scales to predict use of EVPP. Only paths from perceived barriers and three habit subscales contributed directly to EVPP. Further research needs to assess these MGDSDVPP scales in their a) predictiveness of child dietary intake in longitudinal samples and b) utility in vegetable parenting practices interventions.

P084  Infant and young child feeding practicies according to the WHO indicators in Varna, Bulgaria
Usheva N

PURPOSE: To assess the infant and young child feeding practicies according to the WHO indicators from 2008

METHOD: The cross-sectional study of 1287 mothers (having children of age between 0 and 36 months) was conducted in 2009. The mothers completed a theory-based questionnaire about the breastfeeding practicies and social influences together with expectation and intention for breastfeeding while pregnant.

RESULT(S): The early initiation of breastfeeding (within 1h of birth) was only 1,8% (mean – 12 hours). Exclusive breastfeeding under 6 months was determined in 21,9% of infants and
for infants 4-5 months – 5,4%. Median duration of breastfeeding was 2 months. Continued breastfeeding at 1 year – 16,3%. Introduction of solid, semi-solid of soft foods at 6-8 months - 73,9%. Minimum dietary diversity between 6-23 months is 84,1%. Multiple regression analysis showed a positive significant association between the duration of breastfeeding and the educational level of the mothers (p<0,001) and their breastfeeding awareness (p<0,01). High social support (p<0,05), the education level of the mothers (p<0,001), previous lactation experience for more than 2 months (p<0,01), existence of breastfeeding preparation during pregnancy (p<0,01) and early initiation of lactation (≤ 2 hours; p=0,03) were positively associated with the duration of breastfeeding. Sweetened water intake by infants, early introducing of complementary food (<4 months) were negatively associated with the breastfeeding duration (p=0,001). Minimum dietary diversity in the lowest educational groups is under 50%.

CONCLUSION(S): The indicators for assessing of infant and young child feeding practicies have negative characteristics especially for mothers with low edicational level.

P085 What is there to be afraid of? Young children’s conceptions and experiences of trying new foods

PURPOSE: Food neophobia, often defined as fear of new foods, can result in food rejection by young children and suboptimal diet quality. Previous work with children about food rejection has focused on disgust/contamination. Utilizing a grounded theory approach, children’s thoughts were elicited about the experience, emotions and consequences associated with trying new foods and what it means to be a “picky eater.”

METHOD: A short story, Paul the Picky Eater, was developed, piloted and read to children by their teachers during storytime (3 preschools, 6 classrooms; n=86, 49 boys, 37 girls; 3–6 y) in Denver, Colorado. After reading the story, teachers asked children scripted questions about why the character refused to try new foods, the character’s emotions, their reasons for declining to try new foods and the consequences of trying new foods. A constant comparative method of data analysis was utilized.

RESULT(S): That food might taste bad was the prime reason the character did not try the food and being asked to try new foods resulted in negative affect. Their reasons for declining foods included physical reactions (choking, vomiting, bad taste, disgust) and feeling scared. Potential positive consequences included that the food might taste good and then could be eaten again. Most children could not verbalize the meaning of “picky eater” however some stated that it was “rude” and linked to negative social consequences (loss of caregiver approval, punishment).

CONCLUSION(S): Children’s reasoning for rejecting foods may be based on previous negative sensory, physical, and social consequences that go beyond fear of the unknown.
**P086**  Children’s oral sensory characteristics mediate parent child feeding responses to their child’s neophobia
Johnson SL, Boles R, Davies P, Gavin W, Bellows L

PURPOSE: Children’s food neophobia is associated with children’s oral sensory characteristics (OSC) and suboptimal dietary intakes. Corresponding parent feeding practices may have limited effectiveness in addressing neophobia. In an intervention study designed to prevent early childhood obesity in rural Colorado (The Colorado LEAP Study), the relations among parent feeding practices, parent perceptions of child neophobia and parent ratings of their child’s OSC were investigated.

METHOD: Parental reports of feeding practices (Child Feeding Questionnaire Plus), perceived child neophobia (Negative Reactions to Food Scale), and children’s oral sensory characteristics (Oral Sensory Profile), were administered and child weight (BMIz) was measured. Preschool-aged children (n=214; 120 girls, 94 boys; 56.1 ± 4.2 mo; BMIz = 0.49 ± 1.2) and parents (n=161, 48 Hispanic, 113 NonHispanic White) participated in data collection. Mediation analyses were undertaken to evaluate whether child OSC mediated the relation between parent feeding practices and children’s neophobia.

RESULT(S): Child OSC and parent feeding practices were significantly correlated with child neophobia (p<.01) but not child BMIz. Child OSC partially mediated the relationship between parent feeding practices (Pressure to Eat, p<.005; Restriction, p<.05; Concern about Child Not Eating Enough, p<.005; Urging New Foods, p=.084) and child neophobia.

CONCLUSION(S): Results indicate that children’s OSC are related to children’s neophobia and mediate parent responses to their child’s neophobia. Parental pressure to eat, restriction of foods and concern about how much their children are eating, though understandable, have been previously reported to have limited effectiveness in improving children’s eating behaviors and weight outcome.

**P087**  Dietary intake of Dutch food bank recipients
Neter JE, Dijkstra C, Visser M, Brouwer IA

PURPOSE: Recipients of the food bank are a very specific group of people with low-SES, who are limited in their food choices due to dependency on food parcels. A healthy diet can contribute to prevention of nutrition-related chronic diseases. Only 1.8% of the Dutch population meets the dietary guidelines for a healthy diet. People with low-socioeconomic status (SES), such as food bank recipients, meet these guidelines even less often. The aim of this study is to determine dietary intake of recipients of the Dutch Food Bank.

METHOD: In this cross-sectional study data were collected on socio-demographic characteristics by means of a general questionnaire and data on food intake by means of three 24-hour recalls per participant. Data were collected of 177 food bank recipients from 14 different food banks throughout the Netherlands.
RESULT(S): Preliminary analyses of 78 participants from 9 food banks showed that carbohydrate, protein and saturated fat intake (en%) were too high, while fibre intake was too low, compared with the dietary guidelines. Thirty percent of the participants did not eat fruit at all and only 15.4% of the participants ate >200 g/day fruit. Furthermore, 15% of the participants did not eat any vegetables and only 16.7% of the participants ate >200 g/day vegetables. Only 4.1% of the participants met the Dutch fruit and vegetable guidelines.

CONCLUSION(S): Many food bank recipients do not meet the dietary guidelines. Interventions are needed to decrease saturated fat intake and increase fibre, fruit/vegetable intake of recipients of the Dutch Food Bank.

P088 Intake of energy, solid fat, sodium and added sugar in U.S. adolescents in the NEXT Generation Health study
Lipsky L, Iannotti RJ, Pratt C, Nansel TR

PURPOSE: Reported intakes of solid fat, sodium and added sugar by US adolescents exceed recommendations. This study examined correlates of discretionary dietary factors in a national sample of US adolescents (n=477, age=16.2±0.5y, 47%Non-Hispanic White (NHWhite)).

METHOD: Daily mean intakes of energy (EI, kcal), solid fat (SF, g), sodium (g) and added sugar (AS, tsp) were assessed using three 24-hour diet recalls. Sex, race/ethnicity, parent education and family affluence were obtained by questionnaire. Measured height and weight were used to classify weight status according to CDC guidelines. We evaluated independent associations of EI with discretionary dietary factors adjusted for sex, height and weight, and of energy-adjusted associations of discretionary dietary factors with weight status and sociodemographics.

RESULT(S): EI was positively related to sodium, SF, and AS in adjusted analyses (p<0.001). EI was highest in males (p<0.001) and NHWhite adolescents (p=0.004), and in those from more affluent families (p=0.008). In analyses adjusted for EI, SF was highest in NHWhite adolescents (p=0.01); sodium intake was highest in males (p=0.04), NHWhite adolescents (p=0.002), and in those from more affluent families (p=0.005); AS was highest in females (p=0.01) and was positively related to affluence (p=0.004). No differences were observed by weight status or parent education.

CONCLUSION(S): Findings suggest lower diet quality in adolescents in more affluent families due to excessive discretionary intake of sodium and added sugar. Findings of differences in discretionary dietary factors by affluence, sex and race/ethnicity may inform interventions to improve diet quality in this age group.
Parent-child intake of vegetables and fruits, fat, and sugar-sweetened beverages among overweight and obese adolescents

Watts AW, Masse LC, Lovato CY, Barr SI, Hanning RM

PURPOSE: Few studies have compared parent-child dietary intake among adolescents who are overweight or obese. The purpose of this study was to determine the relationship between parent and adolescent intake of vegetables and fruits, fat, and sugar-sweetened beverages.

METHOD: Complete dietary data was collected from 173 parent and adolescent (11-16yrs) pairs who presented for a lifestyle behaviour change intervention. Baseline dietary intake was assessed from 3 web-based 24h diet recalls. Parent and adolescent intake of three dietary components were examined: servings of vegetables & fruits (VF), percent energy from fat (% fat), and servings of sugar-sweetened beverages (SSB). Multivariable regression models were used to identify associations between parent-child dietary variables. Analyses were adjusted for parent BMI, age, sex, education, and child age and sex.

RESULT(S): Adolescents consumed 3.3 servings of VF per day, 33% of their energy was from fat, and 54% reported consuming SSB, with an average of about 1 serving per day. Parents consumed slightly more VF (3.7) and fat (35%), but less SSB (31%) than did adolescents. Parent intake of VF (β=0.17, p=.02), % fat (β=0.25, p=.003) and SSB (OR=3.24, 95% CI 1.56-6.73) were positively associated with their adolescent’s intake of these same dietary components. The relationship between parent-adolescent fat intake was stronger among families with less parental education.

CONCLUSION(S): Parent’s intake of several dietary components important for good health predicted adolescent’s intake. Targeting parents, by helping them improve their own diet, may promote improvements in their adolescent’s diet.

Do parent packed lunches for preschool-aged children measure up to CACFP recommendations?

Briley ME, Sweitzer SJ, Romo-Palafox MJ, Calloway E, Robert-Gray C, Hoelscher DM

PURPOSE: The voluntary government standard for evaluation of meal patterns in early childhood education centers (ECEC) in the United States, Child and Adult Care Feeding Program (CACFP), recently changed. ECEC that do not provide meals do not require parents to meet the CACFP standard for sack lunches. This study evaluated the lunches packed by parents to the revised CACFP standard.

METHOD: Parent-child dyads (N= 132) participated at six ECECs in Central Texas that required parents to send lunches from home. Lunches of three to five year old children were observed and amounts of packed foods were recorded. Packed portions of food were compared to the revised CACFP standard for serving size, and food groups.
RESULT(S): Based on the increase in CACFP recommended serving size for dairy (yogurt and cheese only) and vegetables the mean serving sizes significantly decreased, from 0.818 ± 0.54 to 0.60 ±0.5 and from 0.699 ±0.82 to 0.42 ± 0.609 respectively (p≤ 0.001). The mean serving size for grains significantly increased based on the decrease in CACFP serving size, from 1.57 ±0.91 to 2.83 ± 1.28 (p≤ 0.001). Based on CACFP emphasis on lean meat options, frequency of any acceptable meat and bean option decreased from 307 to 192, thus representing 10.4% of the food group options with the new guidelines, as compared to the 16.7% before.

CONCLUSION(S): CACFP recommendations serve as an evaluation and research tool. Results can then be used to frame educational program and raise awareness of portion size and healthy choices.

P091  Do parents change their lunch packing habits to correspond to their child’s needs?  

PURPOSE: Three to five year old children are often considered together as preschool-aged children. Yet, US Dietary Reference Intakes (DRI) differentiates three year olds from four and five year olds for nutrient and energy needs. This study determined if parents made corresponding changes based on age in serving sizes of foods commonly packed for their preschool aged child attending early childhood education centers.

METHOD: Parent-child dyads (N= 235) participated at nine early childhood education centers in Central Texas that required parents to send lunches from home. Lunches of three to five year old children were observed and amounts of packed foods recorded. An ANOVA was performed to compare mean servings of different food groups between each group of children based on age. Post Hoc Test was conducted to determine differences between each group.

RESULT(S): An analysis of 675 lunches showed significant difference for mean serving sizes across three to five year old children for diary, fruit, grains and vegetables (p≤ 0.05). Mean serving sizes for three year olds were greater compared to four year olds for dairy, fruit, grain and vegetables (p ≤ 0.05) and compared to five year olds for grain and vegetables (p≤ 0.05). Corresponding changes based on foods served were seen in percent of children’s age-appropriate DRIs.

CONCLUSION(S): Parents may not be aware of changes in nutrient needs for a growing child based on the DRIs. This may offer an additional avenue for increasing parents’ awareness of the importance of amounts of healthy food choices for their child.
**P092  Fruit and vegetable consumption of 11-13 year old English children – the Gateshead Millennium study**
Reilly JK, Basterfield L, Parkinson KN, Pearce MS, Mann KD, Reilly JJ, Adamson AJ

**PURPOSE:** To describe consumption of fruit and vegetables in 11-13 year old children and adherence to 5-a-day UK guidelines, and further to measure association of consumption of fruit and vegetables with body mass index and socio-economic status.

**METHOD:** A cross-sectional analysis of the 2012 datasweep of a longitudinal birth cohort recruited as infants in 1999/2000 in northeast England (Gateshead Millennium Study). Dietary intake was measured using computerised 24-hour recall and daily portions of fruit and vegetables consumed calculated. Body mass index (BMI) was calculated from measured height and weight. Socio-economic status (SES) was derived using Townsend quintiles and categorised: (high; middle; low). Linear regression was performed to measure the association of fruit and vegetable consumption with BMI and SES.

**RESULT(S):** Data were collected from 483 children (49.2% male), mean age 12.5 years. 37% of the group were either overweight (17.3%) or obese (19.7%) (mean BMI 20.5kg/m²). Mean consumption of fruit and vegetables was lower than UK averages by nearly half; 1.7 portions per day for boys and 1.6 for girls. Only 6% met the UK 5-a-day recommendations, 45.8% reported eating less than 1 portion per day and 21% reported none. There was no association with BMI and consumption of fruit and vegetables. Fruit and vegetable consumption was significantly associated with SES (p=0.001); lower SES children consumed fewer portions.

**CONCLUSION(S):** Consumption of fruit and vegetables is low, particularly in lower SES children. Interventions to increase consumption within this age group and reduce inequalities are urgently needed. Further analyses are required to examine associations with diet.

**P093  Frequency of use of neighborhood snack food resources is positively associated with children’s energy, sugar-sweetened beverage, and snack food intakes**

**PURPOSE:** To determine the influence of the local food environment on children’s dietary intakes.

**METHOD:** Data were from a multi-site (New York, Cincinnati, and San Francisco) cohort of girls 6-8 years (n=1010). Reported availability and frequency of use of three types of neighborhood snack food resources (food stands, convenience stores, and fast food outlets) were measured. Dietary intakes were the average of up to four 24-hour recalls. Multivariable linear regression models estimated average daily changes in intakes of
calories, sugar sweetened beverages (SSB), and snack foods/sweets associated with use of snack food resources.

RESULT(S): Weekly frequency of use of resources increased with number of available types of resources. Participants with access to one type of food resource reported consuming food/beverage items less frequently than participants with access to two or three types of resources. Daily calorie, SSB, and snack foods/sweets intakes increased across categories of weekly frequency of use resources. Participants who reported using food resources >1-3 times per week consumed an average of 0.27 (95%CI:0.13,0.40) servings of SSB more than participants who reported no use of food resources. Participants who reported using food resources >3 times per week consumed an average of 107.50 (95%CI:32.25,182.67) calories, 0.43 (95%CI:0.29,0.58) servings per day of SSB, and 0.31 (95%CI:0.06,0.57) servings of snack foods/sweets more than children who reported no weekly use of food resources.

CONCLUSION(S): Children’s frequency of use of snack food resources increases with the number of available types of snack food resources and is associated with greater daily intakes of calories, SSB, and snack foods/sweets.

**P094**  
**Children’s involvement in cooking affects vegetable intake**  
van der Horst K, Rytz A, Martin N

PURPOSE: The question how to promote vegetable intake in children is highly relevant because most children do not meet the recommended vegetable intake. Involving children in food-related activities like gardening and food preparation could be an opportunity to develop healthy eating habits and to increase vegetable consumption. The purpose of this study was to examine the effect of children’s involvement in meal preparation on children’s vegetable intake and emotions.

METHOD: An experiment was conducted with 47 children aged 6 to 10 years. In condition 1 (n=23), children prepared a lunch meal (pasta, breaded chicken, cauliflower, and a salad) with assistance of the parent. In condition 2 (n=22) the meal was prepared by the parent alone. Independent-samples t-tests were conducted to compare intake in the “child cooks” and “parent cooks” conditions.

RESULT(S): Children who cooked had a significantly higher salad intake (+74.5%, p=0.006) and a higher cauliflower intake (+22.2%, p=0.067) than children who did not cook. Vegetable consumption was 145 grams in the “parent cooks” condition and 206 grams in the “child cooks” condition. The children who cooked significantly increased in the emotions “positive feelings” and “confidence”, and they also felt more positive and more confident compared to children who did not cook.

CONCLUSION(S): The experiment gives evidence that cooking is a valuable component for interventions aiming to improve children’s dietary behaviours. Children who cooked consumed the recommended daily amount of 200-220 grams of vegetables. Emotions such as positive feelings and confidence might be important mediators between cooking and intake.
P095  Most commonly consumed food by British adolescents: a comparison of portion size and contribution to total energy intake by age and gender
Albar SA, Alwan N, Evans CEL, Cade JE

PURPOSE: Representative data on foods most commonly consumed by adolescents together with average portion-size by age and sex are needed. This study describes food portion-sizes for the top 20 foods consumed by UK adolescents and their contribution to daily energy intake (EI) by age group and gender using newly available national data from the UK.

METHOD: The UK National Diet and Nutrition Survey NDNS (2008/2011) used here includes 666 adolescents aged 11 to 18 years old. 104 sub-food groups were ranked in descending order according to the proportion of adolescents who consumed each food. Food portion-size was calculated based on the number of participants. Differences between age groups and gender were tested using independent sample t-test and Mann-Whitney U test.

RESULT(S): White bread has the highest contribution to daily EI at 8.3% for all adolescents followed by biscuits at 4% and crisps and savoury snacks at 3.8%. Older adolescents (15-18 years) have significantly higher portion-sizes than younger adolescents (11-14 years) for cheese, carbonated soft-drinks and chips purchased from outside the home. The differences in means were 6.3g/d (95%CI: 7g, 20g), 33ml/d (95%CI: 12ml, 54ml) and 21g/d (95% CI: 13g, 30g) respectively. The differences were larger for males than females. Younger adolescents consumed more milk and breakfast cereal than older adolescents which was statistically significant for cereal 7g/d (95% CI: 3g, 12g).

CONCLUSION(S): Adolescent food portion-size varies with age and sex for some commonly consumed foods and drinks but not others. This information is needed for accurate assessment of adolescent diets using estimated food records.

P096  The impact of modelling parents and peers and parental encouragement on child’s fruit and vegetable intake in a follow-up setting
Lehto E, Ray C, Haukkala A, Roos EB

PURPOSE: Infrequent fruit and vegetable (FV) intake is common among school-children in Finland. The aim of the present study was to examine whether, in addition to modelling parental FV intake, modelling FV intake of peers and verbal parental encouragement at baseline predict child’s higher FV intake in the follow-up.

METHOD: In the Pro Greens project, 424 Finnish children at the age of 11-years participated in the study both at baseline in 2009 and in the follow-up 2010 (response rate 83%). Fruit and vegetable intake (times/day) was measured with a validated Food Frequency questionnaire filled in by children in the class room both at baseline and in the follow-up. A validated questionnaire was used to assess modelling FV intake of mother, father, and peers
and receiving verbal encouragement from mother and father at baseline. How modelling and encouragement predict FV intake was examined with separate linear regression analyses.

RESULT(S): Modelling FV intake of parents and peers as well as parental encouragement all predicted separately child’s FV intake. Positive change in fruit intake was associated with modelling father and peers as well as parental encouragement. Significant predictors of positive change in vegetable intake were modelling father and peers and encouragement from father.

CONCLUSION(S): The impact of mother on child’s FV intake was lower than the impact of father and peers. This indicates that interventions which aim to increase child’s FV intake should take into account the impact of child’s social environment in a broad sense.

P097 Interpreting individualism and responsibility at family mealtimes: examining the implications for dietary behaviours
Thompson C, Cummins S, Brown T, Kyle R

PURPOSE: The aim of this study was to explore how families perceive and incorporate individualistic eating habits at mealtimes. Ever more refined methods of processing, distributing and cooking food have transformed eating practices. There is now an established cultural trend towards more solitary eating. Although it is acknowledged that individualised practices are, in part, a provisional response to the problems of scheduling everyday life, there remains a lack of research examining how individualism as a cultural value informs dietary routines.

METHOD: A symbolic interactionist ethnography was carried out in Sandwell, West Midlands, UK. Twenty-six participants were asked to compile food photo-diaries over a four-day period which they were subsequently interviewed about. The overall aim was to describe routine approaches to mealtimes and identify the values and motivations that underpin them.

RESULT(S): Semi-structured interviews revealed three distinct approaches to mealtimes in the home: (1) ‘erratic’, (2) ‘what we fancy’ and (3) ‘regulated meals’. The approaches are differentiated by the value they placed on individual preferences and the extent to which these were allowed to influence mealtimes. Some parents strictly limited individual choice, others exerted considerable time and effort catering to individual preferences at mealtimes, whilst some households reported rarely engaging in any collective eating practices at all.

CONCLUSION(S): The role of individualism as a cultural value is key to understanding changes in family food practices. Responsibility for the home food environment is interpreted in different ways by parents, meaning that individualised eating can be valued or rejected, which has implications for household dietary behaviours.
P098  ‘Why do parents deal with the sweets and snacks consumption of their children the way they do?’
Klaassen R, Gevers DWM, Kremers SPJ, Van Assema P

PURPOSE: Although research has gained some insight into child-feeding practices, it remains largely unclear why parents use them. Therefore, this study aimed to explore which parenting practices parents use regarding the sweets and snacks (S&S) consumption of their children and what explanations parents give for using them.

METHOD: Data were obtained through ten semi-structured interviews with fifteen Dutch parents of primary school children. A grounded-theory based method was used to guide the data gathering and the data analysis.

RESULT(S): All participants spontaneously expressed to have a ‘behavioral style’ towards S&S consumption as part of which they use specific parenting practices related to making S&S available or accessible, offering S&S, having rules, monitoring intake, rewarding with S&S, comforting with S&S, educating, and modeling. Determinants that came forward for either a behavioral style, a specific parenting practice, or both, included personal factors (i.e. parent’s own lifestyle, the way the parent was raised him- or herself, beliefs about health effects of S&S consumption, beliefs about how to teach a healthy lifestyle, perceived and expected effects of certain practices, having alternative non-food related practices, own needs and preferences, perceived necessity of monitoring S&S intake), situational factors (i.e. special occasions, promotion prices, social environmental influences such as other parents’ behaviour) and factors concerning the parent’s perception of various child characteristics.

CONCLUSION(S): Based on the results, a tentative explanatory model was constructed. Further quantitative studies are needed to clarify how determinants interrelate, and how they relate to parenting practices.

P099  A positive attitude to healthy nutrition and a greater sense of eating-related wellbeing are associated with increased dietary quality in adolescents from Otago, New Zealand

PURPOSE: To investigate the relationship between attitudes towards healthy nutrition and eating-related wellbeing on overall diet quality in adolescents.

METHOD: High school students from Otago, New Zealand (aged 15 to 18 years) completed an online survey and had anthropometric measurements taken. A diet quality score (DQS), based on variety and adequacy of consumption of fruit, vegetables, dairy, cereals and meat, was calculated from data obtained from the New Zealand Adolescent FFQ. Attitudes to Healthy Nutrition (Attitude) and Eating Related Wellbeing (Wellbeing) were assessed using a modified version of the Eating Behaviour and Weight Problems Inventory for Children (EWI).
To account for school level clustering of data, generalised estimating equations were undertaken to investigate relationships between Attitude and Wellbeing and DQS. Analyses were adjusted for age, socioeconomic status and age and sex specific BMI Z scores.

RESULT(S): DQS and EWI data were available for 591 participants. Mean (SD) DQS was 52.4% (14.8). Mean Attitude was 48.6% (18.4) and Wellbeing 66.7% (15.7). An SD increase in Attitude was associated with a 2.9% increase (95%CI: 1.2 - 4.5%) in DQS. An SD increase in Wellbeing was associated with a 2.5% increase in DQS (95%CI: 1.1 - 4.2%).

CONCLUSION(S): These data suggest that those adolescents with more positive attitudes to healthy nutrition and a greater sense of eating-related wellbeing have increased diet quality. Future research in this cohort will explore relationships between other constructs of the EWI, such as dietary restraint and fear of weight gain, and diet quality and whether these relationships differ between girls and boys.

P100 Fruits and vegetables consumption and associated factors among in-school adolescents in five Southeast Asian countries
Pengpid S, Peltzer K

PURPOSE: Purpose: The aim of the study was to assess the prevalence of fruits and vegetable consumption and associated factors among Southeast Asian in-school adolescents.

METHOD: Method: Data were collected by self-report questionnaire from nationally representative samples (total 16,084) of school children aged 13 to 15 years in five Southeast Asian countries.

RESULT(S): Results: Overall, 76.3% of the 13 to 15 year-olds had inadequate fruits and vegetables consumptions (less than five servings per day); 28% reported consuming fruits less than once per day and 13.8% indicated consuming vegetables less than once per day. In multivariable analysis, lack of protective factors and being physically inactive were associated with inadequate fruits and vegetable consumption, and sedentary behaviour and being overweight was protective of inadequate fruits and vegetable consumption.

CONCLUSION(S): Conclusion: The results stress the need for intervention programmes aimed at increased consumption of fruits and vegetables, targeting proximal factors such as the family environment and distal factors by aiming at integrating other risk factors such as physical activity into health promotion among adolescents.
Assessing self-regulation strategies: development and validation of the Tempest Self-Regulation Questionnaire for Eating (TESQ-E) in adolescents
De Vet E, De Ridder D, Stok M, Brunso K, Baban A, Gaspar T

PURPOSE: Applying self-regulation strategies may help adolescents to navigate the obesogenic food environment and to eat healthier. Because adequate measures to assess self-regulation of eating in adolescents are lacking, a theory-based questionnaire (TESQ-E) was developed and validated.

METHOD: Qualitative research and pilot-testing in four countries (n = 336) informed the 24-item TESQ-E questionnaire, which assesses self-regulation strategies that address 1) temptations directly (avoidance of temptations and controlling temptations), 2) the meaning of temptations (distraction and suppression), and 3) goals directly (goal and rule setting and goal deliberation). Next, 11,392 adolescents from nine European countries completed a survey assessing the TESQ-E, background characteristics, eating-related behaviours and dietary intake. Further, test-retest reliability over a four-week period was examined in 140 Romanian adolescents. Finally, 93 Dutch adolescents completed a questionnaire to test the TESQ-E’s associations with related theoretical concepts (e.g., trait self-control, autonomy, motivation).

RESULT(S): Factor analyses confirmed the hypothesized TESQ-E structure. Internal consistencies ranged from .73 to .78, and test-retest reliabilities ranged from .55 to .74 for the six strategies. Goal deliberation was used most often and avoiding temptations least often. Girls and younger adolescents used self-regulation strategies most often. The strategies showed a meaningful pattern of associations with related concepts of self-regulation. Further, the strategies were consistently related to fruit, soft drink and snack intake, but inconsistent to vegetable and breakfast intake.

CONCLUSION(S): In sum, the theory-based TESQ-E provides a short reliable and valid measure of multiple strategies, assessing broad dimensions of self-regulation. Potential uses of the TESQ-E will be discussed.

Nutritive versus non-nutritive motivations for offering children snacks
Davison KK, Orlet Fisher J, Perkins M, Smith L, Taveras EM

PURPOSE: Children today snack more frequently, consume larger snack portions, and consume greater amounts of energy from snacks than in previous decades. We examine parents’ reported reasons for giving children snacks and variations by age, gender, income, and race/ethnicity.

METHOD: Participants included 202 parents of children ages 2-12 years recruited from three low-income communities in the northeastern United States (66% reported incomes...
Parents were administered a brief survey in English or Spanish. In addition to demographic factors, the survey assessed seven potential reasons for giving their 2-12 year old children snacks and the weekly frequency for each (0 to 5 or more times/wk). Demographic differences in reasons for providing snacks were assessed using chi-square, analysis of variance or spearman correlation analysis as appropriate.

RESULT(S): Across all ages groups, the most frequently reported reasons parents offered their children snacks were to help their child grow, reduce hunger, and because the child requested a snack (~1-2 times/wk). Significant age differences were identified; parents of 2-5 year olds gave their children snacks for behavioral reasons such as rewarding good behavior, keeping their child quiet, and celebrating an event/achievement more often than parents of children 6 years and older. In fact, parents gave their 2-5 year old children snacks for behavioral reasons as frequently as for nutritive reasons (i.e., growth, hunger), both of which were provided 2-3 times/wk. Few gender, income or racial/ethnic differences were identified.

CONCLUSION(S): Parents of young children may frequently offer snacks for reasons outside of child nutrition and growth.

P103 The role of self-efficacy on fruit and vegetable intake among Somali women and children: the FAV-S Pilot Study
Kehm R, Hearst M, Lechner KE, Sherman S

PURPOSE: To determine the role of self-efficacy on fruit and vegetable consumption, and to assess the impact of the FAV-S intervention on increasing self-efficacy and fruit and vegetable intake among Somali women and children.

METHOD: Somali women were recruited from a low-income housing complex in Minneapolis, Minnesota to participate in the FAV-S intervention. The intervention was conducted by trained Somali community health workers and consisted of two small group education sessions addressing nutrition, serving size, and label reading; a cooking session incorporating fruits and vegetables into traditional Somali dishes; and a grocery store session demonstrating best purchasing practices. Pre and post intervention surveys were administered verbally in Somali. Self-efficacy was measured on a five-point scale based on questions assessing confidence in purchasing and preparing fruits and vegetables. Fruit and vegetable consumption was measured on a servings-per-day scale. Linear regression was used to assess the association between self-efficacy and consumption.

RESULT(S): Twenty-five low-income Somali women (median age=41) were recruited for the intervention. Self-efficacy increased from 2.81 to 4.17 post intervention (t=-3.82, p=0.001). Self-reported fruit and vegetable intake increased from 0.69 to 1.74 per day among women (t=-3.31, p=0.0033) and 0.63 to 2.01 per day among children (t=-3.93, p=0.0008). Increasing self-efficacy was not associated with more fruit and vegetable consumption although a positive trend was apparent.
CONCLUSION(S): The FAV-S intervention improved self-efficacy and fruit and vegetable consumption among Somali women and children. These findings identify a need for further research on a larger scale to better understand the impact of self-efficacy on fruit and vegetable intake.

P104 Soft drinks over water: adolescents motives and peer influences on their decision making
Toumpakari Zi, Haase AM

PURPOSE: Fizzy drinks are an important aspect of adolescents’ diet, and are mostly consumed within the context of social activities and with peers. Hence, it is necessary to understand and identify individual and group factors for targeting in future peer interventions to encourage healthier drinking choices. This study aims to explore reasons motivating adolescents to choose fizzy drinks over healthier alternatives, such as water/milk, along with understanding their peers’ influences on those choices.

METHOD: Six focus groups were conducted with 14-16 year old adolescents from UK secondary schools. Digital recordings were transcribed and transcripts analysed using directed thematic content analysis. Topics were derived from Self-Determination Theory.

RESULT(S): Adolescents reported greater preferences for energy drinks. However due to perceived high caffeine content, energy drinks were viewed as not acceptable by parents and therefore were only consumed with peers. Factors such as thirst, perceived low energy levels, need for socializing and convenience (low cost, on offer, available at home) made fizzy drinks and energy drinks desirable at this age. Adolescents also referred to flavour, taste, and colour as positive characteristics of fizzy drinks and energy drinks, while their attractive packaging and increased social image enhanced their consumption over healthier alternatives such as water or fruit juices. Above all, consumption of these drinks was viewed as a normal habit and personal decision/choice.

CONCLUSION(S): Although motivation to change was low, this study identified factors that could be targeted for future interventions.

P105 Adolescent aesthetic athletes: a group at risk for eating pathology?
Van Durme K, Goossens L, Braet C

PURPOSE: Previous research shows that certain leanness- and weight-dependent sports increase the risk of developing disturbed eating behaviour. Therefore, this study investigated whether adolescent aesthetic athletes (n = 68, M = 14.6 years), particularly ballet dancers and figure skaters, exhibit more eating pathology compared to the general population. Furthermore, it was investigated whether sport-related factors have explanatory value for the dieting behaviour of aesthetic athletes.
METHOD: To assess eating pathology, reliable and valid self-report questionnaires were used including the Eating Disorder Inventory-II, the Children’s Eating Disorder Examination-Questionnaire and the Dutch Eating Behaviour Questionnaire.

RESULT(S): Results show that female aesthetic athletes show more drive for thinness, features of bulimia, dieting behaviour and concerns about weight and shape compared to female adolescents from the general population. Concerning the explanation of dieting behaviour in aesthetic athletes, hierarchical regression analyses revealed that both sport-related factors (competition state anxiety) and general risk factors (eating concerns) seem to be of significance.

CONCLUSION(S): These results suggest that female aesthetic athletes show more disturbed eating behaviour and thoughts compared to female adolescents from the general population and therefore may have an enhanced risk of developing clinical eating disorders. Furthermore, these results emphasize the importance of the development of specific etiological models of eating pathology for (aesthetic) athletes taking account of both sport-related and more general risk factors.

P106 Assessing home food availability and dietary consumption of preschool aged children in rural communities

Burdell AC, Bellows L, Johnson SL, Davies P, Gavin W, Boles R

PURPOSE: Home food availability has been linked to child dietary intake. Understanding the relationship between the home food environment and child dietary intake may provide intervention targets to address nutrition within the home. In an intervention study designed to prevent early childhood obesity in rural Colorado (The Colorado LEAP Study), the relationships within the home environment and a child’s consumption were investigated.

METHOD: Preschool aged children (n=143, 52% female; BMIz= .46± 1.1) and parents (90% mothers, 30% Hispanic, 43% income <$27,000; BMI 26.6±6.1) participated in data collection. Parents completed a self-report inventory of home foods (Home IDEA) and child consumption (Block Food Frequency Questionnaire). Demographic and anthropometric variables were collected for both children and parents. Linear regression was used to analyze relationships among availability of home food items and child consumption, controlling for demographic variables.

RESULT(S): Home availability of fruits and vegetables significantly predicted child consumption of fruits (R2=.08,p<.01) and vegetables (R2=.10, p<.001), respectively. Whole grains availability significantly predicted whole grain consumption (R2=.12, p=.01). Sugar sweetened beverages (SSB) failed to predict daily calories from SSB when controlled for demographics. Younger, less educated, lower income Hispanic families were significantly more likely to have higher caloric intake from SSB.

CONCLUSION(S): The availability of foods in the home environment of rural families was linked with child consumption of key foods related to long term health. Interventions to
modify child consumption may benefit from direct changes in availability of home foods, while considering demographic related influences.

**P107**  
**Association of parents’ education, family structure and weekly allowance with nutrition and food in-take among Finnish teenagers**  
Roos EB, Pajunen T, Lehto RL, Ovaskainen M-L, Tapanainen H, Hoppu U

**PURPOSE:** To examine the associations of parents’ education, family structure and weekly allowance with nutrient and food intake and regular meal pattern among teenagers.

**METHOD:** The data on meal patterns consisted of a cross-sectional survey questionnaire completed by 726 13-14-year-old pupils in 12 schools situated in the Finnish cities of Tampere, Lahti and Mikkeli in the spring of 2007. Consumption of foods and intake of nutrients was studied with a 48-hours recall food interview completed by 42 percent of the original sample (306 pupils). Socioeconomic status was measured by parents’ highest educational level, family structure and teenager’s weekly allowance.

**RESULT(S):** Higher parental education was associated with higher consumption of fruits, berries and vegetables as well as skimmed milk and correspondingly with higher intake of vitamin C, folate and calcium. Lower parental education was associated with less regular consumption of breakfast. Teenagers living with both parents consumed more rye bread and milk than those living in single parent households. Living with two parents was also associated with eating breakfast and lunch more regularly on school days. The amount of weekly allowance was positively associated with higher consumption of soft drinks.

**CONCLUSION(S):** Socioeconomic differences in nutrition and meal patterns exist among teenagers, but they were smaller than those generally found in the adult population.

**P108**  
**Presence of junk foods in the home varies by parent and child weight**  
Vaughn AE, Mazzucca S, Hales DP, McWilliams CP, Ward DS

**PURPOSE:** To present a new instrument measuring the home nutrition environment and specific associations between the presence of junk foods and parent and child weight.

**METHOD:** A sample of 135 parents of 3-12 yo children were asked to complete the HomeSTEAD self-administered survey on three occasions over 12-18 days and allow an in-home observation. HomeSTEAD is a new comprehensive measure of the home physical and social environment related to child nutrition and physical activity. During the observation, parent and child height and weight were measured. Reliability and validity of the new instrument were evaluated using common statistics (Kappa, ICC, mean comparisons, limits-
of-agreement, correlations). While evaluating construct validity, we examined how presence of junk foods varied between households with normal vs. overweight parents and children (adjusting for demographic variables).

RESULT(S): Food availability items demonstrated adequate-to-good reliability and validity evidence. Overweight parents had more cookies (16.67 oz. vs. 8.32 oz., p=0.01) and sweet snacks (3.84 vs. 3.05, p=0.02) at home compared to normal weight parents. There was a trend for overweight parents to have more frozen treats (e.g., ice cream, frozen yogurt, popsicles; 1.52 vs. 1.15, p=0.09). Households with overweight children had less frozen treats (0.94 vs. 1.47, p=0.05) compared to those with normal weight children; there was also a trend for households with overweight children to have less ice cream (13.95 vs. 26.17, p=0.14).

CONCLUSION(S): This comprehensive measure of the home environment helps further our understanding of how parents might be adjusting food availability in reaction to child’s weight but not their own weight.

P109 Restaurant and home food policies among low-income English and Spanish speaking parent-child dyads
Carpenter L, Pinard CA, Chapman M, Yaroch AL

PURPOSE: To conduct in-depth interviews to describe co-decision making in low-income Latino and Non-Latino parent-child dyads around menu choices and home food policies.

METHOD: Twenty parent-child dyads were interviewed; children were between the ages of 8-13. The interviews lasted 30 minutes and participants received a $20 gift card. Interviews were transcribed verbatim and coded for meaning units/themes.

RESULT(S): Parents were 85% female and 40% earned less than $10,000/year. English-speaking participants (N=10) were mainly non-Hispanic White, Spanish-speaking parents (N=10) were Hispanic-White. English-speaking families reported eating dinner in front of the TV, while the Spanish-speaking families ate at the dinner table with no TV. English-speaking families frequented fast food restaurants due to convenience, lack of energy, and taste preferences, while nutrition was cited as less important. Spanish-speaking families cooked more “from scratch” and ate out less. Generally, parents from both groups allowed children to order what they wanted from the kid’s menu. Children’s favorite food, both at home and out included: chicken nuggets, hamburgers, pizza, mac ‘n’ cheese, and nachos. Parenting policies included: the “clean plate club”, negotiating, no soda at home, and using food as a reward. Parents reported not role modeling positive dietary behaviors, despite having concerns for their child’s weight. Recommendations to improve children’s menus included: fruits and vegetables as sides, smaller portion sizes, and nutrition information available at point of purchase.

CONCLUSION(S): Overall, this in-depth exploration of restaurant and home meal patterns among low-income parent-child dyads has implications for the promotion of healthier food policies in these environments.
P110  Perceptions about meals eaten at restaurants in a nationally representative sample of US children

PURPOSE: Assessing children’s perceptions of foods eaten at restaurants can help shape opportunities for healthy eating that are congruent with their attitudes and experiences.

METHOD: Harris Interactive (New York) was commissioned to administer an online survey in 2010. Respondents were 8- to 18-year-old US children (N=1,178). Data were weighted to be nationally representative.

RESULT(S): Ninety-five percent of children reported eating at restaurants at least a few times per year, with 55.8% eating at restaurants frequently (greater than or equal to a few times per month). Most children (75.0%) decided what to order based on familiarity and taste (“It is a food I know I like”). Fifty-nine percent reported ever ordering kids’ meals (84.0% of tweens (N=509), aged 8-12; 40.2% of teens (N=669), aged 13-18). Of these children, more than half said that they would order a kid’s meal that came with vegetables (56.2% of tweens; 54.8% of teens) or fruits (78.9% of tweens; 73.0% of teens). When asked how they would feel if their kid’s meal came with a vegetable or fruit but not French fries, about one-third of children reported that they would be unhappy, one-third would be neutral, and one-third would be happy. Children who ate at restaurants frequently were more likely to be happy if their kid’s meal came with a vegetable or fruit (r=.08, p<.05).

CONCLUSION(S): Results suggest that vegetable and fruit side dishes would be accepted by a substantial number of children, particularly those who eat at restaurants more often.

P111  Front-of-package nutrition labels lead to more-healthful product selection by parent/child pairs
Graham DJ

PURPOSE: To assess the impact of Front-of-Package (FOP) Nutrition Labels on selection of food products.

METHOD: 64 parent/child pairs from Minnesota, U.S. participated in a food-selection task. Pairs were randomly assigned to one of three FOP label conditions: 1) Multiple Traffic Light (MTL) labels (with numerical and color-coded amounts of saturated fat, sodium, and sugar); 2) monochromatic labels (representing the Nutrition Keys [NK] labels currently used by the U.S. food industry with numeric but not color-coded information); or 3) no FOP labels. In a laboratory set up like a grocery-store aisle, participant pairs were instructed to shop together as if they were in a grocery store and to select products including cereals, chips, and cookies that they would actually take home with them. All participants wore glasses that monitored their gaze to provide data on whether FOP labels were viewed. The most salient health characteristic (i.e., sugar for cereals, sodium for chips, and fat for cookies) of purchased foods was compared for participants in each group using t-tests.
RESULT(S): Participants randomly assigned to view either FOP nutrition label selected cereals with significantly lower levels of sugar compared with participants who saw no FOP labels. The same pattern was evident for both sodium in chips and fat in cookies. With the current sample, there was insufficient power to detect effects between FOP groups; by March 2013, we will have 186 additional pairs and eye-tracking videos to present.

CONCLUSION(S): FOP labeling appears to improve the healthfulness of food selections.

**P112**

**Associations between structural characteristics of the school setting and irregular lunch consumption – Are there gender differences?**

Pedersen TP, Holstein BE, Krølner R, Erbsøll AK, Utter J, McNaughton SA, Neumark-Sztainer D, Rasmussen M

**PURPOSE:** The association between characteristics of the school setting and regularity of lunch consumption among schoolchildren is under-investigated. The purpose was to 1) investigate associations between structural school characteristics and irregular lunch consumption among schoolchildren, and 2) examine whether gender modified these associations.

**METHOD:** Danish data from the international cross-sectional study ‘Health Behaviour in School-Aged Children in 2010’ were used. Data were collected among schoolchildren aged 11, 13 and 15 years from a random sample of 75 schools. The schoolchildren (N=4922) completed a self-administered questionnaire at school (response rate=86.3%). School principals (N=69) completed the school setting questionnaire (response rate=92 %). Associations between school level variables and irregular lunch consumption were estimated by multilevel logistic regression, adjusting for individual level socio-demographic factors.

**RESULT(S):** Having access to canteen/school stall was associated with a higher risk of irregular lunch consumption, OR=1.26 (1.04-1.52). No adult present in lunch breaks was associated with a higher risk of irregular lunch consumption, OR=1.52 (1.26-1.82). At the individual level, irregular lunch consumption was associated with being a boy, attending 7th grade, medium and low family social class, migration status, and living in a single and reconstructed family structure. Analyses stratified by gender showed similar results but among girls the results indicated no association between access to canteen/school stall, migration status and lunch consumption.

**CONCLUSION(S):** The findings indicated that availability of a canteen/school stall did not promote regular lunch consumption among boys while the presence of an adult in lunch breaks promoted regular lunch consumption among both boys and girls.
P113  Childhood obesity in New York City and Shanghai: comparison of food policy initiatives
Leung MM, Agaronov A, Freudenberg N

PURPOSE: Both Shanghai and New York City (NYC), two commercial capitals of their respective nations, have experienced dramatic growth in childhood obesity the last few decades. The purpose of this study is to compare food policies between the cities, in response to this epidemic.

METHOD: A comprehensive literature search was conducted for peer-reviewed studies addressing food-related policies and initiatives aimed at childhood obesity published between 1990 and November 2012. Additional databases and online libraries were searched for related “grey literature”. A qualitative analysis of the current evidence was conducted across various sectors.

RESULT(S): Comprehensive food policies and initiatives have been implemented in both cities across multiple sectors, such as school and retail food settings. Shanghai created a Healthy Promoting Schools Program focused on improving nutrition standards of school foods and incorporating mandatory physical activity, among other activities. As part of the Mayor’s Task Force on Obesity, NYC has installed over 1,000 salad bars in public schools with a goal of extending the program city-wide by 2015. Differences in priorities exist as NYC initiatives also address food insecurity, while Shanghai has launched food safety programs.

CONCLUSION(S): A comparison of the two cities’ responses to childhood obesity reveals important similarities and differences. In both cities, global food production changes have transformed local food environments making energy-dense food more available and affordable. Both cities have used their school systems to reduce childhood obesity by making healthier food and physical activity opportunities more available. However, differences in culture, history and governance have contributed to different processes of implementing initiatives.

P114  Adolescents’ intake of sugar-sweetened beverages and less healthful foods in schools with less healthy nutrition environments
de Niet J, Masse LC, Naylor P-J, Saewyc E

PURPOSE: The school environment represents an important setting to address childhood obesity. This study evaluated whether intake of sugar-sweetened beverages (SSB) and less healthful foods was highest among adolescents who attended schools with less healthy nutrition environments.

METHOD: Data from students (n=11,385) in grades 7-12 who completed the 2008 British Columbia Adolescent Health Survey was linked to school principal data (n=174). Adolescents’ intake assessed previous day consumption of SSB, fruits/vegetables, and low-
nutrient energy dense snacks (cookies, cakes, candies) and foods (pizza, hotdog, French fries). A Food Consumption Index (FCI) was computed to denote overall consumption of less healthful foods. Principals completed a survey measuring the school nutrition environment including assessment of nutrition guidelines (schools and districts), nutrition capacity/resources, participation in nutrition programs, and support for adopting stringent nutrition guidelines. In addition, principals reported on the availability of SSB and less healthful foods at school. Multi-level mixed-effects linear and logic regression analyses with relevant covariates were used for the analyses.

RESULT(S): Adolescents in schools with increased availability of SSB and less nutrition guidelines (e.g., fewer requirements for nutrition education and fewer guidelines for using foods as rewards) were significantly more likely to consume SSB (p=.003). In contrast, the school environment and availability of less healthful foods at school were not associated with adolescent intake of less healthful foods.

CONCLUSION(S): Preliminary evidence suggests that the school environment is associated with adolescent intake of SSB. The extent to which school policies may reduce intake of SSB remains to be investigated.

**P115**  
Italy’s slow food school canteens and implications for school lunch programs in the U.S.  
Brown SC, Hornberger E

PURPOSE: Recommendations from the U.S. Institute of Medicine (2011) and the Healthy, Hunger-Free Kids Act (2010) seek to improve the nutritional quality of school lunches. Still missing is the need to change the U.S. school lunch culture. This study analyzes implementation of the Slow Food philosophy in schools in Bagno a Ripoli and Bra, Italy. It also examines differences between school lunch environments in Italy and schools in Lexington, Kentucky and how these differences may affect childhood obesity rates in the U.S.

METHOD: Lunch menus were analyzed to determine types and amounts of food provided. Cultural context was provided by 1) direct observation of school meals; 2) interviews with relevant personal—including Slow Food administrators, teachers, administrators, dieticians, chefs, and city officials; and 3) visits to local farms and school gardens.

RESULT(S): Slow Food’s canteen menus had shorter food chains that used seasonal, local food and reflected a commitment to quality, biodiversity, sustainability, flavor, and tradition. The children ate in small groups in a home-like environment, sharing the same meal. Food from school gardens promoted food literacy. The Italian programs enjoyed strong local government and parental support. U.S. menus emphasized convenient and highly-processed foods. American students had little knowledge about the foods consumed.

CONCLUSION(S): Slow Food school canteens highlight ways to improve the school lunch culture in the States. U.S. schools should explore ways to shorten food chains, focus on
quality and flavor, serve a common shared meal (eliminating choice), and create school gardens to teach food literacy.

**P116**  
**How food marketers use sport to influence children’s food preferences**  

PURPOSE: This research examines marketing techniques supporting sport sponsorship and how it creates brand associations influencing children’s food preferences. While the effect of alcohol and tobacco sponsorship on consumption, particularly in youth is clear, fewer studies have examined the impact of food company sponsorship in sport and none have explored marketing techniques supporting sports sponsorship or their impact on children’s food choices.

METHOD: A mixed methods study. Websites of 307 national and regional New Zealand sporting organisations, and 108 clubs from two exemplar sports, were systematically reviewed to identify sponsoring food companies. Fifty-five purposively selected key informants participated in semi-structured interviews which were analysed thematically. Results were triangulated.

RESULT(S): Food company sponsorship differed between sports and within different levels of sport. This study found 24% of national and regional sports organisations, 37% of rugby clubs, and 0.3% of netball clubs received food company sponsorship. Almost 30% of food companies sponsoring sport were unhealthy. Few sponsorships were supported by marketing campaigns. These built strong associations between sports and their brand and used sport to market directly to consumers, often children. Marketers used operant and respondent conditioning techniques including provision of food vouchers, branded equipment, product samples and collectables. Many key informants considered sponsorship income was more important than the impact of associating themselves with unhealthy food.

CONCLUSION(S): Sponsorship linked to supporting marketing creates explicit associations between brands and sport, evoking positive feelings and encouraging consumption. Policy approaches restricting sport sponsorship by unhealthy food manufacturers may reduce children’s exposure to unhealthy food marketing within sports settings.

**P117**  
**Rural schools in Minnesota have fewer policies and practices that promote healthy eating**  
Caspi C, Davey C, Kubik MY, Larson N, Nanney S

PURPOSE: School nutrition policies/practices have the potential to reduce the current all-time high U.S. rates of adolescent obesity, but little is known about how policy environments vary across school settings. This study sought to evaluate disparities in nutritional policies/practices in Minnesota secondary schools by location, poverty and racial/ethnic
composition.

METHOD: The 2010 Minnesota School Health Profiles and National Center for Education Statistics data were used to examine school characteristics, including locale (city, rural, town/rural, town/fringe, suburban), percent students eligible for free/reduced-price lunch (FRPL), percent minority students, and school grade level, in relation to nutrition policies/practices in 303 Minnesota secondary schools. Nutritional policies/practices assessed included availability of low-nutrient, energy-dense (LNED) foods, use of strategies to promote healthy eating, and banning advertisements for LNED foods.

RESULT(S): Compared with city schools, rural schools were more likely to have vending machines or school stores for snack purchasing (OR=4.35, 95% CI: 1.23-15.40), more likely to sell soda and sports drinks (OR=10.32, 95% CI: 1.31-81.41), and less likely to use taste testing to promote healthy eating (OR=0.31, 95% CI: 0.11-0.88) controlling for other school characteristics. Compared with suburban middle schools, rural middle schools were less likely to ban advertisements for LNED foods in school buildings (OR=0.12, 95% CI: 0.12-0.71). Schools in small towns/town fringe areas were generally similar to rural schools. Controlling for school location, there was no association between percent minority or percent FRPL and nutritional policies/practices.

CONCLUSION(S): Rural schools may warrant special attention regarding nutritional policies, especially those related to competitive food sales and LNED food advertising.

P118 What’s for lunch? An analysis of Oklahoma child care center menus
Frampton AM, Sisson SB, Horm D, Campbell J, Lora K, Ladner JL

PURPOSE: To examine the frequency of Child Care Center (CCC) menus meeting the Dietary Reference Intakes (DRIs) including Recommended Dietary Allowances (RDAs), Adequate Intake (AIs), and Acceptable Macronutrient Distribution Ranges (AMDRs).

METHOD: A geographically proportionate sample of CCCs providing all-day care to young children in Oklahoma (n=167) were contacted to complete a telephone questionnaire and provide a lunch menu. Response rate was 50% (n=83). Means ± SD of the lunch menu nutrient content was calculated using FoodWorks©. Comparisons were made to both the 1-3-year-old and the 4-8-year-old DRIs. A one-sample t-test compared mean nutrient content of lunches to one-third of the DRIs (representing lunch only) for each nutrient.

RESULT(S): 77% of CCCs participated in the Child and Adult Care Food Program. Lunch was 327 ± 36 kcal and 48% carbohydrate, 20% protein and 32% fat. Compared to both age groups DRIs, menus were significantly deficient in carbohydrate, dietary fiber, iron, vitamin D, and vitamin E and percent fat. For both age groups, menus significantly exceeded the DRIs for protein, magnesium, sodium, zinc, vitamin A, and vitamin C. Calcium was significantly higher than the 1-3-year-old RDA, but lower than the 4-8-year-old RDA. Folate was significantly higher than the 1-3-year-old RDA, but not significantly different than the 4-
8-year-old RDA.

CONCLUSION(S): There is significant room for improvement in CCC menu planning. Awareness of gaps and inclusion of nutrition professionals in the menu-planning process may improve the planned meals to ensure CCCs provide adequate nutrients for the growth and development of preschool children.
**P119  Physical activity, sedentary behaviour and postnatal depression: a review**  
Teychenne M, York R

**PURPOSE:** Postnatal depression is highly prevalent in new mothers. Although physical activity (PA) has been found to reduce the risk of depression in the general population, little is known regarding the link with postnatal depression. This review examined original research investigating associations between PA and sedentary behaviour (SB) dose (i.e. frequency, intensity and duration) and domain, and risk of postnatal depression.

**METHOD:** A systematic search for original research articles investigating associations between PA and SB dose and domain, and risk of postnatal depression was performed using several electronic data bases. A total of seven observational and seven intervention studies were included.

**RESULT(S):** Most studies (i.e. one cross-sectional, one longitudinal and six intervention studies) found an inverse association between postpartum leisure-time PA (LTPA) and risk of postnatal depression. One longitudinal study found occupational PA was positively associated with postnatal depression risk. There was inconclusive evidence to suggest an optimal dose of postpartum PA for reducing postnatal depression risk. Two longitudinal studies found an inverse association between antenatal LTPA and postpartum depression risk. One out of two studies that investigated SB found a positive cross-sectional association between SB and postnatal depression risk.

**CONCLUSION(S):** Although studies are limited, on balance, LTPA prior, during and after pregnancy may be important for reducing the risk of postnatal depression. Further research is required to determine the optimal dose and domain of PA for reducing postnatal depression risk as well as to examine the link between SB and postnatal depression.

**P120  Relationships between physical activity, sitting time, dietary habits, sleep, and self-rated health in the 10,000 Steps Cohort**  
Duncan MJ, Kline C, Vandelanotte C, Sargent C, Di Milia L

**PURPOSE:** Physical activity, sitting time, dietary habits and sleep are hypothesized to influence health, yet are infrequently examined in combination. This study investigates the relationships between these behaviors and the prevalence of poor/fair self-rated health.

**METHOD:** Adult members of the 10,000 Steps project (n=159,699) were emailed an invitation to take part in an online survey of health behaviors in November-December 2011. The survey included items on physical activity (IPAQ-LF), sitting time (Workforce Sitting Questionnaire), dietary habits (fruit, vegetables, soft drink, fast food), sleep duration and
quality (Pittsburgh Sleep Quality Index), and health related quality of life (CDC Healthy Days). Adjusted Cox proportional hazard models were used to examine the relationships between physical activity, sitting time, dietary habits, sleep duration and sleep quality and the prevalence of fair/poor self-rated health.

RESULT(S): A total of 14,145 members completed the survey, analysis is delimited to those who provided complete data for the current analysis (n=8,838). The prevalence of fair/poor self-rated health increased with lower levels of physical activity (Moderate: PR=1.60, p≤0.001; Low: PR=2.20, p≤0.001), higher levels of sitting (≥11h/day: PR=1.33, p≤0.001), poorer quality diet (Low: PR=1.33, p≤0.001), <7h sleep (PR=1.17, p=0.024), ≥8h sleep (PR=1.37, p≤0.001) and lower quality sleep (Fairly Good: PR=1.94, p≤0.001; Fairly Bad/Bad: PR=3.36, p≤0.001).

CONCLUSION(S): Physical activity levels, sitting time, dietary habits, sleep duration and sleep quality were significantly related to the prevalence of poor/fair self-rated health in this sample of adults. These results highlight the importance of improving activity, dietary and sleep behaviors to improve quality of life.

P121 Sitting time, physical activity and body composition in a population of overweight and obese adults
Berendsen BAJ, Hendriks MRC, Meis JJ, Schaper NC, Savelberg HHCM

PURPOSE: Physical (in)activity patterns of overweight adults are of increasing interest. Both physical activity and sedentary time have been related to development of co-morbidities. We aim to assess the relationships between physical activity, sitting time and body composition in participants of a lifestyle intervention. Additionally, we compared self-reported with objectively measured BMI.

METHOD: Inclusion took place at GP practices. Inclusion criteria were being overweight or obese and having (risk factors for) comorbidities. Participants completed a questionnaire including height, weight and the IPAQ to measure physical activity and sitting time. In addition, weight, fat and muscle mass were measured with bioelectrical impedance. Agreement between self-reported and objectively measured BMI was analyzed with ICC. Regression analyses were used to assess relations between physical activity, sitting time and body composition.

RESULT(S): Data of 323 participants was available for analyses (age 54.5±12.4 years). Self-reported BMI was not significantly different from objectively measured BMI (34.6±4.4 kg/m2 (range 24.7-49.6)). Median moderate to vigorous physical activity time was 150 minutes per week (25th and 75th quartile 0.0 and 420.0) and median sitting time was 360 minutes per day (25th and 75th quartile 240.0 and 480.0). Sitting time was negatively related to physical activity time. Sitting time and physical activity were not related to BMI, fat or muscle mass.

CONCLUSION(S): In this population, BMI from self-reported weight and height is valid. Our results suggest that people with less sitting time are more physically active. Although
overweight is a major current focus, body composition is not associated with physical activity and sitting time.

P122 The study on relationship of physical activity and body composition in female college students
Chen X, Zheng L

PURPOSE: The purpose of this study was to assess the physical activity level (PAL) among female college students, and discuss the relationship between physical activity (PA) and body composition.

METHOD: One hundreds and eighty-two female college students with a mean age 20.48±1.31 years were voluntarily recruited after comprehension of the nature and purpose of the study. We measured the body composition using dual energy x-ray absorptiometry (DXA). Physical activity was measured by an RT3 accelerometer over seven consecutive days, including a weekend. Anthropometrical parameters including age, whole body mass, height, waistline and hips were obtained.

RESULT(S): In our study, 72.2% of participants were in light active (PAL < 1.7), and 22.5% were in moderately active (PAL ranging from 1.7 to 2.0), and only 6% were in vigorously active (PAL≥2.0). The average of whole body mass was 53.76±9.32 kg, which included the following three parts, bone mass, fat mass, and lean mass. The fat mass was significantly negatively correlated with daily activity-related energy expenditure (AEE) (r= -0.347, p<0.001), but there was significantly positive correlation between lean mass, bone mass and AEE (r=0.323, p<0.001; r=0.201, p<0.001). AEE showed a significant and negative relationship with whole body mass, body mass index, waistline and hips (r= -0.303, p<0.001; r= -0.319, p<0.001; r= -0.247, p<0.001; r= -0.329, p<0.001).

CONCLUSION(S): We concluded that most of female college students were less active. Maintaining high physical activity level may be effective in decreasing whole body fat mass and increasing lean mass and bone mass.

P123 The study on relationship of physical activity and bone mineral density in female college students
Zheng L, Chen X

PURPOSE: The purpose of this study was to assess the situation of the bone mineral density among female college students, and discuss the relationship between physical activity (PA) and bone mineral density (BMD).

METHOD: One hundreds and eighty-two female college students with a mean age 20.48±1.31 years were voluntarily recruited after comprehension of the nature and purpose of the study. Femoral neck, lumbar spine, arms, legs, trunk and whole body BMD were
measured by dual energy x-ray absorptiometry (DXA). Physical activity was measured by RT3 accelerometer over seven consecutive days, including a weekend. The participants were divided to light physical active group (LG, PAL < 1.7) and moderate - vigorous physical active group (MVG, PAL ≥ 1.7).

RESULT(S): The number of female college students who engaged in light daily physical activity levels was 3.1 times of those who engaged in moderate – vigorous physical activity levels. The left femoral neck, lumbar spine, arms, legs, trunk and whole body BMD of MVG (0.959 ± 0.120; 1.186 ± 0.135; 0.791 ± 0.082; 1.223 ± 0.117; 0.896 ± 0.073; 1.121 ± 0.085) were significantly higher than those of LG (0.959 ± 0.120; 1.186 ± 0.135; 0.758 ± 0.063; 1.170 ± 0.108; 0.857 ± 0.068; 1.084 ± 0.074, p<0.01). These parameters showed a significant and positive relationship with activity-related energy expenditure (AEE) (r=0.216, p<0.001; r=0.196, p<0.001; r=0.322, p<0.001; r=0.282, p<0.001; r=0.311, p<0.001; r=0.291, p<0.001).

CONCLUSION(S): The data suggests that maintaining high - vigorous physical activity level may be effective in increasing BMD of the female college students.

P124  Relationship between energy expenditure and bone mass in postmenopausal women
Xun L, Zheng L, Chen X, Wang X

PURPOSE: To discuss the relations between energy expenditure and bone mass in postmenopausal women.

METHOD: 60 healthy postmenopausal women, aged 45-60ys, were divided into two groups: 29 women, who participated in regular exercise 3-5 times weekly, and 31 women acted as non-exercisers. Participants wore accelerometer (OMRON) for 7 consecutive days. Total diary energy expenditure(TDEE), physical activity energy expenditure(PAEE), basal energy expenditure(BEE) were detected. Bone mineral density(BMD) and bone mineral centent(BMC) at all sites was measured by dual-energy x-ray absorptiometry (DXA).

RESULT(S): For postmenopausal women who participated in regular exercise, there was positive correlation between BMD at trunk, pelvis, BMC at ribs and PAEE(r=0.375, 0.384, 0.464; p<0.05). BMD at arms, legs, trunk, ribs, pelvis and total body were positively correlated with BEE(r=0.455, 0.461, 0.387, 0.461, 0.382, 0.413; p<0.01-0.05), and TDEE(r=0.411, 0.409, 0.470, 0.409, 0.474, 0.381; p<0.01-0.05). BMC at arms, legs, trunk, ribs, pelvis and total body(r=0.623, 0.722, 0.471, 0.459, 0.731, 0.611; p<0.01-0.05) and TDEE(r=0.512, 0.479, 0.478, 0.572, 0.413, 0.489; p<0.01-0.05). For non-exerciser, BMD at arms, legs, trunk, ribs, pelvis, spine and total body were positively associated with BEE(r=0.704, 0.697, 0.678, 0.791, 0.676, 0.668, 0.605; all p<0.01) and TDEE (r=0.482, 0.458, 0.405, 0.465, 0.421, 0.439, 0.399; p<0.01-0.05). BMC at arms, legs, trunk, ribs, pelvis, spine and total body were positively associated with BEE(r=0.678, 0.869, 0.786, 0.763, 0.731, 0.776, 0.772; all p<0.01) and TDEE (r=0.517, 0.685, 0.466, 0.442, 0.413, 0.502, 0.540; p<0.01-0.05).
CONCLUSION(S): There was positive correlation between bone mass and energy expenditure, especially total diary energy expenditure and basal energy expenditure.

P125  Weight-bearing or not for maintaining bone mineral density in menopausal women?
Chang S-C, Lee L-L

PURPOSE: To examine the effect of a 12-week walking intervention, without weight bearing, on maintaining Bone Mineral Density (BMD) among postmenopausal women.

METHOD: A randomized controlled trail design was used to test the effect of the walking intervention. Participants were recruited from an east township of Taiwan. A total of 57 participants was randomized to either a control (n=28) or intervention group (n=29). Control group participants received a usual care when needed. Participants in intervention group received a 12-week, without-weight-bearing walking intervention.

RESULT(S): At 12th week follow up, mean change of BMD was similar in two groups (p=.5). Aerobic steps were increased in intervention group. Scores of exercise self-efficacy and exercise outcome expectation were also improved significantly.

CONCLUSION(S): A 12-week, without-weight-bearing walking intervention may increase physical activity, exercise self-efficacy, and exercise outcome expectation among postmenopausal women but the effect on maintaining BMD was not found. Future study testing the effect of longer period, with or without-weight-bearing walking intervention on maintaining BMD is warranted. Only then maintaining or improving BMD through walking activity among postmenopausal women could be feasible.

P126  Taking up physical activity in later life and healthy ageing: the English Longitudinal Study of Ageing
Hamer M, Lavoie KL, Bacon SL

PURPOSE: Physical activity is associated with improved overall health in those people that survive to older ages, otherwise conceptualized as healthy ageing. Previous studies have examined the effects of mid-life physical activity on healthy ageing, but not the effects of taking up activity later in life. We examined the association between physical activity and healthy ageing over 8 years follow-up.

METHOD: Participants were 1,955 initially disease-free men and women (aged 68.9 ± 5.6 yrs at baseline) from the English Longitudinal Study of Ageing, a prospective study of community dwelling older adults. Self-reported physical activity was assessed at baseline and through follow-up. Healthy ageing, assessed at 8 years follow up, was defined as those participants who survived to age 70 without developing major chronic disease, depressive symptoms, physical or cognitive dysfunction.
RESULT(S): At follow-up, 32.1% of the sample was defined as healthy ageing. In comparison with sedentary participants, moderate (odds ratio, 2.20, 95% CI, 1.52–3.20), or vigorous activity (3.26, 2.20–4.83) at least once a week was associated with healthy ageing, after adjustment for age, sex, smoking, alcohol, marital status, and wealth. Becoming active (multivariate adjusted, 2.34, 1.20–4.55) or remaining active (4.58, 2.62–8.01) was associated with healthy ageing in comparison with remaining sedentary over follow-up.

CONCLUSION(S): Physical activity in older age is associated with improved overall health in participants surviving to 70 years of age and above. Significant health benefits were even seen among participants who became physically active relatively late in life.

P127 Association of physical activity, functional fitness and mental fitness among older adults in Nakornpathum, Thailand: a pilot study
Purakom A, Nakornkhet K, Tanoomsuk M, Pupanead S

PURPOSE: Physical activity (PA) empirical database in aging are rare in Thailand. The study was to investigate association of physical activity level with functional fitness and mental fitness in Thai older adults.

METHOD: A cross-sectional study was conducted in Kampang-sane, Thailand in 2013. The subjects included 304 older adults age ≥60 years (107 men, 201 women) were assessed for physical activity with the long version of GPAQ2 (WHO, 2012), functional fitness was assessed according to Sport Authority of Thailand (2003), and mental fitness was assessed using Thai Mental Health Indicator Version 2007. Logistic regression models were performed to test the association between PA level with the composite z-score for functional fitness and mental fitness.

RESULT(S): Compared with low intensity group, the odds of composite Z-score for functional fitness among older adults with moderate intensity and vigorous intensity group were one times higher than those in the low intensity group (OR = 1.012, 95% CI: 1.002-1.021, P=0.023), (OR = 1.014, 95% CI: 1.005-1.024, P=0.002) and the odds of mental fitness among vigorous intensity group were two times higher than those in low intensity group (OR = 2.332, 95% CI: 1.073-5.071, P=0.033).

CONCLUSION(S): The study provide preliminary evidence that elderly who spent more time in physical activity or less sedentary behavior exhibit improved functional and mental fitness. These data indicated the important of early development of national public health policies, local administration organization policies and highly useful for establish specific PA intervention programs that promote functional and psychological ability in older adults.
**P128**  
United States prevalence of physical activity and sedentary behavior among adults with cardiovascular disease  
Evenson KR, Butler EN, Rosamond WD

PURPOSE: Physical activity is recommended for both primary and secondary prevention of cardiovascular disease (CVD). This study describes the prevalence of self-reported and accelerometer-measured physical activity and sedentary behavior using a nationally representative sample from the United States (US), a subset of whom had CVD, including angina, coronary heart disease (CHD), congestive heart failure (CHF), and myocardial infarction (MI).

METHOD: Using the most recently available accelerometer data (2003-2006) from the National Health and Nutrition Examination Survey, the study sample included 680 adults with CVD who completed a questionnaire and wore an ActiGraph accelerometer for one week. We selected an “unexposed group” (n=1000) without CVD and with similar age, gender, and race/ethnic distributions to compare physical activity and sedentary behavior estimates. Percents and means were weighted to reflect the US population from 2003-2006.

RESULT(S): Across CVD groups, self-reported past month moderate leisure activity ranged from 39.7% (CHF) to 53.8% (CHD) and vigorous leisure activity ranged from 12.9% (CHF) to 18.4% (CHD), with walking the most commonly reported activity. Television watching >=4 hours/day ranged from 36.1% (MI) to 44.8% (CHF). Using accelerometry, moderate-to-vigorous physical activity ranged from a mean of 8.6 minutes/day (CHF) to 11.4 minutes/day (angina). Sedentary behavior ranged from a mean of 9.6 hours/day (angina) to 10.1 hours/day (CHF). All four CVD groups had lower leisure activity and moderate-to-vigorous physical activity, and higher television watching and sedentary behavior, when compared to the unexposed group.

CONCLUSION(S): Continued efforts are needed to encourage physical activity and reduce sedentary behavior for secondary prevention among those with CVD.

**P129**  
"It’s all about the chatting and there’s lots of laughter. Laughter is better than any medicine": older adults’ perceptions of the benefits of participating in walking groups  
Niven A, Laing N, Fawkner S

PURPOSE: In Scotland only 20% of adults aged 65-74 years and 8% of aged 75+ years are sufficiently active to achieve health benefits. Brisk walking has been identified by policy makers as a key mechanism through which older adults can achieve current physical activity recommendations and Paths for All promote walking for health in older adults through volunteer led walking groups. The aim of this qualitative study was to identify what older adults perceive are the benefits of participating in Paths for All walking groups.

METHOD: Following institutional ethical approval, ten older adults (65+ years) who had been
walking with Paths for All groups for a minimum of 12 months participated in individual interviews at a place of their convenience. Interviews were audio recorded, transcribed verbatim and the data were analysed using interpretive phenomenological analysis to identify individual and group perspectives.

RESULT(S): The four largest group themes that emerged were labelled benefits relating to: i) social aspects (e.g., ‘I love being part of the group because it is an all-inclusive group’); ii) physical health (e.g., ‘When I walk, I feel well’; iii) sense of well-being (e.g., ‘I feel energised, it just gives you the feel good factor’); and iv) characteristics of the walk (e.g., ‘walking through natural woodland...that makes me very happy inside’).

CONCLUSION(S): The findings illustrate the range of benefits older adults gain from walking in a group. These benefits may be used by practitioners to promote walking for health in this age group.

P130 The contribution of walking on preservation of functional capacity in the elderly
Sampaio A, Carvalho J

PURPOSE: Means and strategies to enhance and prolong the functional autonomy and quality of life of elderly people have gained importance, as the world population ages at an exponential rate. It becomes increasingly relevant that these strategies are low cost, easily accessed and aimed at preventing chronic degenerative diseases. The aim of this study is to understand and evaluate how walking can contribute to maintaining the functional capacity and quality of life of elderly subjects.

METHOD: This exploratory study was conducted in Viseu, Portugal. Fifty elderly subjects (73.28 ± 6.94 years) of both sexes were studied. The individuals were divided in 2 groups. The first group (n=25) walk for an average of 5 hours divided into 3 or more times per week for a minimum of 1 year. The second group (n=25) does not have regular physical activity habits. Physical fitness (Senior Fitness Test), Physical activity (IPAQ), Health-Related Quality of Life (HRQoL) (MOS SF-36), anthropometric variables (BMI and waist circumference) were assessed.

RESULT(S): In this study, the walkers had a better physical fitness level (p<0.05), HRQoL (p<0.05) and higher levels of physical activity (p<0.05). Non-walking subjects presented higher values of BMI and waist circumference than walkers.

CONCLUSION(S): These results allowed us to verify that walking as regular PA is a significant element for the promotion and maintenance of health, allowing a higher HRQoL compared to inactive subjects. This study suggests that walking can be a low-cost and easily accessed strategy to improve physical function in the elderly and to promote their quality of life.
P131 Affect regulation in response to lunchtime walking in previously physically inactive employees
Thogersen-Ntoumani C, Loughren E, Duda JL, Fox KR

PURPOSE: To examine the effects of participation in a lunchtime walking programme on affect at work using an Ecological Momentary Assessment (EMA) methodology

METHOD: Physically inactive University employees (N = 56; M age = 47.68) were randomised to an immediate treatment (IT) or a delayed treatment (DT) group. Participants participated in three 30-minute lunchtime group-led walks three times per week for 10 weeks. Using an ecological momentary assessment methodology, the participants in the IT group completed twice daily affective reports using mobile phones at work (late morning and early afternoon) on two randomly assigned days per week for a 10 week period. The DT participants completed these momentary reports during control (DT-C) and intervention phases (DT-I).

RESULT(S): Enthusiasm and relaxation was greater on afternoons in the IT group following lunchtime walks compared to the DT group (DT-C phase). These affective states were also more positive on walking day afternoons compared to non-walking day afternoons for the IT and DT (DT-I phase) groups. In addition, nervousness decreased on walk day afternoons for the DT condition during the DT-I phase. Finally, nervousness was lower in the afternoons than in the mornings on walking days for IT and DT (DT-I phase) while fatigue and relaxation was greater in the afternoon in the IT group only.

CONCLUSION(S): The intervention was largely effective in changing affective states at work in previously inactive employees. The programme could be offered as part of effective wellness initiatives and may have broader implications for public health and workplace performance.

P132 Relationship between objectively measured physical activity and maternal blood glucose
Hayes L, Kinnunen TI, Robson SC, Poston L, Bell R

PURPOSE: Physical activity is associated with lower maternal glucose in some, but not all, studies. Inaccurate measurement of physical activity might account for equivocal findings. We examined the relationship between maternal blood glucose and objectively measured physical activity.

METHOD: Design: Cross sectional study Participants: Pregnant women referred to the Royal Victoria Infirmary, Newcastle, UK for an oral glucose tolerance test Measures: Women wore an Actiheart physical activity monitor for four days. Women who provided at least 48 hours of data were included in the analysis. Total (TEE) was estimated using Actiheart software. Analyses: Differences in blood glucose between women classified as 'more active' (above the median TEE) and 'less active' were compared using t-tests.

RESULT(S): 52 out of 64 women recruited to the study (81%) provided sufficient data for
inclusion in the analysis. Women were between 16 and 35 weeks’ gestation at recruitment (mean 28 weeks; SD 5.3). Mean (SD) age was 30.9 (6.8) years. Mean BMI was 32.6 (6.4). Median (inter-quartile range; IQR) TEE was 2492 (369) kcal/day. Mean (SD) fasting and 2-hour post glucose challenge blood glucose were 4.6 (0.5) mmol/l and 6.7 (1.9) mmol/l respectively. Women who were more active had non-statistically significantly lower post load blood glucose than those who were less active (mean [SD] 6.3 [1.6] mmol/l and 7.1 [2.1] mmol/l respectively; p=0.1).

CONCLUSION(S): A difference of 0.87mmol/l in post-load glucose could be of clinical significance given the continuous association between maternal glucose levels and adverse pregnancy outcomes, although this difference was not statistically significant in this small study.

P133 Is active commuting good for our health?
Flint E, Cummins S, Sacker A

PURPOSE: Physical activity reduces the risk of cardiovascular disease and is an important factor in healthy weight maintenance. However, overall levels of physical activity have declined in the developed world, and tackling obesity is a public health priority. Active commuting is thought to be a particularly effective way of getting exercise, as walking and cycling are easily adopted and likely to be maintained as part of one’s daily routine.

METHOD: Using data from wave 2 of the UK's Understanding Society study, this research investigates the extent to which active commuting (walking or cycling to work) predicts four objectively measured health outcomes: body mass index (BMI); percentage body fat; lung function; blood pressure. The analytic sample was restricted to those who worked outside of the home and had complete data for the analytic variables (n=3517 men; n=4204 women). Gender-stratified nested multivariate linear regression analyses were utilised in order to adjust for covariates: age, distance travelled, illness/disability, social class, work-related physical activity, sporting activity and diet quality.

RESULT(S): In age-adjusted analyses, active commuting was associated with lower BMI for men (b -0.77; p=0.001) and women (b -0.59; 95% p=0.009). Adjustment for other covariates did not greatly attenuate this association for men (b -0.64; p=0.005) or women (b -0.79; p=0.001). Similar results were found for Body Fat. Active commuting did not significantly predict lung function or blood pressure.

CONCLUSION(S): The results from this investigation corroborate findings from other studies in suggesting that cycling or walking to work may help individuals maintain a healthy weight and body composition.
**P134**  The interaction between occupational physical activity and workplace social capital in relation to coronary heart disease  
De Clercq B, Maes L, Braeckman L, Casini A, Clays E

PURPOSE: Several studies have shown that physical activity and psychosocial risk factors at work have interacting effects on musculoskeletal disorders, but it is unclear whether this is also the case for their relation with coronary heart disease (CHD). This study aimed to assess the interaction between occupational physical activity and workplace social capital in relation to coronary heart disease.

METHOD: The sample included 14,337 middle-aged men free of CHD at baseline (1994-1998), in whom the incidence of coronary events was followed over a 3 year period. Baseline data were collected through standardized questionnaires and clinical examinations. A theoretical workplace social capital model was developed and The Job Content Questionnaire was used to assess physical activity at work. Cox proportional hazard regression modeling was applied to assess relations with CHD.

RESULT(S): During follow-up, 87 new coronary events were registered. After adjusting for socio-demographic and classical coronary risk factors, results showed that both high occupational physical activity (HR 1.17; 95% CI 0.51-2.65) and low vertical workplace social capital (HR 2.17; 95% CI 1.39-3.38) increased the risk for CHD. However, no significant interactions were found.

CONCLUSION(S): Results demonstrated that high occupational physical activity and low workplace social capital independently contributed to the incidence of CHD. The synergistic health effects of physical activity and social capital as found in community studies, could not be replicated in an occupational context.

**P135**  Physical activity during pregnancy and its effects on neonatal outcomes  

PURPOSE: Physical activity during pregnancy has been reported as a protective factor in maternal and child health. However, its effects on neonatal outcomes are still controversial. This study aimed: (1) To explore whether pregnant women adhered to the physical activity recommendations of the American College of Sports Medicine (ACSM) and to determine the relationship between ACSM physical activity recommendations during pregnancy and neonatal outcomes at birth.

METHOD: We conducted a prospective study with a sample of 70 pregnant women in three stages: at 10-12 weeks’ gestation - T1, 20-24 weeks’ gestation - T2 and in the immediate postpartum period (first 48 hours). Height and weight were determined using standard anthropometric methods. Physical activity was assessed via accelerometry, during the T1 and T2 evaluation stages. Women were categorized into three groups: inactive,
inconsistently active and active, in accordance with the ACSM physical activity recommendations. Postpartum, medical records were examined for neonatal outcomes at birth: weight, length, head circumference and Apgar score.

RESULT(S): 52.86% of women were inactive (did not reach ACSM physical activity recommendations at T1 and T2). No significant differences in neonatal outcomes at birth were observed between the women who did and did not comply with ACSM physical activity recommendations (p>0.05 for all outcomes).

CONCLUSION(S): Currently, a great number of women do not comply with ACSM physical activity recommendations. Healthy pregnant women should be encouraged to follow the physical activity recommendations of the ACSM during pregnancy, given that no significant negative associations were found between physical activity and neonatal outcomes.

P136 Proportions of total activity by vigorous physical activity: prospective relationships with mental health, physical functioning, and weight
Gebel K, Ding D, Bauman A

PURPOSE: Recent meta-analyses concluded that the intensity is superior to the role of the amount of physical activity (PA) in predicting health benefits. The debate about the relative roles of activity intensity and energy expenditure as predictors of morbidity and mortality continues today. We examined prospectively whether the proportion of PA that is achieved by vigorous activities is associated with positive effects on mental health, physical functioning, and weight.

METHOD: Data were combined from the 45 and Up and SEEF studies conducted in Australia (n=60,404). Logistic regression models examined whether the proportion of vigorous activities in total PA is associated with changes in mental health, physical functioning, and weight gain, adjusting for multiple potential confounders. Mental health was measured with the Kessler 10 score, and physical function with the Medical Outcomes Study Physical Functioning Scale.

RESULT(S): A one percent increase of total activity by vigorous activities at baseline was associated with decreased odds for deteriorating mental health (OR=0.99, 95%CI=0.98-0.99) and physical function (OR=0.99, 95%CI=0.98-0.99). The association with increased weight was not significant. A 10% increase over time in the proportion of vigorous activity in overall PA was related to a reduced risk for weight gain (0.97, 95%CI=0.96-0.99) and for decreased physical function (OR=0.91, 95%CI=0.90-0.93).

CONCLUSION(S): Independent of the total volume of PA, the proportion of overall PA achieved by vigorous activities was related to reduced odds for health problems. Even though the effect sizes were small, this highlights the importance of vigorous activities which might have to be better reflected in PA guidelines.
P137  Physical inactivity among older adults: implications for life expectancy among normal weight and overweight/obese individuals  
Coombs N, Stamatakis E

PURPOSE: To identify if non-adherence to physical activity guidelines at older ages is associated with reduced life expectancy among normal weight and overweight/obese individuals.

METHOD: Health Survey for England and Scottish Health Surveys conducted between 1994 and 2004 were linked to mortality data (5 year follow up) for respondents aged 60 and over (2671 decedents, 1413 males). Physical inactivity was determined from the Chief Medical Officers 2011 physical activity guidelines for older adults. Cox proportional hazard ratios were used to calculate the proportion of mortality directly attributable to physical inactivity for males and females in normal weight and overweight/obese BMI categories. These proportions were applied to sex-specific period life tables for Great Britain (1998-2000) to yield years of life lost due to physical inactivity at ages 60 years and over for normal weight, and overweight/obese individuals. Results were adjusted for age, general health, longstanding illness, ethnicity, and smoking status.

RESULT(S): Non-adherence to physical activity guidelines accounted for 3.8 (95%CI 2.3 to 5.2) years of life lost among normal weight females and 1.6 (0.2 to 2.8) years of life lost among overweight/obese females at age 60. For males, non-adherence to physical activity guidelines was associated with reduced life expectancy for the normal weight group only (1.7 years, 0.7 to 2.7).

CONCLUSION(S): At older ages, meeting physical activity guidelines is associated with increased life expectancy among normal weight individuals. Among overweight/obese individuals meeting physical activity guidelines is associated with increased life expectancy for females only.

P138  Mid-intensity physical activity is essential to preserving or improving bone mass in postmenopausal women  
Wang K, Zheng L, Chen X, Ming Y

PURPOSE: To evaluate the relationships between physical activity(PA) and body composition(BC), energy expenditure(EE), BMD, and to define the reference standard of EE affecting bone mass in postmenopausal women.

METHOD: 60 volunteers sampled from postmenopausal women (menopause age 6.78±4.11Ys) in Beijing. Exercise and control group (EG and CG, 30 persons/group) were randomly assigned. EG participated in compound exercises (aerobic, resistance and lower impact exercise; 60min/time, 3 5times/week) for 1y. Daily PA characteristics, EE (hja-350it accelerometer, OMRON, Japanese), BC and BMD (DXA, Lunar Prodigy, GE, USA) were
RESULTS: 1. Walking steps, 3-6METs-min and 6METs-min were higher in EG than that in CG; PAEE, W(walk)EE, and T(total) EE in EG were higher than that in CG 1y later. 2. BW and PBF were lower, PBM higher; FNLBMD was higher, L2-4, FNR and TBMD no significant changes in EG. But, BW increased, PBM, FNL, FNR and TBMD decreased in CG 1y later. 3. WEE and PAEE were respectively positive correlation with △ PBM and △ FNLBMD, but negative correlation with △ BW and △ PBF. TEE, 3-6METs-min was positive correlation with △ PBM. △ BW was positive correlation with △ TBMD.

CONCLUSION(S): Compound exercise are effective exercise for preserving or increasing bone mass in postmenopausal women, which may be attributed to improving energy expenditure, ameliorating body composition and muscle mass, elevating strength and mechanical load stimulation to bone. Daily PAEE, which is lower than 650 kcal, should be considered as a standard of lack of exercise for postmenopausal women.

P139 Association of physical activity and metabolic syndrome among Malay adults in a middle income country, Malaysia
Moy FM, Chu AHY

PURPOSE: Metabolic syndrome is highly prevalent among adult population especially among those physically inactive. This scenario is frequently observed in developed countries but there is inadequate evidence in middle income countries. Therefore, we aimed to study the association of physical activity with metabolic syndrome among Malay adults in Malaysia.

METHOD: This was an analytical cross sectional study. Body mass index (BMI), waist circumference, systolic/diastolic blood pressure, fasting blood glucose, triglycerides and high density lipoprotein (HDL) cholesterol were measured. Self-reported physical activity was obtained with the validated IPAQ (Malay version) and categorized into low-, moderate- and vigorous-activity levels. Metabolic syndrome was assessed using the NCEP ATP III criteria.

RESULT(S): From a total of 686 participants, 65.6% of them were overweight and obese. Metabolic syndrome was diagnosed in 31.9% of participants, with 37.1% men and 24.2% women. The prevalence of metabolic syndrome among participants with low-, moderate-, and high-activity level was 13.3%, 11.7% and 7.0%, respectively (p<0.001). There was an inverse association between BMI, the number of metabolic abnormalities with low physical activity level (p<0.05). The odds ratios (95% CI) for having the metabolic syndrome in the categories of vigorous and moderate activity were 0.42 (0.27, 0.65) and 0.52 (0.35, 0.76) respectively, after adjusted for gender.

CONCLUSION(S): Moderate and vigorous physical activity was each associated with reduced odds of developing metabolic syndrome independent of gender. Although a slightly lower prevalence of metabolic syndrome was associated with vigorous activity, the potential beneficial health effects were witnessed as soon as moderate activity was performed.
**P140  Posture analysis of secondary school teachers in a classroom situation. Can smartboards improve teachers postures to reduce work related muscle-skeletal problems?**
Zinzen E, Bogaert I, De Ridder K, Beutels M, De Martelaer K

PURPOSE: (i) To make a posture analysis of teachers while teaching theoretical courses; (ii) to estimate their risk for the development of muscle-skeletal problems (MSP); (iii) to investigate if the use of smartboards can reduce MSP compared to chalkboards.

METHOD: 35 secondary school teachers were randomly selected and filmed during 30 min of a theoretical course. Posture analysis of back, arms, legs and risk assessment was performed every 5 sec. using OWAS. Differences between teachers using chalk- and smartboards were determined by t-tests (p<0.05).

RESULT(S): Average chalkboard teachers (N=20): 41.4 years, 172.7 cm and 71.15 kg, teaching experience 17.85 years. 11 experienced MSP. They stand upright with straight back for 89.3% of their time; 10% with bended back. In 8.7% one arm was above shoulder height. Walking was done in 19.25% of their teaching time. Only 10.5% of the teachers scored a mild risk for the development of MSP. Average smartboard teachers (N=15): 38.3 years, 170.6 cm, 66.4 kg, teaching experience 13.9 years. 6 experienced MSP. They stand upright with straight back for 87.2 % of their time; 12.1% with bended back. In 15.87 % one arm was above shoulder height. Walking was done in 18.7% of their teaching time. Only 12.4% of the teachers scored a mild risk for the development of MSP. Smartboard users had significant more one arm above shoulder height.

CONCLUSION(S): Teaching imposes no harmful postures. Differences between chalk and smartboards are negligible but slightly in favor of chalkboards. Teachers need more ergonomic education in the use of smartboards.

**P141  Psychological well-being among physically active and inactive adults**
Kangasniemi A, Lappalainen R, Kankaanpaa A, Tammelin T

PURPOSE: The aim of this study was to compare psychological well-being between physically inactive and active adults. Especially we examined psychological symptoms, mindfulness-skills and psychological flexibility. The second purpose was to describe how objectively measured physical activity was associated with psychological well-being.

METHOD: Cross-sectional study (N=108) included 58 physically inactive and 50 physically active adults. Participants completed questionnaires which measured their psychological well-being; overall mental health (GHQ-12), psychological symptoms (SCL-90), depressive symptoms (BDI-II) mindfulness-skills (KIMS) and their psychological flexibility (AAQ-2). Physical activity was measured objectively by an accelerometer during the waking hours for seven consecutive days.
RESULT(S): Physically active participants scored higher in mental health (GHQ, p<0.001), had less psychological (SCL-90, p=0.011) and depression symptoms (BDI-II, p<0.001), had better mindfulness-skills (KIMS, p=0.009) and scored higher in psychological flexibility (AAQ-2, p=0.016) compared to the physically inactive participants. A consistent association was observed between the objectively measured physical activity and psychological well-being.

CONCLUSION(S): Physically more active lifestyle was associated with psychological well-being. Physically active adults had less psychological symptoms and depression, but also better ability to be in the present moment and they were more psychologically flexible in their behavior. This new finding of positive association between physical activity, mindfulness and psychological flexibility may partly explain better well-being among physically more active participants.

P142 Physical activity, quality of life and prosthesis adaptation in transtibial amputees
Mateus J, Palmeira AL

PURPOSE: To test the hypothesis that people with a traumatic transtibial amputation are more active, have better quality of life and prosthesis adaptation than people with a vascular amputation. As an additional purpose we aimed at an exploratory recommendation for a guideline of moderate to vigorous activity for transtibial amputees.

METHOD: Physical activity was measured in 25 unilateral transtibial amputees of any aetiology, (4 women, 18-65 y), using an accelerometer (Actigraph GT3X) during one week. To measure quality life we used the SF12, and the level of adaptation to prosthesis with the LCI.

RESULT(S): The traumatic amputees reported less sedentary activity and higher lifestyle and moderate activity than vascular amputees (p≤0.006). However when we controlled the age of amputees, the functionality of the prosthesis and the time of use these differences became non-significant. The results show the younger showed higher levels functionality, and that the use of the prosthesis was associated with higher levels of moderate activity (p≤0.033). Amputees who practice moderate to vigorous activity from 100 minutes/week presented higher quality of life at the physical domain (ES=0.85). From 125 minutes/week the amputees present better quality of life at physical (ES=1.32) and mental domains (ES=0.81)

CONCLUSION(S): The traumatic amputees are more physically active than the vascular ones. The time of use of the prosthesis, the functionality with it and the age of amputees are the most important conditions that influence the physical activity. The better life quality levels were associated with more than 100 minutes for week of moderate to vigorous activity.
P143 Association between exercise dependence and burnout among fitness class instructors
Ferreira T, Palmeira AL

PURPOSE: To assess the relationship between exercise dependence (ED) and burnout among fitness class instructors in Lisbon, Portugal.

METHOD: Participants were 149 fitness instructors (71 male; 78 female), teaching body & mind, strength, aerobic and dance classes. Exercise dependence was measured with the EDS-21, burnout with the MBI and body image related variables were assessed with the EDI-2. Statistical analyses include Pearson correlation, ANOVA and multiple regression.

RESULT(S): We found that 71.80% of our sample was symptomatic for ED. The instructors who engage in more physically intense classes reported more depersonalization and this construct was positively correlated to ED (p<0.05). In addition, higher values of emotional exhaustion were associated with higher values of ED (r(142) = 18, p = 0.030). Higher values of ED were associated with lower qualifications of instructors (p<, 05). However, no significant differences were found between burnout, ED, body image and perfectionism related to professional experience. Two thirds of the instructors were emotionally exhausted and this was related to the manifestation of withdrawal symptoms of ED.

CONCLUSION(S): According to our study, most of our sample revealed to be symptomatic for ED and the values showed significant correlation with burnout. Further studies are needed to understand the long-term health effects and social impacts of ED and burnout experience in fitness instructors.

P144 Adult Learning Open University Determinants study (ALOUD): physical activity associated with study success
Gijselaers J, de Groot R, Kirschner PA

PURPOSE: Life expectancies keep rising and the aging population is growing. As a result people have to work longer in this rapidly developing knowledge economy. This leads to an ongoing demand for people to develop their professional knowledge and experience far into adult age. Consequently, adults participate more in formal education. Physical activity, as well as sedentary behavior, influences cognition and learning capacity in adults. Therefore, the associations between physical (in)activity and study success are investigated in adults participating in distance education, an adult aging population that is barely investigated in research and which can relatively easily combine work, education, and private life. A healthy lifestyle, with regard to physical activity, is expected to be positively associated with study success.

METHOD: An observational design is used. During 1 year, all new Master students (18-80 years old) of the Open University (NL) are approached (n=±6000, expected response n=±2000). A digital online survey is used to measure physical activity (i.e. SQUASH, sedentary information, one-item question on compliance with the guideline for physical activity) and
covariates. Cognition is measured with an objective digital online neuropsychological test battery. Study success is measured using data from the exam registration office. All tests are administered via computer at the participants’ home via internet. Data will be analyzed with multiple regression analyses.

RESULT(S): Preliminary results will be available at the congress (expected n=1200).

CONCLUSION(S): The results give insight in the role of physical activity and sedentary behavior in study success of adult students in distance education.

P145 Associations of physical activity with body composition in Central European women
Gába A, Pridalová M, Pelclová J, Zajac-Gawlak I, Pospiech D, Klimešová I, Mitáš J, Dygrýn J

PURPOSE: Sedentary life style is associated with increased prevalence of overweight and obesity. Therefore, the aim of this study was to analyze the associations between physical activity (PA) and body composition (BC) in women aged 50–74 years.

METHOD: This cross-sectional study used data collection of 314 Czech, Polish and Slovak women. BC was measured via a direct segmental multi-frequency bioelectrical impedance analysis (InBody 720) and PA was recorded from all subjects using the accelerometer ActiGraph GT1M for seven continuous days. Separate bivariate logistic regression models were used to examine the associations between BC (dependent variables: body mass index [BMI], body fat mass percentage [%BFM], visceral fat area [VFA], or fat-free mass index [FFMI]) and PA (covariates: steps/day or moderate PA).

RESULT(S): Compared with sedentary and low active women (<7,500 steps/day), those who accumulated 7,500–9,999 steps/day were 2.6 times (p=0.01), 4.1 times (p<0.01), and 4.8 times (p=0.02) more likely to have BMI, %BFM, and VFA in the normal range, respectively. Moreover, those who met the step-based recommendation (>10,000 steps/day) were 3.8 times (p<0.01), 6.3 times (p<0.01), and 5.0 times (p=0.01) more likely to have BMI, %BFM, and VFA in the normal range, respectively, then sedentary and low active participants. Conversely, FFMI was not associated with step-based PA, even in those who accumulated >10,000 steps/day. There were no significant associations between BC and moderate PA (odds ratio ranged from 0.72 to 1.67).

CONCLUSION(S): The present findings support the idea that steps-based PA was proved to be a protective factor against obesity in women.
Physical activity measurement, patterns and trends in children and adolescents

P146  Design and validation of a questionnaire focusing on sedentary occupations and active transports (ACTI-Cités project)  

PURPOSE: Measuring physical activity (PA) practice is essential for the understanding and the prevention of chronic diseases relative to nutrition. There is increasing interest on the importance of active transports (AT) (e.g. walking, cycling) and life-style related PA, and the impact of sedentary behaviors on health. Existing questionnaires give satisfying information for leisure activities but turns out to be not relevant enough for AT and sedentary occupations. The aim of this study is to validate a PA questionnaire focusing more specifically on these behaviors.

METHOD: A modified questionnaire was developed from the French version of the RPAQ (Recent Physical Activity Questionnaire; Besson et al., 2010, AJCN) enhanced with questions targeting sedentary occupations and active transport. The understandability of this modified questionnaire and its reproducibility at one month interval were tested in 34 volunteers. In addition, answers were tested against data collected from activity logbooks and objective measurement tools (accelerometer Actigraph GT3X and GPS QStarz GQ1000eX) worn by 60 subjects for a 15 days period. Intra-class correlation coefficients, linear regressions, and Bland-Altman graphs were used for data analysis.

RESULT(S): Cognitive testing showed a good level of understandability. Reproducibility was similar to that of other AP questionnaires from the literature. Comparisons between answers to the questionnaire and objective measurements show promising results for the first available subjects, especially for AT.

CONCLUSION(S): The development of this questionnaire will participate to a better understanding of the relationships between AT, sedentary behaviors and health.

P147  Agreement between parent and child report on parental practices regarding dietary, physical activity and sedentary behaviours: the ENERGY cross-sectional survey  
Rebholz CE, Chin A Paw MJM, van Stralen M, Singh AS, Brug J, te Velde SJ, ENERGY Consortium

PURPOSE: To assess agreement between parent and child report on parental practices regarding energy-balance related behaviours (EBRBs) across different countries in Europe and to identify correlates of agreement.

METHOD: Within the ENERGY-project a cross-sectional survey has been conducted among
10-12 years old children and their parents in eight European countries. Both children and parents filled in a questionnaire on 14 parental practices regarding 5 different EBRBs (soft drink, fruit juice and breakfast consumption, sports activity and watching TV) and socio-demographic characteristics. We objectively assessed children’s BMI. To assess agreement, per parental practice and country, we calculated percentages of agreement between children’s and parents’ report and weighted kappa statistics. We assessed factors associated with agreement using multilevel linear regression.

RESULT(S): Reports of 6425 child-parent pairs were available for analysis. Overall mean agreement was 43%, with little variation across countries. Lowest agreement was found for practices referring to joint parent-child activities, such as sports (27%; Kappa=0.14) or watching TV (30%;κ=0.17), and for parents allowing of taking soft drinks (32%;κ=0.24), or fruit juices (32%;κ=0.19), or watching TV (27%;κ=0.17). In general, agreement was lower for boys, younger children, younger parents, parents with less than 14 years of education, single parents and parents with a higher self-reported BMI.

CONCLUSION(S): Parents and children perceive parental practices regarding dietary, physical activity and sedentary behaviours differently in all parts of Europe. We advise future studies to assess both parents and children’s view on parental practices.

P148 Calibration of the GENEA wrist- and waist-worn accelerometer in children and adolescents

Knowles G, Mellecker RR, Thomas GN, Adab P, McManus AM

PURPOSE: To calibrate the new GENEA accelerometer as a measure of sedentary behaviour and physical activity energy expenditure (PAEE) in children and adolescents when worn at the wrist and waist.

METHOD: 47 students (40% male, 11-16y) completed a series of structured activities (rest, screen-time, slow walking, fast walking, and running). Oxygen uptake was measured by indirect calorimetry. Two GENEA accelerometers, one worn at the wrist and the other at the waist, were worn throughout. Accelerometer data were summarised as the signal vector magnitude (SVM per second). Oxygen uptake was aligned with the corresponding accelerometer data. Accelerometer data were categorised as sedentary, low, moderate and vigorous intensity. ROC curves gave the optimal threshold values for each intensity.

RESULT(S): Strong correlations with oxygen uptake were observed for wrist SVM (r=0.81, p<0.0001) and waist SVM (r=0.93, p<0.0001). All ROC curves showed excellent ability to discriminate between intensity categories. When worn at the waist, the optimal thresholds (SVM per second) were: <1.7 (sedentary); 6.6-19.9 (moderate intensity); >19.9 (vigorous intensity). The area under the ROC curves (AUC) were 96-100% for each threshold. Sensitivity and specificity ranged from 99-100% and 92-98%, respectively. When positioned at the wrist, the optimal thresholds were: <1.9 (sedentary), 5.1- 10.0 (moderate), and >10.0 (vigorous intensity). The AUCs were 94-99% for each threshold. Sensitivity and specificity ranged from 94-96% and 86-99%, respectively.
CONCLUSION(S): The GENEa is an effective tool for assessing sedentary behaviour and PAEE in children when worn at the waist or the wrist. Positioning at the wrist may improve wear-time and compliance.

P149  Differences in the physical activity levels of 3-4 year old children following the application of different accelerometer cut points
Bingham DD, Costa S, Clemes SA, Akhtar S, Wright J, Barber SE

PURPOSE: To report preschool childrens' time spent in moderate-to-vigorous physical activity (MVPA) and total physical activity (TPA) following application of different cut-points; and to identify how this impacts upon the number of children classified as meeting UK physical activity (PA) guidelines (180 min.day-1 TPA).

METHOD: Seventy-five children aged 3-4 years wore an ActiGraph GTX3+ accelerometer for 7-days. Wear time criteria were defined as ≥3 days with ≥8 hours of wear per day. Non-wear was defined as ≥60 consecutive minutes of zero counts. Accelerometer data were analysed at 15-second epochs, using 3 commonly cited cut-points for preschoolers (Sirard et al, 2005; Pate et al, 2005; Puyau et al, 2002). Repeated measures ANOVAs compared time in MVPA and TPA according to the different cut-points.

RESULT(S): Time spent in MVPA and TPA differed significantly across the 3 cut-points (p <0.05) (MVPA min.day-1: Pate 68.0±31.09, Puyau 18.5±9.8, Sirard 200.3±105.7; TPA min.day-1: Pate 139.1±55.1, Puyau 136.7±51.71, Sirard 259.6±118.5). Bonferroni-corrected post-hoc comparisons revealed that time spent in MVPA differed significantly across all 3 cut-points, whilst time spent in TPA was significantly greater using the Sirard cut-points compared to cut-points from Pate and Puyau. The amount of children meeting UK PA guidelines differed significantly between cut-points. Of the 75 children, 19 met the guidelines when using Pate cut-points, 15 using Puyau, and 56 using Sirard cut-points.

CONCLUSION(S): Large differences in preschoolers’ activity levels were observed when different accelerometer cut-points were applied. This highlights the need for a standardised approach to analysing accelerometer data in preschoolers.

P150  Assessing mode of commuting to school: a systematic review
Herrador-Colmenero M, Pérez-García M, Ruiz JR, Chillón P

PURPOSE: To review and analyse the questions used for measuring the mode of commuting to and from school among children and adolescents between 4-18 years old and to conduct a qualitative assessment among the identified studies.

METHOD: An electronic search was set in five electronic databases. Four categories of search terms were identified: question, active transportation, school-aged children and school.
Once the list of potentially relevant studies was compiled, titles and abstracts were reviewed to determine if the studies met the four inclusion criteria. The quality of the selected studies was scored using a quality assessment list.

RESULT(S): The electronic search strategy produced 4,637 studies. After applying the inclusion criteria, we identified 95 studies. More than half of the identified studies (n=50, 52.63%) specified literally the question about mode of commuting to school. Most of the studies administrated directly the question to study subjects (i.e., children and/or adolescents) (n=61, 64.21%) and the most outcome used was percentages of commuting to school (n=87, 91.58%). Only a few studies (n=11, 11.58%) used a valid and reliable question. The quality assessment of the studies was medium.

CONCLUSION(S): The questions used for measuring the mode of commuting to and from school are heterogeneous in the scientific literature. A questionnaire proposal for measuring the mode of commuting to school is provided.

P151 Association between the parental estimation and measured physical activity in children from the IDEFICS study

PURPOSE: To study how declared PA matches with measured MVPA and its effect on cardiovascular risk.

METHOD: 1.) We analysed the parental answers from Parental Core Questionnaire referring to PA, and Evenson’s MVPA, measured by accelerometer by creating terciles from the data of 7086 children in the IDEFICS sample. 2.) The anthropometric and laboratory parameters of the above groups were compared in order to evaluate whether these categories of parental declaration influence health outcome. Statistical analysis was carried out by post hoc ANOVA Scheffe’s test.

RESULT(S): Parental evaluation of PA was in accordance with objectively measured PA only in 34-40% of cases. Interestingly not only objectively measured PA but the parental estimation also influenced body composition and cardiovascular risk: z-score of BMI, - waist circumference, total-, LDL-cholesterol level.

CONCLUSION(S): It’s essential that parents should be aware of their child’s PA and estimate it realistic. If parents estimate incorrectly the child’s PA, they will not have any motivation to change their children’s PA-level.
P152 Validity of a Chinese waist-wore accelerometer for measuring physical activity among children under free-living conditions

PURPOSE: Childhood obesity is becoming a major public health concern. The epidemic reflects that age-related decrease in physical activity is one of the most important factors. Activity monitors, devices that quantify physical activity (PA) for prolonged periods of time (days or weeks) are increasing being used to assess PA to better understand the relationship between PA and disease. The purpose of the study, therefore, was to determine the validity of the Zhili UX-02 accelerometer for measuring PA among children under free-living conditions using ActiGraph GT1M as the criterion.

METHOD: Sixty children, aged 8-11 years, were recruited in this study. All participants wore the UX-02 accelerometer and ActiGraph GT1M simultaneously with adjustable elastic belts positioned on the waist for consecutive 7 days. The patterns were calculated by converting accelerometer data outputs as time spent at light, moderate, vigorous and moderate to vigorous PA per day on average. Differences between monitors were analyzed by t-test, intraclass correlation, and Bland-Altman plots.

RESULT(S): The paired t-test presented no significant differences for vigorous physical activity (VPA) and moderate to vigorous physical activity (MVPA) (using 4 METs threshold for UX-02) between two accelerometers (P>0.05). The concordance correlation coefficient between the data from GT1M and UX-02 with 4 METs threshold ranged from 0.60 to 0.79 at different PA levels (P<0.05). The Bland-Altman method shown good agreement between data obtained from both accelerometers at several PA levels (P<0.05).

CONCLUSION(S): The UX-02 shows promising validity evidence as affordable, commercially available instrument in China of measuring PA for children under free-living conditions.

P153 Patterns of physical activity and sedentary time among English and Spanish youth during weekdays and weekends
Fairclough SJ, Ramirez-Rico E, Hilland TA, Foweather L, Fernandez-Garcia E

PURPOSE: Levels of physical inactivity and obesity among English and Spanish youth are high. The purpose of this study was to describe physical activity (PA) and sedentary time during key segments of the day and week and compare these critical contexts between English and Spanish youth.

METHOD: In this cross-sectional study PA was objectively assessed in 235 English and 241 Spanish youth (aged 10-14 years) who wore accelerometers for seven consecutive days. Minutes of sedentary time, moderate PA (MPA), vigorous PA (VPA), and moderate-to-vigorous PA (MVPA) were calculated for weekdays, weekend days, school time, non-school time, and after-school. Between country differences were analysed using ANCOVAs.

RESULT(S): Spanish youth spent significantly more time in sedentary activity than English
counterparts. Spanish youth engaged in more minutes of MPA than English youth during weekdays, school time, and non-school time (p<.01). English children recorded more time in VPA than Spanish peers during week days and weekend days (p<.01), and during school time and after-school periods (p<.01). MVPA was significantly higher among Spanish youth during non-school time (p<.01). Around 25% of all youth achieved recommended levels of MVPA.

CONCLUSION(S): This study found low levels of MVPA and systematic differences in sedentary time, MPA, and VPA between English and Spanish youth. There is a need to target interventions at the least active children during weekends, after-school, and non-school periods within the different cultural contexts of the two countries.

P154 U.S. children’s physical activity by time of day: results from the National Health and Nutrition Examination Survey (NHANES)
Hennessy E, Belcher BR, Perna F, McClain JJ

PURPOSE: To evaluate youth physical activity (PA) patterns by time of day and demographic groups.

METHOD: Data are from 2003–2004 National Health and Nutrition Examination Survey based on participants (6-19 years) that had any days with ≥ 10 hours of detected accelerometer wear-time (N = 2520). Weekday time was subdivided to reflect a typical US school day: before (6-9 AM), during (9-3 PM), after (3-6 PM) school, and evenings (6-9 PM). Descriptive, unweighted statistics for the rate of activity calculated as the total counts for each time period divided by the total hours of the time period were analyzed overall and by subgroup. Weighted, multivariate analyses will be conducted.

RESULT(S): Preliminary data suggest that the lowest activity rate (mean counts/hr (SE)) occurred before (10333 (127)) and highest rate after (28822 (253)) school vs. during school (20482 (161)). Boys had a higher rate of activity. This sex difference was largest after school. Obese youth had the lowest rate of activity overall vs. healthy weight youth with the largest difference after school (24532 (476) vs. 30715 (350)). Non-Hispanic Blacks had a higher rate of activity during weekday evenings compared to non-Hispanic Whites and Mexican-Americans (26527 (452) vs. 21471 (415) and 22508 (393), respectively). Children (6-11 yrs) had the highest activity rate except before school when adolescents (12-15 yrs) were more active (12032 (222) vs. 10586 (202)). All findings are significant (p<0.001).

CONCLUSION(S): Different intervention strategies may be needed to target specific demographic groups and time periods throughout the day.
P155  An evaluation of Irish primary school children’s moderate to vigorous physical activity during the segmented school day: a pilot study
Hegarty D, Murtagh EM, Ní Chróinín D

PURPOSE: To determine the amount of minutes Irish children spend in moderate to vigorous physical activities (MVPA) during classroom, physical education (PE), break times, lunchtimes and the total school day.

METHOD: Third to sixth class Irish students (N=117; 59 boys, age 11.3 + 1.2 years, BMI 19.5 + 3.0 kg/m2; 58 girls, age 11.1 + 1.3 years, BMI 19.1 + 3.0 kg/m2) wore GT3X or GT1M accelerometers for 5 consecutive days during school hours.

RESULT(S): Boys spent significantly more time in MVPA than girls in the total school day (21.49 vs 13.54 minutes) and all segments of the school day except during classroom time. There was no significant difference between the minutes that boys and girls spent in MVPA during classroom time. Boys and girls accumulated the highest amount of minutes of MVPA in the total school day during PE (boys: 10.83 minutes; girls: 8.64 minutes), followed by classroom time (boys: 9.14 minutes; girls: 8.05 minutes), lunchtime (boys: 7.74 minutes; girls: 3.85 minutes) and break time (boys: 4.4 minutes; girls: 2.06 minutes).

CONCLUSION(S): Girls spent significantly less time than boys in MVPA during the majority of the school day segments -This finding suggests that an intervention to target primary school-aged girls’ physical activity (PA) within the school day is warranted 1) to ensure that opportunities for activity during these times are optimised and 2) to assist girls to accumulate more minutes of MVPA in order to meet the World Health Organisation PA guideline.

P156  Web application for active transport (AppFAT) in INDARES

PURPOSE: The aim of the study is to introduce developed website tool to collect geospatial data of active commuting.

METHOD: The spatial and time localization of active/passive commuting is an important factor in physical activity research. Active transport as a regular physical activity may significantly influence the total weekly physical activity (PA). GPS devices are widely used to locate realization of physical activities. The main issue in using GPS is the delay during first start and inaccurate data caused by splitting source signal of the GPS device to more than one (namely in areas with many tall buildings). The application has been tested on the control group of 37 Czech adolescents aged 15-17 years. Participants draw the route by themselves using specific icon in toolbar.

RESULT(S): Most adolescents (86%) were able to draw the route from home to school without outside assistance. The route was exported to GPX format with all attributes and
support integration with existing GIS systems.

CONCLUSION(S): This presentation provide information about potential uses of AppFAT in physical activity research. The knowledge of location and duration of active transport is essential to researchers exploring how environmental factors influence physical activity. The AppFAT is one of web applications in INDARES system developed at the Faculty of Physical Culture in Olomouc. The tool AppFAT is applicable in all countries of the world (if Google maps are present there).

P157 Patterns of sedentary behaviors and physical activity in Spanish adolescents
Cabanas-Sánchez V, Tejero-González C, Veiga OL

PURPOSE: To examine the patterns of sedentary behaviors and physical activity among Spanish adolescents.

METHOD: The sample was made up by 627 adolescents (322 girls, 13.85 ±1.98) from UP & DOWN Pilot Study. Adolescent's lifestyle was assessed by APASBQ questionnaire. It asses 6 categories of behaviors: Screen Time (ST), three kinds of Non-Screen Sedentary Time (NSST-Social, NSST-Educational, NSST-Others), Light Physical Activity (LPA) and Moderate-to-Vigorous Physical Activity (MVPA). A cluster analysis based on the Z scores in the six behavior categories was performed in order to identify adolescent’ behavior profiles.

RESULT(S): Five clusters were identified for both genders. Cluster 1 was characterized by high levels of ST. Boys reported low levels of MVPA and girls low levels of educational activities. Cluster 2 contains adolescents who spent much of their sedentary time in social activities. Furthermore, boys reported a low amount of time in educational activities; and girls, reported a low level of NSST-social and LPA. Cluster 3 was that scored the highest level for social sedentary activities; also, boys spent a low time in educational activities. Cluster 4 contains boys and girls who reported a high level of LPA and a low time in educational activities. The last cluster grouped adolescents with high levels of MVPA and low levels of ST. Moreover, girls reported a low time spent in NSST-Social.

CONCLUSION(S): This study suggests using multiple sedentary and active behavior indicators for get a more complete examination of adolescents’ lifestyle. This can provide better information for a subsequent intervention.

P158 Identifying patterns of physical activity among adolescents: a latent class analysis approach
Lawler M, Nixon E, Heary C

PURPOSE: Most studies of adolescent physical activity behaviours have focused on overall levels of activity without attempting to categorise the potential differences in the pattern of
physical activity. The present study therefore examined different patterns of involvement in physical activity among adolescents.

METHOD: A seven day self-report physical activity diary was completed by 996 adolescents aged between 12 and 18 years. Latent Class Analysis (LCA) was used to identify distinct classes of physical activity based on weekday and weekend minutes of moderate and vigorous intensity physical activity and involvement in structured and unstructured sports and physical activities.

RESULT(S): Four classes of physical activity were identified including a low active class which comprised the largest sample of adolescents. The most active class demonstrated the greatest probability of meeting recommended physical activity levels on weekdays and weekends. A third class was characterised by high levels of unstructured physical activity with greater minutes of physical activity engagement occurring during weekend days. The final class represented high engagement in team sport with a low probability of engaging in other physical activities.

CONCLUSION(S): The findings may prove useful for tailoring interventions to promote physical activity among adolescents on the basis of their patterns of involvement in physical activities.

P159 Longitudinal changes in physical activity and body composition in English children – The Gateshead Millennium study
Basterfield L, Reilly JK, Parkinson KN, Pearce MS, Adamson AJ, Reilly JJ

PURPOSE: To describe the change in objectively Measured physical activity (PA) and sedentary behaviour (SB) of children at three time-points over the transition from primary to secondary education and their associations with body composition.

METHOD: Longitudinal analysis of a birth cohort of children in northeast England. Objective measures of PA and SB were made at ages 7.5, 9.4 and 12.6 years with Actigraph GT1M accelerometers (n at each stage =600). Body mass index (BMI) and BMI z-score were derived from measured height and weight. Repeated measures ANOVAs assessed the change in PA, SB and BMI over time, and linear regression assessed the associations of past and current PA/SB and body composition on current BMI/BMI z-score.

RESULT(S): Analysis is available on 231 children to date. Over 5 years, overall PA decreased (p=0.005) from 754 counts per minute (cpm) at age 7.5y to 671cpm at 9.4y to 512cpm at age 12.6 years. SB increased (p<0.001) from 77.2% to 80.5% to 85.5%. Daily MVPA decreased from 9.4y to 12.6y (29 to 25 mins, p=0.005). BMI and BMI z-score increased with time, and at 12.6y were associated with BMI/BMI z-score at 9.4y, but not previous or current PA/MVPA/SB. Proportion of overweight/obese children increased from 21.6% to 31.6% to 37.5%.
CONCLUSION(S): Overall PA decreases from mid-primary age, and more sharply after leaving primary school. As the health consequences of inactivity are detrimental, measures to prevent this decrease during the transition from primary to secondary school are urgently required.

P160 Systematic observation of leisure-time physical activity: preliminary findings from the Children’s Museum of Manhattan EatSleepPlay™ exhibit
Agaronov A, Leung MM, Platkin CS, Kwan A, Nestler SD, Yeh M-C, Zarcadoolas C

PURPOSE: National recommendations call for children to increase their daily moderate-to-vigorous physical activity (MVPA), suggesting that physical activity (PA) be enjoyable and attainable in various settings. The EatSleepPlay™ exhibit is a unique initiative of the Children’s Museum of Manhattan, which uses interactive methods to engage children about PA, nutrition and sleep. The purpose of this pilot study was to better understand how youth visitors interact with the exhibit by assessing gender differences in child PA.

METHOD: Direct observation of PA levels was conducted on two weekend days in winter 2013 using a modified version of the System for Observing Play and Leisure Activity among Youth (SOPLAY). During observation, children (ages 4-8 years; 50.2% girls) were coded as sedentary, walking, or very active. Count data were summed across both days and converted into percentages for both genders. Walking and very active counts were aggregated into MVPA. Data were analyzed using Chi-squared test.

RESULT(S): Slightly more than half (51.5%) of all children were engaged in MVPA (35.6% very active; 15.9% walking). No significant differences in PA levels were observed between boys and girls coded as sedentary (48.7% vs. 48.7%; p=1.0), walking (13.2% vs. 18.5%; p=0.25) and very active (38.1% vs. 33.1%; p=0.38). Levels of MVPA between boys and girls only differed by 0.3% (51.3% and 51.6%; p=1.0).

CONCLUSION(S): Greater efforts are needed to promote youth PA. Preliminary findings suggest that the EatSleepPlay™ exhibit may be helpful in promoting MVPA in both genders as no significant differences were observed between boys and girls.

P161 Weekday and weekend physical activity patterns of high and low active children: the contribution of moderate and vigorous intensity activity

PURPOSE: Lower physical activity (PA) levels in children are widely reported on weekend
days. Despite this, the influence of PA status has not been accounted for. Therefore, the aim of this study was to elucidate such a relationship.

METHOD: Physical activity levels (7-day accelerometry) were assessed in 630 children (276 boys; 10.65±0.31 years) with mean height, weight and BMI values of 1.44 m, 37.8 kg and 18.1 kg/m², respectively. Children were dichotomised into a low- and high-active group, based on the proportion of valid days achieving the recommended PA guidelines of 60 minutes moderate-to-vigorous PA (MVPA). The analysis sample included 134 and 142 boys, and 74 and 280 girls, classified as having high and low PA status, respectively. Sex-specific ANCOVAs with repeated measures were computed to analyse differences in outcome variables between PA status, and time of week (weekday and weekend day), controlling for accelerometer wear-time, BMI Z-Score and socio-demographic status.

RESULT(S): Boys’ PA at all intensities declined at weekends regardless of PA status, whereas girls’ PA increased in the high active group at weekends. Specifically, high PA status girls significantly increased MPA (F(1,335)=26.86, p<0.001), VPA (F(1,335)=13.06, p<0.001) and MVPA (F(1,335)=23.62, p<0.001) at weekends. Low active boys decreased MPA (F(1,261)=4.21, p=0.04) significantly more than their high active male counterparts, who significantly decreased their sedentary time (F(1,261)=6.79, p=0.01) on weekend days.

CONCLUSION(S): Findings suggest that children’s weekend PA engagement is dependent on weekday PA status and gender, and therefore should be considered in the development of PA interventions, particularly those targeting low active children.

P162 Accelerometer-measured physical activity levels and patterns of 9-17 years old Chinese students
Chao W, Peijie C, Jie Z, Zheng Z, Wenjie Z

PURPOSE: To describe physical activity (PA) levels and patterns of 9-17 years old Chinese students in a sample from Shanghai using accelerometers.

METHOD: Participants in this study were 297 students aged 9-17 years (mean age = 13.12 ± 2.33 years, 50.8% boys) from four schools in Shanghai. PA was measured by ActiGraph GT3X+ or GT3X accelerometers for seven consecutive days. Accelerometer data were reported as time spent in moderate to vigorous PA (MVPA) based on Freedson’s age specific equation using 4 Mets as the threshold of moderate PA. Information on sex, height, weight, BMI, and grade were also collected. Paired-sample T test was used to determined the difference of MVPA between weekdays and weekends. Differences of PA across sex, grade, and weight status were tested by three-way ANOVA.

RESULT(S): Participants spent an average of 35.10 ± 16.62 min MVPA per day, and only 7.7% of students could reach PA recommendations of 60 minutes MVPA per day. Students accrued more MVPA (38.07 ± 18.78 vs 26.67 ± 21.73 min/d, P<0.01) during weekdays than weekend days. Boys were more active than girls, and MVPA tended to decrease with grade group. No differences in PA level were found between overweight and non-overweight students.
CONCLUSION(S): Only 7.7% of 9-17 years old students in this study could reach PA recommendations. Boys were more active than girls and students were more active during weekdays than weekend days. PA level tended to decrease with grade.

P163  A survey of the active video gaming practises of 7-to-11 year-old children in the North East of England
Allsop S, Rumbold PLS, Debuse D, Dodd-Reynolds C

PURPOSE: Active video games may provide an opportunity to increase children’s low physical activity. Information is sparse however regarding children’s real-life active video gaming practises. This study developed a questionnaire to survey the everyday active video gaming practises of children, their socio-demographic characteristics and to understand why they play these games.

METHOD: The Active Video Gaming Questionnaire was distributed to 7-to-11 year-old children via primary schools within a major city in the North East of England. The schools were located in areas with either high or low deprivation levels. A total of 40 questionnaires were completed.

RESULT(S): The majority of children had access to active gaming consoles at home. The favourite console and game was Nintendo Wii™ and Nintendo Wii™ Sports respectively. They enjoyed playing against others, particularly siblings. On average, they played for 60-minutes, 1 or 2 days per week, usually on a Saturday. More than half of the children consumed foods or drinks during play and a significant association was found between this and an extended average play time (90-minutes). No associations were found between socio-demographic characteristics and active video gaming practises. Thematic analysis of the open-ended questions revealed the reasons for playing active video games were for enjoyment, perceived health benefits and lack of safe green space.

CONCLUSION(S): The Active Gaming Questionnaire revealed that active video gaming practises of children from the North East of England were unrelated to socio-demographic characteristics. The average active video game play time however was related to food and drink consumption.

P164  Trends in screen-time behaviours and moderate-to-vigorous physical activity among German adolescents 2002-2010
Bucksch J, Inchley J, Zdenek H, Finne E, Kolip P

PURPOSE: Little is known about recent trends in screen-time behaviours (ST) and moderate-to-vigorous physical activity (MVPA). The purpose of the present analyses was to examine time trends in German adolescents’ ST as well as MVPA from 2002 to 2010.

METHOD: Data were derived from the German Health Behaviour in School-aged Children (HBSC) study 2002, 2006 and 2010. Analyses were based on 16,918 11-to 15-year olds boys
(49.1%) and girls. Outcome variables were time spent in TV viewing and using a PC (weekday and weekend day) as well as the number of days achieving 60 minutes of MVPA. Through sex-specific linear regression, controlling for age and family affluence, we analysed the changes for ST and MVPA over time.

RESULT(S): TV viewing on weekdays, but not at weekends, declined steadily over time with a difference of 12 min/day in girls and 18 min/day in boys (p for trend <.01). We found an increase in PC use over time for girls only, with a difference of 54 min/weekday and 70 min/weekend day (p<.001). For MVPA we found a slight increase, similar for boys and girls (p<.001).

CONCLUSION(S): Although MVPA increased from 2002 to 2010 in German adolescents, the time spent in MVPA was still low. Despite the observed decrease in TV viewing, there is a clear need for strategies and interventions aimed at reducing ST particularly in light of the marked increase in computer use among girls and no decline in PC use among boys.

P165  Scaling of peak oxygen uptake in children: a comparison of 3 body size index models

PURPOSE: We aimed to compare three candidate body size index models for the scaling of aerobic fitness (VO2peak) in children; whole body mass, total lean body mass, and the lean mass of both legs.

METHOD: VO2peak, and total lean mass of the body and both legs (via dual-energy x-ray absorptiometry), were assessed in 126 girls and 87 boys aged 9-11 years. We applied nonlinear allometric models of the form VO2peak = a•body sizeb, adjusted for biological sex and maturity offset (years from peak height velocity; PHV). We assessed goodness of fit using the Akaike Information Criterion.

RESULT(S): The Akaike weights (Akaike differences) were: lean mass of both legs = 0.69 (0), total lean body mass = 0.31 (1.6), whole body mass = <1e-8 (36.6). The size exponent (90% confidence interval) for the lean mass of both legs was 0.55 (0.46-0.64). VO2peak was 17% (13-21%) lower in girls after controlling for the lean mass of both legs and maturity offset. After controlling for body size and sex a 1-year increase in maturity offset (closer to PHV) was associated with a 6% (4-9%) higher VO2peak.

CONCLUSION(S): Allometric scaling of VO2peak by the lean mass of both legs provides the best model for quantifying growth-related changes in aerobic fitness in paediatric populations, though this model is only marginally superior to the total lean body mass model. There is no support for the total body mass model. Maturity and sex are also important covariates exerting a size-independent influence on peak aerobic power.
P166  Contextual implementation of health promoting schools: a provincial experiment
Mclsaac J-L, Kuhle S, Veugelers P, Kirk SFL

PURPOSE: Health promoting schools (HPS) is recognized globally as an effective approach to support early development of healthy behaviours among children and youth; however, adoption and implementation requires investment, support and buy-in from school partners. The purpose of this research will be to explore contextual experiences that relate to provincial implementation of HPS in the Canadian province of Nova Scotia.

METHOD: Mixed methods research was conducted to quantitatively measure implementation and qualitatively describe school experiences. As part of a broader provincial project, schools (n=247) completed a self-assessment tool to measure HPS implementation. A purposive sample of schools (n=9) were asked to take part in additional research to develop an understanding of how school circumstance and experiences influenced HPS implementation.

RESULT(S): Interviews (n=22) were conducted with school stakeholders (principals, teachers and parents) from a diverse sample of schools and data was analyzed to understand how school context influenced the implementation of supportive practices. Structural and systemic barriers were reported and supportive political and organizational characteristics were identified.

CONCLUSION(S): Schools are implementing a variety of HPS practices but they continue to face challenges with competing educational priorities and community norms. Communities and the education sector need to value health as an essential contributor to students’ overall prosperity and provide appropriate support to facilitate the cultural changes to improve and sustain action toward HPS.

P167  Implementation of health promoting schools: a Canadian provincial experiment
Mclsaac J-L, Kuhle S, Fung C, Kirk SFL, Veugelers P

PURPOSE: Health promoting schools (HPS) is recognized globally as an effective approach to support early development of healthy behaviours among children and youth. As school jurisdictions increasingly endorse HPS, it is important to understand how schools can advance implementation strategies. The purpose of this research is to explore how HPS practices were associated with student health behaviours in the Canadian province of Nova Scotia.
METHOD: As part of the 2011 Children’s Lifestyle And School-performance Study (CLASS), all public schools with grade 5 students in Nova Scotia were invited to participate. School stakeholders were asked to complete a self-assessment tool to measure HPS implementation. Self-reported health behaviours and measured body mass index were collected from grade 5 students. Parents/guardians also completed a survey to collect information on factors relating to socio-demographics and the home environment.

RESULT(S): A total of 269 of 286 schools (94.1%) took part in the study and parental consent was attained from 5913 parents (average response rate per school of 67.7%). Schools were implementing a range of supportive practices related to curriculum, physical activity, healthy eating or health promotion. This presentation will discuss how the reported implementation of HPS practices related to student health behaviours.

CONCLUSION(S): Assessing healthy school practices across diverse school contexts is a challenging task. This research will provide important insight into understanding the type of HPS practices that have the most potential to influence healthier behaviours among children and youth.

P168 The effects of a healthy weight program on the knowledge, attitude and behavior toward healthy eating and regular physical activity of pupils in the elementary school in Taiwan
Lee F-H, Lin L-F, Chiu T-I

PURPOSE: This study was designed to obtain preliminary estimates of the effectiveness of a healthy weight program about healthy eating and regular physical activity compared with one control group.

METHOD: A quasi-experimental research design was conducted. The research target contained 118 students as the experimental group from the fifth and sixth grade students of two suburban elementary schools in central Taiwan and 99 students as the control group from the same graders of another two suburban elementary schools in the same district. Students of the experimental group received a healthy weight teaching courses including healthy diet and healthy physical activity in four units and the control group did not. Both groups were pre-tested before the intervention and post-tested one month later and the obtained data was statistically analyzed. In order to evaluate the effectiveness of the program, a questionnaire including Knowledge (Kuder-Richardson reliability = 0.48), Attitude (Cronbach’s α= 0.67), and Behavior (Cronbach’s α= 0.75) was designed.

RESULT(S): The results on the experimental group showed that the knowledge scores of the posttest significantly increased than the pretest, while the control group demonstrated no significant difference between the pretest and the posttest. For the knowledge on the posttest, the experimental group exhibited significantly higher than the control group, with no significant difference between the two groups on the pretest.
CONCLUSION(S): The results indicated that the healthy weight program had positive effects on students’ knowledge in elementary school. Based on the findings of the study, several recommendations for health promoting school were proposed.

P169  
**Healthy after school: feasibility of a ‘whole setting’ approach to increasing physical activity and healthy eating opportunities in after school childcare**  
Naylor P-J, Scott J, Dobson B

PURPOSE: After school is an important aperture for physical activity (PA) and healthy eating (HE). Healthy After School (HAS) is a whole setting intervention targeting after school childcare policies, practices, environment and family connections. HAS provided guidelines, planning tools, training, resources, coaching and cross-site sharing. The purpose of the research was to explore the feasibility of HAS for changing the after school childcare PA and HE environment.

METHOD: Feasibility was explored in 4 sites over 3 months using mixed methods. Providers completed pre/post NAPSACC audits and logged activities. We observed snack and playtime and accelerometers assessed PA pre/post (n=40 children). Post-intervention we conducted a focus group with care providers and surveys with parents (n=26).

RESULT(S): Sites made incremental changes in PA and HE policies and practices but actions varied. All sites created a written policy and served water instead of juice. Observations showed a shift to serving vegetables at snack (3/4 sites) and a seasonal shift from outdoor play to indoor where space was constrained. Accelerometry showed a concomitant decrease in light (p=.05) and moderate activity (p=.012) but significant increases in vigorous PA in per protocol sites (p=.029). Focus groups showed high satisfaction with HAS training and resources but emphasized the importance of training and support to implementation. Lack of time and staff buy-in were barriers. 70% of parents reported reading materials.

CONCLUSION(S): A whole setting approach was feasible for enhancing PE and HE policies and practices in after school care settings but changes were modest. Implementation required training, ongoing support and motivation.

P170  
**Development of a social marketing campaign by-youth-for-youth to promote positive health and wellbeing**  
Kunkel J, Duncan S, Jarden A, Naylor M, Schofield G

PURPOSE: Lifestyle choices influence physical and mental wellbeing, and, in New Zealand, youth represent the most vulnerable age group. Public health campaigns often focus on one aspect or on illness rather than wellbeing. Focusing on positive psychology and wellbeing, using social marketing as tool and integrating the target group from the development of the
campaign is this project’s novel approach to promote wellbeing to New Zealand youth.

METHOD: The setting is one secondary school in Auckland (approx. 2,700 students), of which Year 12 and 13 students can actively participate in the study. The methodological framework was grounded in action research theory. The formative stage comprised a two-day ‘design thinking’ workshop with eight health students followed by four two-hour focus groups (eight students each) divided by school year and gender and including a range of health interests and ethnicities.

RESULT(S): The workshop and focus groups served as engaging tools to identify aim, design and components of the campaign. The researcher gained extensive insight into perceived health status quo, problems, aims and solutions. Described problems and ideals were congruent with problems identified in research and current health messages. All discussions included the core problems society, norms, and group pressure. Creating a new norm and not influencing or being influenced by group pressure became core messages of various foci.

CONCLUSION(S): A design thinking workshop followed by focus groups were effective tools to develop a social marketing campaign by-youth-for-youth. The efficacy of the campaign to change adolescent behaviour is subject of research with the implementation of the campaign.

P171 Process evaluation of the action planning and “toolkit approach” in HealthKick, a healthy lifestyle intervention in schools in the Western Cape Province, South Africa
De Villiers A, Lambert EV, Fourie J, Draper CE, Abrahams Z, Hill J, April E, Steyn NP

PURPOSE: HealthKick is a school-based healthy lifestyle intervention aimed to improve nutrition and physical activity behaviours of primary school children, their educators and parents in low resource settings. One aim was to evaluate the action planning and toolkit approach used in the intervention.

METHOD: Sixteen purposively selected schools from a representative formative sample (n=100) in two education districts (urban and rural) were randomly allocated to intervention and control groups. School staff at the eight intervention schools participated in an action planning process (AP) from 2009-2011. AP was supported by a toolkit containing an educators’ manual, physical activity resources and printed material. Staff could select actions from nutrition, physical activity, staff health and chronic disease awareness areas. AP was guided and monitored through the 3-year intervention and then evaluated using structured questionnaires, focus groups and interviews.

RESULT(S): Schools selected a variety of actions (n=110), but only implemented about 50%, mostly as once-off actions (n=36). Actions requiring long-term implementation were often initiated but not sustained. Successful actions included the curriculum intervention, vegetable gardens and tuck shop changes. School staff reported increases in own health
awareness as an important outcome of the intervention. However, they raised similar barriers to implement the program as identified during the formative assessment.

CONCLUSION(S): Although it is possible to engage school staff in low-resource settings in AP, our intervention showed that barriers are often deeply embedded and should initially receive more attention. External barriers such as curriculum and policy environment changes may impact on the feasibility of healthy lifestyle programmes at schools.

P172  A participatory approach to school health promotion (SCIP-school) – Outcomes and lessons learnt
Elinder LS, Heinemans N, Hagströmer MM

PURPOSE: Evaluate the outcome at school and student level of a health intervention (quasi-experimental) with a participatory approach and discuss lessons learnt.

METHOD: Schools formed multi-professional health teams and assessed strengths and weaknesses of their health promotion work within four areas: school health care, school meals, physical activity and mental health by help of a new tool called KEY. Teams were then encouraged to write an action plan adapted to local needs and opportunities. Implementation of action plans was at the responsibility of the local health teams, receiving support from the research team. Impact at school level was monitored by yearly assessment with the KEY. Process evaluation was carried out by the research staff. Outcome measures at student level were anthropometry, and health behaviours by a validated questionnaire, at baseline and after 2 years. The effect of the intervention was evaluated by regression analysis adjusted for gender and baseline values.

RESULT(S): Programme fidelity was high demonstrating feasibility, but fidelity to school action plans was only 50% after two years. Positive and significant (p<.05) impacts were noted in school health practices in the areas of physical activity, mental health and nutrition. At student level no significant intervention effects were seen for the main outcomes.

CONCLUSION(S): Through a participatory approach school staff has the capacity make changes at school level on the basis of self-assessment and facilitation by external agents, but more specific support might be needed. Possible reasons for the lack of effect at student level will be discussed as well as lessons learnt.

P173  Healthy Homes Healthy Families: preliminary results of a pilot study to prevent obesity in 2-5 year old children from low income families
Gans KM, Montes Y, Gorham G, Risica PM

PURPOSE: To study the feasibility of home-based childhood obesity prevention interventions
for ethnically diverse, low income families with children aged 2-5.

METHOD: A pilot study was conducted with 50 intervention and 10 control families. Baseline assessments included telephone and in-person surveys, a home audit and anthropometric measures. The intervention included: three 30-minute motivational interviewing telephone calls, 4 sets of tailored written materials; a family PA video, and a TV control device. The intervention focused on increasing PA, reducing screen time, reducing sugar sweetened beverages (SSB), juice, and fast food (FF), and increasing water and fruit/vegetables (FV).

RESULT(S): Almost half of the children were Hispanic. Baseline data demonstrated that juice intake was high; 50% of children drank SSB in last month; 40% drank whole milk; 74% ate FF > once a week; 71% of homes have 3+ TVs; 72% of children have TV in bedroom. Parent role modeling of healthy behaviors was low: 62% of parents say their kids never see them walk instead of drive to get places; 80% say their kids see them eat FF > a week; 70% say their kids never see them exercising; 55% say their kids never see them drink low fat milk. Follow-up data is being analyzed.

CONCLUSION(S): Low income families of 2-5 year old children have a high prevalence of obesity-related risk factors in the home. We hypothesize that the HHHF intervention will cause greater changes in weight, child PA/dietary behaviors and changes in the home social/physical environment than control families. Change data will be presented.

Recruitment, screening and enrollment in community-based, family-focused obesity prevention trials: lessons Learned from the HOME Plus Trial

PURPOSE: To provide guidance for future studies based on lessons learned regarding recruiting, screening and enrolling families in HOME Plus, a randomized, community-based obesity prevention trial.

METHOD: Conducting community-based research is important and essential, yet also challenging, time-consuming and expensive. Challenges include selecting and involving community partners, screening for eligibility, and engaging families. HOME Plus enrolled 160 families in an urban setting and delivered the intervention in community-based settings. Screening for child height and weight according to study inclusion criteria (child body mass index (BMI) > 50th %) complicated eligibility assessment. The long-term commitments for families (10 monthly sessions; two years of data collection) impacted enrollment.

RESULT(S): We partnered with Minneapolis Park and Recreation (MPR) because they have community centers close to all homes in Minneapolis, centers are familiar to families, and our study aims aligned with MPR’s mission. Multiple strategies were necessary for recruitment, including attending MPR celebratory and hosted events and sports registrations; emails; flyers; and media press—343 families were screened to enroll our goal of 160 eligible families. Screening for BMI eligibility was time-consuming and expensive with
66 children determined to be ineligible via phone, based on parental estimates of height and weight. Additionally, 22 children were ineligible at the first data collection visit. Calendars of intervention dates/locations and screening protocols assisted with full disclosure of family-level commitment.

CONCLUSION(S): Successful strategies used and lessons learned regarding recruitment, screening and enrollment from HOME Plus may guide future community-based programming, research planning and implementation.

P175  Designing a systematic process evaluation to explore facilitating factors and barriers to nationwide implementation of the Dutch school-based obesity prevention program DOiT

van Nassau FF, Singh AS, van Mechelen WW, Paulussen TGWM, Brug J, Chin A Paw MJM

PURPOSE: To date, there is only limited information on the actual effectiveness of health-promotion programs, when implemented under real-life conditions. Program effectiveness depends on the efficacy, but also on the reach, adoption, implementation and maintenance. Therefore, it is important to develop a systematic process evaluation, based on theoretical models, to gain insight into how a program works and what program elements contribute to its effectiveness. This study describes the design process of the systematic process evaluation of the Dutch Obesity Intervention in Teenagers (DOiT) study.

METHOD: In order to systematically investigate and evaluate the DOiT implementation, we combined several implementation frameworks and translated them into measurement instruments.

RESULT(S): We decided to measure seven process indicators addressing recruitment, context, reach, dosage, fidelity, satisfaction and continuation. To assess these indicators, we developed a semi-structured interview route addressing teachers; questionnaires for teachers, students and parents; and teacher logbooks. Using the logbooks, we administered quality of implementation by having teachers indicate if the lessons were taught according to the teacher manual. We also measured determinants that may explain the process of behavioural change among intermediate users (i.e. teachers) that are expected to be critical for the delivery of the program to the final target population (i.e. students).

CONCLUSION(S): The systematic theory-based process evaluation can provide insight into key factors that contribute to successful implementation, allowing translation of research into daily practice. Issues related to designing process evaluations, developing measurement instruments and recommendations for future process evaluations will be discussed.
P176  Texas CORD: multilevel healthcare systems change to address childhood obesity
Pont SJ, Butte NF, Hoelscher DM, Fanburg JT, Taveras EM, Adeoye O, Barlow SE

PURPOSE: The Centers for Disease Control and Prevention’s Texas Childhood Obesity Research Demonstration (CORD) project will evaluate a multisystem, multilevel approach to obesity prevention and treatment in Medicaid-eligible children aged 2-12 years. We describe the primary care improvement component, a CORD cornerstone, including initial recruitment, training, and implementation across clinics in multiple health systems in Texas.

METHOD: Non-academic pediatric practices in low-income, diverse catchment areas were recruited to implement electronic health record (EHR) changes that alert providers to overweight/obese status and embed provider cues regarding screening, diagnostic testing, referral and treatment approaches. We provided novel English and Spanish obesity behavior change counseling materials (Next Steps) for use during clinic encounters; a 2-hour provider training on EHR changes, Next Steps, and motivational interviewing techniques presented in live, teleconference, and video format; and orientation of office staff to the project. Self-administered questionnaires assessed baseline knowledge, self-efficacy and obesity care practices.

RESULT(S): All practices (n=12) and providers (n=43) approached joined the CORD project. Each healthcare system provided in-kind support for changes in their EHR systems (Epic, NextGen and E-Clinical Works). Completion rate for provider orientation and baseline questionnaire was 100%, and 80% for office staff. To date 104 children and families have been recruited for additional community-based complementary CORD interventions.

CONCLUSION(S): Engagement of pediatric primary care practices was highly successful. Clinicians and staff welcome the materials and EHR support. Practice interventions for childhood obesity that include counseling materials and EHR changes are readily scalable and could be implemented in practices across the US.

P177  What is proposed to overweight and obese youth in a sample of fitness centers?
Cloes M, Lebrethon M-C, Fortemps G

PURPOSE: Overweight and obesity take a growing place in the public health preoccupations as the proportion of people over the normal BMI limit increases dramatically year after year. This evolution could have devastating consequences on the economy for years and possibly generations to come. Youth physical activity is pointed out as a priority. Fitness centers are possible partners of health services. This study aimed to know if overweight/obese youth could be welcomed into a sample of fitness centers.

METHOD: A sample of 13 fitness centers of the Liege area was visited. Fourteen interviews with the managers have been conducted. Specific questions were asked about what is
proposed to overweight and obese people and specifically to youth group. Content analysis has been done from verbatim transcripts.

RESULT(S): Most of the subjects consider that overweight/obese youth could encounter some difficulties to adhere to a fitness center. Unfounded embarrassment about the look of others is underlined by 7 out of the managers. The real intrinsic motivation of the youth would be a key factor as well as real difficulties to use the equipment. Few fitness centers currently propose specific activities but 7 would be ready to collaborate with a medical unit in order to propose specific activities. Two decided to stop such initiatives according to the cost and lack of perseverance of the youth.

CONCLUSION(S): This study showed that fitness centers managers would be interested to implement initiatives to offer specific services to overweight/obese youth but it would require collaboration with health services.

P178 A program for the treatment of adolescent obesity (TOP): 6 month results on cardiorespiratory fitness, body mass index and weight related quality of life
Quaresma A, Palmeira AL, Martins SS, Falcato L, Fonseca HR

PURPOSE: Analyze the results of the first 6-months of the TOP (Tratamento da Obesidade Pediátrica) program on the weight-related quality of life (WRQoL), cardiorespiratory fitness (CRF), and Body Mass Index (BMI).

METHOD: The sample comprised twenty one teenagers (BMI ≥ 95th percentile, 15,1±1,1 years, 16 girls), from TOP’s 1st cohort. WRQoL was assessed with the impact of weight on quality of life (IWQOL-kids), CRF was assessed using the PACER test, and weight and height were measured, at baseline and 6 months. The progress of CRF, WRQoL and BMI were analyzed (paired t-test). For gender and respondent groups (on BMI and CRF) WRQoL were compared (Mann-Whitney U test).

RESULT(S): CRF increased (p=,023) and BMI decreased (p=,043), with small effect sizes (dCRF=0,2 e dBMI=0,2). No significant WRQoL differences were observed between moments. Positive correlations were verified between CRF and Physical-Comfort (p=,016); and negative correlations between BMI and Physical-Comfort (p<,001), Family-relations (p=,005) and Total WRQoL (p=,009). Results were significantly higher among males on Physical-Comfort (p=,013), Body-Esteem (p=,009), and Total WRQoL (p=,018). Those who achieved a BMI decrease, reported higher WRQoL in Family-relations (p=,008). No differences were observed between the group that increased their CRF and others.

CONCLUSION(S): TOP participants, on average, increased CRF and decreased BMI. Albeit preliminary, these results were correlated to improvements in WRQoL, and that shows a relatively extended period (6 month) on which these adolescents altered their previous weight gain and impaired quality of life paths. Long term validations of these findings are needed to evaluate the overall impact of the TOP program.
P179  Development of HAPPY (Healthy and Active Parenting Programme for the early Years) an intervention to prevent childhood obesity: a theory-based approach  
Sahota P, Barber SE, Taylor N, Sargent J, Loach J, Wright J

PURPOSE: Interventions that make extensive use of theory tend to have larger effects on behaviour. The Intervention Mapping (IM) framework (Bartholomew, 2001) incorporates theory into intervention design, implementation and evaluation, and was applied to the development of a community-based early obesity prevention intervention for a multi-ethnic population.

METHOD: IM was applied as follows: 1) Needs assessment of parents, wider community and practitioners; consideration of evidence-base, policy and practice; 2) Identification of outcomes and change objectives following identification of barriers to behaviour change mapped alongside psychological determinants e.g. knowledge, self-efficacy, beliefs 3) Selection of theory-based methods and practical strategies to address barriers to behaviour change e.g. strategies for responsive feeding; 4) Design of the intervention by developing evidence-based interactive activities and resources e.g. visual aids to show babies stomach size. The activities were integrated into an existing parenting programme 5) Adoption and implementation: parenting practitioners were trained by healthcare professionals to deliver within Children Centres.

RESULT(S): HAPPY is aimed at pregnant women (BMI > 25); consists of 12 x 2.5 hr. sessions (6 ante-natal from 24 weeks; 6 postnatal upto 9 months and addresses 1) mother’s diet and physical activity 2) breast or bottle feeding 3) infant diet and parental feeding practices 4) infant physical activity 5) parenting practices: parenting styles and skills.

CONCLUSION(S): The theory-based, pragmatic, and culturally-relevant intervention is currently being evaluated by a feasibility trial.

P180  Design and participant characteristics for the Colorado LEAP Study: a longitudinal study for obesity prevention in early childhood  
Bellows L, Johnson SL, Davies P, Gavin W, Boles R

PURPOSE: The preschool years are a critical time for obesity prevention efforts; representing a time when children establish healthy eating habits and physical activity patterns. Understanding the context in which these behaviors develop is critical to formulating a model to address childhood obesity. The Colorado LEAP Study, an intervention study designed to prevent early childhood obesity that utilizes a social ecological approach to explore individual, family and environmental factors and their relationship to child weight status over a 3 year timeframe.

METHOD: The study is located in 5 rural Colorado preschool centers and elementary schools
(2 treatment and 3 control). Treatment sites receive The Food Friends nutrition (12 weeks) and physical activity (18 weeks) interventions during preschool. Observational measures assess children’s food preferences, food intake, gross motor skills, physical activity (pedometers/accelerometers), self-competence and height/weight. Parents provide information on feeding and activity practices, child’s diet, home food and activity environment, height/weight and physical activity (pedometers). School personnel complete a school environment and policy assessment. Measurements are conducted with 2 cohorts at 4 time points – baseline, post-intervention, 1- and 2-year follow-up.

RESULT(S): Participants include 214 children (56% female; 41.3% Hispanic; BMIz=.49± 1.2) and 157 parents (89.4% mothers; <33.2% high school education; 43% income <$27,000; BMI=27.0 ± 6.7). Retention rate for children at post-intervention is 93% and 78% at 1-year follow-up.

CONCLUSION(S): The design of this study allows for longitudinal exploration of relationships among eating habits, physical activity patterns, and weight status within and across spheres of the social ecological model.

P181 Towards health in all policies - Intersectoral collaboration within local governments for the prevention of childhood obesity
Hendriks AM, Kremers SPJ, Gubbels J, Raat H, De Vries NK, Jansen MWJ

PURPOSE: The childhood obesity epidemic can best be tackled by means of an integrated approach, which is enabled by integrated public health policies, or Health in All Policies. Integrated policies are developed through intersectoral collaboration between local government policy makers from health and non-health sectors. Such intersectoral collaboration has proved to be difficult. In this study we investigated which resources influence intersectoral collaboration. The Intersectoral Collaboration Behavior Change Ball framework was used to categorize motivation-, capability- and opportunity-related resources for intersectoral collaboration.

METHOD: In-depth interviews were held with eight officials representing 10 non-health policy sectors within a local government.

RESULT(S): Results showed that health and non-health policy sectors did not share policy goals, which decreased motivation for intersectoral collaboration. Awareness of the linkage between health and non-health policy sectors was limited and management was not involved in creating such awareness, which reduced the capability for intersectoral collaboration. Insufficient organizational resources and structures reduced opportunities for intersectoral collaboration.

CONCLUSION(S): To stimulate intersectoral collaboration to prevent childhood obesity, we recommend that public health professionals re-frame health goals in the terminology of non-health policy sectors, that municipal department managers increase awareness of
public health in non-health policy sectors, and that flatter organizational structures be established.

P182  An ecological and theoretical deconstruction of a school-based obesity prevention program in Mexico
Safdie M, Cargo M, Richard L, Lévesque L

PURPOSE: Although ecologically-founded intervention programs that encompass a diversity of strategies to engage multiple stakeholders in a variety of settings are recommended to prevent overweight and obesity in children, the optimal combination of strategies remains unknown. In 2007-2008, the Mexican National Institute of Public health (INSP) implemented an ecological intervention program that was successful in modifying the school environment and student health behaviors in 436 5th and 6th grade students. The purpose of the current study was to assess the integration of ecological principles and theoretical constructs in this successful school-based obesity prevention program in Mexico City.

METHOD: The Intervention Analysis Procedure (IAP), based on Richard and colleagues’ scheme, was used to “map” the integration of ecological principles within 25 activity descriptions garnered from project documents and implementation staff and a theoretical checklist completed by 15 implementation staff was used to gauge the use of constructs from Social Cognitive Theory (SCT).

RESULT(S): Descriptive results showed that 4 different types of strategies engaging different targets (students, parents, school representatives, government) were used across 2 domains (Nutrition and Physical Activity) in one setting (school). Wilcoxon and Friedman tests revealed no significant differences in SCT construct either within or between intervention domains.

CONCLUSION(S): The deconstruction of a successful Mexican intervention program that has documented environmental and student behavior improvements provides novel information for the implementation of multifactorial interventions in school-based health promotion programs.

P183  Metabolic and endothelial effects of a 12-week lifestyle intervention program in overweight children/adolescents and their parents
Dubé M-C, D'Amours M, Bachelard H, Weisnagel SJ

PURPOSE: Endothelial dysfunction may appear prior to the onset of metabolic diseases. The endothelium could be an important biological determinant of disease prevention and health-promotion strategies. This pilot study assessed the effects of a 12-week lifestyle intervention on endothelial and metabolic profiles in overweight children/adolescents and
their parents.

METHOD: The intervention consisted of 3 nutritional and exercise consultations. Evaluations (OGTT, endothelial measures by Endo-PAT®, anthropometry, VO2max, nutritional diary) were executed pre- and post-intervention on 6 subjects. Insulin and glucose levels were measured fasting, during and 120 min after the OGTT. Insulin sensitivity was assessed by the Matsuda index. Fasting plasma lipids were measured. Student t tests were performed.

RESULT(S): The proportion of proteins in the diet was improved by the intervention (13.9 ± 2.5 vs. 17.8 ± 3.1%, p=0.06) as fasting insulin values (127 ± 34 vs. 75 ± 23 pmol/l, p=0.008), insulin sensitivity (6.2 ± 1.3 vs. 7.7 ± 2.0, p=0.06), triglycerides (1.32 ± 0.41 vs. 1.02 ± 0.33 mmol/l, p=0.02) and the chol/HDL-chol (3.94 ± 0.82 vs. 3.62 ± 0.62, p=0.03). The sum of skinfolds improved in parents (151 ± 33 vs. 137 ± 36mm, p=0.03) and tended to improve in the entire group. The intervention had no effect on endothelial measures.

CONCLUSION(S): Despite a low number of subjects, metabolic changes were observed following a lifestyle intervention program in overweight children/adolescents and their parents. However, no endothelial changes were noticed. Longer interventions on larger number of subjects may be needed to produce significant changes on such parameters.

P184 A qualitative exploration of long-term behaviour change in families with children who are overweight
Watson P, Knowles Z, Murphy R, Dugdill L, Cable T

PURPOSE: Family-based obesity treatment has beneficial long-term weight outcomes for some children, yet for others it has little impact. This study is the first to explore long-term outcomes from the perspectives of families themselves. It asks which families benefit most, and what can be learned from these families to help other children make sustainable changes to physical activity and diet.

METHOD: Semi-structured interviews were conducted with parents from 15 families who had taken part in a childhood obesity treatment intervention 3-5 years earlier. Topics included perceived outcomes, experiences of behaviour change, maternal relationship with weight and parenting style. A novel analysis method was used to cluster families by perceived outcomes and explore the psychosocial characteristics associated with long-term success.

RESULT(S): Six family clusters emerged. Clusters differed by perceived child outcome, intervention impact and magnitude of changes to physical activity and diet. Perceived outcomes did not always reflect objective weight change. Families with the most positive long-term outcomes used multiple behaviour change strategies and had children who engaged in autonomous physical activity. Mothers demonstrated an authoritative parenting style and a positive relationship with weight-related behaviours at follow-up.
CONCLUSION(S): Families respond in different ways to childhood obesity treatment. It is important interventions allow flexibility for tailoring to individual needs and focus not only on weight outcomes, but also on cognitive and behavioural changes. Our qualitative data suggest interventions should encourage authoritative parenting, promote autonomous child physical activity, and teach behavioural change strategies. Prospective research is required to substantiate these findings.

P185 Intervention effect on BMI in adolescent girls: The HEalth in Adolescents (HEIA) study – A school-based two-year cluster randomized trial

PURPOSE: The purpose of this study was to investigate effects of a multicomponent school-based intervention, aiming to promote a healthy weight development in adolescents, on anthropometric outcomes.

METHOD: A 20-month intervention promoting healthy diet, increased physical activity and reduced sedentary behaviour was evaluated in a cluster randomized controlled trial including 1324 11-year-olds. Low cost and feasibility were emphasized. Main outcome variables were body mass index (BMI), BMI-for-age z-score (BMIz), waist circumference (WC) and overweight/obesity (weight status). Weight, height and WC were measured objectively, while pubertal status and parental education was self-reported. Intervention effects were determined by regressing post-intervention values of outcome adjusted for baseline values onto the condition by ANCOVA and logistic regression, after checking for moderating effects of gender, pubertal status and parental education.

RESULT(S): Moderating effects of gender were detected for BMI, BMIz and WC. The intervention affected BMI (F (1, 640)=5.09, p=0.024) and BMIz (F (1, 640)=8.80, p=0.003) positively in girls, but not in boys (F (1, 678)=0.002, p=0.306) and F (1, 678)=0.98, p=0.322) respectively. No further effects were detected concerning WC and weight status. Significant positive intervention effect for BMI (F (1, 438)=4.93, p=0.027) was found in participants with parents with the highest level of education, but not in participants with parents with lower education.

CONCLUSION(S): A feasible multi-component two-year school-based intervention positively influenced BMI and BMIz in adolescent girls but not in boys. However, the social gradient in obesity prevention is reconfirmed and needs further attention.
Interventions on health behaviors and body composition in adults

P186  MACY - Join in and stay healthy - A participatory health promotion programme for elderly and young people in Germany
Hassel H, Bütterich A, Metzner K, Klein J, Klein M

PURPOSE: Macy aims to improve the attitudes towards health literacy as well as well-being, self-management and social participation by setting-up generation-bridging. Target groups are people over the age of 60 and children between 11-14 years. Special emphasis is placed on the participatory development of the intervention to enhance the acceptance of the programme and to analyze the expectations of the target groups regarding their health behavior.

METHOD: By means of focus group discussions (FGD) the expectations of the two target groups and scientists were analysed. Additionally health literacy issues, adequate methods of programme implementation and local barriers were identified. The intervention was developed using the results of eight homogenous FGD with elderly, children and scientists, applying the principles of „knowledge mapping“(adapted to the target groups).

RESULT(S): The development process brought out a manual with methods and guidelines for the generation-bridging workshops. Additionally a training was developed for those elderly who act as moderator of the workshops with elderly and children. The results of the development process will be presented.

CONCLUSION(S): The municipalities will be responsible to transfer the programme into other communities/institutions. In order to create a sustainable health promoting atmosphere in settings, a close collaboration between the target groups and scientist is necessary. The results of the study will contribute to the development of practical and evaluated health promotion programmes.

P187  Does lifestyle advice improve intrinsic motivation for physical activity and healthy diet among generally obese people willing to participate in a lifestyle intervention (the BeweegKuur)?
Rutten GM, Meis JJM, Hamers FJM, Hendriks MRC, Kremers SPJ

PURPOSE: In combined lifestyle interventions (CLI), including lifestyle coaching, for individuals with overweight and obesity, intrinsic motivation is required to reach sustained behavior change. In the BeweegKuur intervention, the lifestyle advisor (LSA) intends to enhance participant’s intrinsic type of motivational regulation. We examined the relation between the LSA’s activities and the change in participant’s motivation.

METHOD: The LSA invited BeweegKuur participants for the study. Demographic data, LSA-
Performance and motivation were measured with a self-report questionnaire at baseline and at 4 months. Questions of LSA-performance were based on the BeweegKuur protocol, motivation for physical activity and healthy eating was measured with the Behavioral Regulation in Exercise Questionnaire (BREQ) and the Regulation of Eating Behavior Scale (REBS). Longitudinal multiple regression analysis will be used to assess the association between LSA-performance and participant's motivation.

RESULT(S): Data of 185 participants were eligible. LSA-performance showed three main constructs: education, directive communication and protocol adherence. Motivational regulation for physical activity and healthy eating was mainly autonomous. Preliminary baseline bivariate correlation analysis shows that LSA’s education was related to introjected and identified regulation for physical activity, directive communication was related to amotivation for both behaviors and to external regulation for physical activity. Protocol adherence showed no statistically significant relations with motivational regulation.

CONCLUSION(S): Relations exist between LSA-performance and type of motivation towards engaging in physical activity and healthy eating of participants in a CLI. Further analyses and data presentation will concern the relation between LSA-performances and changes towards more intrinsic types of motivation.

P188 Offer and demand for health related nutritional and physical activity products and services: a European perspective
Denker K, Thurn J, Zinsmeister M, Schlicht W

PURPOSE: Studies show that combining physical activity and nutrition in complex interventions increase efficiency in regulating risk factors for non-communicable diseases more than those interventions addressing a single behaviour. In a scientific work funded by the EU 7th framework "Activity and Food for Regional Economies Supporting Health" we developed together with partners of eight European regions a joined European wide research agenda addressing offers and demands of nutrition and physical activity preventing the onset of non-communicable diseases.

METHOD: We assessed offers and demands for nutritional and physical activity products and services from eight European Research Driven Clusters (RDCs) in a social-ecological approach. The offers are investigated in terms of capabilities, skills and research structures by questionnaires completed by regional experts. The demands are observed from a latent and a manifest perspective. The manifest demands are determined by a standardized checklist to assess quantitative data, whereas the latent demands are analysed based on 54 expert interviews to assess qualitative data.

RESULT(S): The aggregated health market for nutrition and physical activity shows complementarities of the RDCs indicating market equilibriums, disparities and mismatch situations for each region. Eastern and western European regions show significant differences.
CONCLUSION(S): Manifest data are insufficient to overcome the gap between food and physical activity research and to offer those products and services fitting the demands. Therefore, it is necessary out of an ecological view to have sufficient comparable data on a regional level. Latent data are promising to identify main components out of the consumer perspective.

P189 The “healthy worker” programme to improve physical activity, dietary intake and quality of working life among office workers in Malaysia: a quasi-experimental study
Sulaiman N, Choo C, Darus A, Hazreen AM

PURPOSE: General objective: To determine if the “Healthy Worker” programme can improve the diet, physical activity, and quality of working life (QOWL) among office workers. Specific objectives: 1) To determine if the “Healthy Worker” Programme can reduce weight, body mass index (BMI) and steps taken in a day. 2) To determine if the “Healthy Worker” Programme can improve job and career satisfaction, stress at work, working conditions, control at work, home-work interface, employee engagement and general well-being.

METHOD: Based on the socio-ecological model, a complex intervention was carried out at the individual, co-worker, organizational and workplace environment levels. Assessments for weight, BMI, QOWL and physical activity were conducted at baseline and after 3rd and 6th months of intervention.

RESULT(S): A total of 132 and 151 workers participated at the intervention and control sites respectively. At the third month, physical activity increased significantly to 4428 MET-minutes/week among the intervention group, compared to 2278 MET-minutes/week among controls. There was significant increase of ‘job and career satisfaction’ among the intervention group at the third month. After the 6th month, body mass index significantly reduced in the intervention group by 0.4 kg/m2. Those who followed the program were 3.4 times more likely to reduce at least 5% of their original weight and 2.2 times more likely to achieve or maintain 10,000 steps a day compared to controls.

CONCLUSION(S): The “Healthy Worker Program” may improve the physical activity, reduce weight and body mass index among overweight and obese office workers, while having positive effects on job and career satisfaction.

P190 Lessons learned for the implementation of nutrition and physical activity environmental and policy interventions at worksites
Lemon SC, Estabrook B, Druker S, Pbert L

PURPOSE: Worksites are an important setting in which to address obesity. Environmental and policy-based initiatives are key components of worksite obesity initiatives because they
reach large numbers of individuals and can be sustained. However, research testing these approaches have to date been equivocal. We describe lessons learned from two NIH-funded studies in Massachusetts that tested multi-component interventions designed to prevent weight gain in employee populations included environmental and policy-based interventions.

METHOD: The first study was a cluster-randomized trial conducted in 6 hospitals (n=806). The second was a cluster-randomized trial conducted in 12 public high schools (n=782). Interventions were tailored to each site: example interventions included policies providing access to onsite fitness facilities, onsite walking routes, modifications to cafeteria and vending options, and point of selection nutritional information. Qualitative process evaluation data were obtained from Employee Advisory Boards meeting discussions, site intervention coordinators interviews and research staff experiences, and results were triangulated.

RESULT(S): Challenges to successful implementation and sustainability of policy and environmental interventions included maintaining engagement over time, identifying and cultivating effective employee advocates, competing demands of involved staff, working with middle management and outside vendors who are not accountable to the initiative, and economic and policy pressures on the institutions and employees.

CONCLUSION(S): Lessons learned include: 1) cultivating strong employee and leadership advocates over extended time, 2) engaging middle management responsible for implementation activities, 3) visible leadership support for initiatives that is well-communicated to middle management and outside vendors, and 4) starting with small achievable goals and building toward more challenging interventions.

P191 Behaviour change during pulmonary rehabilitation: a qualitative exploration of COPD patients’ experiences and guidance by healthcare professionals
Meis JJM, Bosma CB, Teixeira PJ, De Vries NK, Schols AMWJ, Kremers SPJ

PURPOSE: Pulmonary rehabilitation incorporates both physical activity and nutritional counselling. The present study aimed to explore COPD patients’ experiences during pulmonary rehabilitation and the guidance provided by healthcare professionals, with a special emphasis on the anticipation of maintenance of physical condition after completion of the program.

METHOD: Focus groups, followed by semi-structured interviews, were used to collect data from seven COPD patients at the beginning and six other COPD patients at the end of an inpatient pulmonary rehabilitation program, supplemented by a focus group and semi-structured interviews among fourteen healthcare professionals. A descriptive phenomenological approach was applied to analyse the data.

RESULT(S): Starting out, patients displayed trouble with acceptance of their disease, they
had insufficient knowledge about exercising and diet guidelines, and showed difficulties in setting specific realistic goals. Seeing fellow patients struggle with similar problems and tailored counselling by healthcare professionals helped them to overcome these barriers. During rehabilitation, patients became more confident in exercising and managing their daily life activities, they gained knowledge and acquired new self-management skills. Many patients evolved a desire to self-regulate their lives. It became clear that incorporating physical activity and a healthy diet after returning home into their usual daily routines was anticipated to be tough.

CONCLUSION(S): Patients undergoing pulmonary rehabilitation experience a complex health behaviour change process, in which healthcare professionals fulfil a major contributing role. Therefore, guiding patients in staying physically fit and eating a healthy diet is a vital component of healthcare professionals’ work.

**P192 Examining the communication effects of health campaigns: a case study using Find Thirty every day® in Western Australia**

*Leavy J, Bauman A, Bull F, Rosenberg M*

PURPOSE: Health communication campaigns have been used to increase awareness of the benefits of physical activity. Key campaign elements include mass media such as television and radio. The relationship between raising campaign awareness influencing physical activity behavior through intermediate variables has not been fully explored. The aim of this study was to examine the relationship between campaign awareness and four intermediate variables on changes in physical activity levels amongst a cohort of adults in a 12 month physical activity campaign.

METHOD: Find Thirty every day® was a serial mass media campaign in Western Australia. The cohort comprised 566 adults, completing a Computer Assisted Telephone Interview collecting data on campaign diagnostics, socio-cognitive variables, physical activity and demographics.

RESULT(S): There was a significant association between campaign awareness and higher outcome expectations. The likelihood of higher outcome expectations and higher decisional balance was significantly greater in people who maintained campaign awareness compared with people who had no campaign awareness (OR 1.62 95% CI 1.14-2.3; OR 1.56 95% CI 1.06-2.30, respectively). Those with higher compared with lower outcome expectation, self-efficacy, social support and decisional balance were more likely to remain sufficiently active. An association between the four individual variables and levels of change in physical activity appeared independent.

CONCLUSION(S): This study is one of few examples of a cohort evaluation of a mass media physical activity campaign to describe the relationships, over time. The paper adds to a small but growing body of literature that reinforces the importance of audience segmentation in physical activity mass media campaigns.
P193  Impact of a community health assessment on community-based obesity prevention efforts
Vinci DM, Turner S

PURPOSE: In 2005, a health assessment was implemented in NW Florida to define the vision for the future health of the region. This resulted in the formation of a community collaborative under the direction of a Leadership Team and five Solution Teams charged to set goals and advocate for change through community-based interventions. The purpose of this study was to assess activities of the Health Solutions Team (HST) in its “mission to educate and motivate children and families to practice healthy lifestyles including physical activity and healthy nutrition thereby reducing childhood obesity and its effect on future generations”.

METHOD: Using a timeline approach, a content analysis of HST minutes/documents from 2007-2012 were utilized to gain insight into the activities of the HST related to its mission.

RESULT(S): Phase 1 analysis indicated that HST initially implemented nutrition and physical activity interventions targeting after-school programs. While 85 children attended these classes, HST determined that future efforts needed to have a wider reach fostering a lifestyle approach. Efforts shifted to supporting school gardens. HST fostered community partnerships to raise funds and provide infrastructure to support the gardening movement. These efforts resulted in the growth of school gardens from one in 2007 to 24 in 2012 impacting participating schools’ culture related to nutrition and physical activity.

CONCLUSION(S): Community health assessment provided the framework for collaborative community effort to address childhood obesity. Phase 2 analysis will focus on a mixed methods approach to gain insight into schools’ culture/policies as a result of the inclusion of gardens within schools’ infrastructure.

P194  Using virtual reality to foster dietary and physical activity behaviors among minority women
Senior J, Parker V, Cason K, Gilbert JE, Meehan N, Hernandez Y, Blanco K, Linton B

PURPOSE: Design a Virtual Reality (VR) platform that utilizes a theory-based nutrition education intervention to promote healthy lifestyles amongst female African Americans ages 18-29.

METHOD: Background: The rates of obesity are alarming among minorities, especially black women. Data indicates that over 78% of African American (AA) women are overweight and over 52% are obese. With incidence still on the rise, combating this problem and its consequences among this population requires behavioral changes at the individual level and the environmental level. VR technologies provide a unique opportunity to apply the Transtheoretical Model (TTM) to the prevention and management of obesity among AAs.
RESULT(S): Methods: TTM will serve as the framework, and strategies employed will: 1) engage a multidisciplinary collaborative approach to create a novel module for promoting healthy behavioral changes; 2) adapt current culturally compatible nutrition education curriculums for AA women to be delivered through a VR platform and 3) employ VR technologies to support healthy behavioral changes. Phase I will consist of defining specific behaviors related to food choice and physical activity, and strategies that will be used during interventions based on TTM. Phase II will involve designing the guidelines for the VR environment. Phase III will comprise of designing an intervention; and Phase IV will evaluate that intervention.

CONCLUSION(S): Our approach will 1) test the impact of the module’s implementation on nutrition education research; 2) define ground-breaking parameters for culturally-tailored interventions to promote behavioral changes among populations with higher obesity risk; 3) facilitate future incorporation of innovative learning technologies into nutrition education programs.

P195 “Boost your fertility”: helping overweight and obese women with polycystic ovary syndrome (PCOS) getting pregnant by a multidisciplinary lifestyle program

Jiskoot LG, de Niet J, van Busschbach JJ, de Klerk C, Laven JSE

PURPOSE: Polycystic ovary syndrome (PCOS) affects 5–10% of women in their reproductive years. Losing as little as 5 to 10% of the initial body weight improves all clinical features and often leads to spontaneous ovulation and pregnancy in women with PCOS. Therefore, the aim of this study is to investigate the effect of a multidisciplinary lifestyle program on body mass index (BMI) as well as on reproductive outcomes in women with PCOS.

METHOD: A total of 234 patients will be randomized in an experimental group (n = 156) and a control group (n = 78). The experimental group receives a multidisciplinary cognitive-behavioural lifestyle intervention and additional maintenance intervention via SMS. The effect of the interventions on the outcome variables will be determined using mixed modelling. Outcome variables will be measured at the start of the study, at three, six, nine and twelve months. BMI is the primary outcome. Secondary outcomes include: (1) reproductive outcomes, (2) anthropomorphometric outcomes, (3) clinical and biochemical PCOS features, (4) psychological outcomes: eating behaviour and disturbances, Quality of Life, depression, self-esteem, fear of negative appearance and (5) physical activity.

RESULT(S): We hypothesize that by changing dietary and physical habits it is expected that primary and secondary outcomes will improve. This study is currently carried out. Preliminary results of 50 participants will be presented.

CONCLUSION(S): This study will show whether lifestyle modification should be included in standard care protocols for this particular patient group.
P196  Physical activity as a mediator of weight loss in mid-age women: mediation analysis of the 40-Something RCT
Hollis JL, Williams LT, Collins CE, Morgan PJ, McElduff P

PURPOSE: The 40-Something RCT aimed to determine whether a 12-month health professional intervention employing motivational interviewing, could result in diet and physical activity (PA) behaviour change for weight control, in 44-50 year old non-obese (BMI=18.5-29.9kg/m²) premenopausal women. In phase two, effect maintenance was monitored from 12-24 months (October 2012) for 30 women who completed both phases. This secondary analysis explored potential dietary and PA behavioural mediators hypothesised to be causally related to weight change.

METHOD: Fifty-four women were randomised to a Structured Intervention (SI) (n=28) (four Dietitian, one Exercise Physiologist consultations), or a control Self-Directed Intervention (SDI) (n=26) (written information). Both groups were advised to follow 10 weight control recommendations. Compliance to the recommendations was measured at 3 months by a 4-day weighed food record and PA diary (step count, PA minutes and sitting time). Mediation was tested through regression analysis (SPSS Statistics 21.0).

RESULT(S): Weight change differed between the SI (-3.68kg) and SDI (-1.41kg) groups at 12 months (β=2.263, p=0.045) but not at 24 months (SI=-1.99kg, SDI=-0.28kg, β=1.709, p=0.094). SI participants had better compliance to fruit (β=-1.956, p=0.008; β=-2.407, p=0.008), vegetable (β=-1.536, p=0.031; β=-2.183, p=0.005) and 10,000 step (β=-1.373, p=0.002; β=-1.492, p=0.004) recommendations at 12 and 24 months respectively. Participants who complied with step recommendations (β=-0.729, p=0.032) lost more weight than non-compliers at 24 months. Weight change was not mediated by any of the recommendations at 12 months.

CONCLUSION(S): A health professional-led intervention can improve compliance to fruit, vegetable and step recommendations, and increasing step count can assist weight control in mid-age women.

P197  Implementation of a “Health-At-Every-Size” program in health and social services centers in Québec: dosage, adaptations and related acceptability
Samson A, Bégin C, Turcotte M, Mongeau LLM, Paquette M-C, Provencher V

PURPOSE: To explore the implementation process of a “Health-At-Every-Size” (HAES) program by 1) identifying the extent to which program information has been delivered (dosage) and characterizing the type of adaptations made by providers, and 2) determining which types of adaptations are not consistent with program theory (unacceptable adaptations).

METHOD: After each program session, dyads of providers (n=23) completed a checklist to
describe how they carried out the planned activities. Also, the program developers established the level of flexibility acceptable for these activities. Quantitative and inductive analyses (grounded theory) were conducted.

RESULT(S): On average, 85.2% of the HAES program’s activities were delivered without any adaptation. Activities that were adapted by the providers (14.8%) were categorized as: 1) withdrawing an activity, 2) adapting the content (addition, substitution, update or reduction), 3) adapting the delivery method (changes to co-animation, group support or educational format), and 4) changing activities’ duration. The program developers considered that adaptation made to activities was unacceptable if it could limit the group development, the activities’ themes progression or objectives achievement. Within that context, activities’ withdrawals were the most frequent unacceptable adaptations. Skipping group discussions or theoretical content, combining activities with different objectives, limiting the progression of themes or participants’ active involvement were also unacceptable adaptations of content and delivery method. Finally, changes in duration of theoretical presentation, participants’ discussion or introduction activities were unacceptable.

CONCLUSION(S): Highlighting adaptations made by providers during the implementation of a HAES program will contribute to further improve actual providers’ training and support.

P198 Steps ahead: adaptation of physical activity and dietary guidelines for reducing unhealthy weight gain in the Lower Mississippi Delta

PURPOSE: To test the effectiveness of adapting the Dietary Guidelines for Americans (2010) (DG), with and without a physical activity (PA) component, in reducing weight gain in the Lower Mississippi Delta region (LMD) of the United States.

METHOD: A sample of 121 White and African-American adults (ages 35 - 64 yrs; BMI 25 - 34.9 kg/m2) were randomized to an adapted DG only group (n = 61) or an adapted DG+PA group (n = 60). Primary outcomes of weight, BMI and waist circumference (WC) were assessed at baseline and after 12 weeks of an education and behavior change intervention. Mixed linear models were used to investigate changes in the outcome variables over time, controlling for baseline level.

RESULT(S): Overall, 81.8% of participants returned at follow-up (85.2% in DG group, 78.3% in DG+PA group). Weight, BMI and WC significantly decreased from baseline to follow-up (p < 0.05). Pooling both groups, the mean changes (SD) in weight, BMI and WC were -1.22 (2.61) kg, -0.43 (0.64) kg/m2, and -1.89 (4.11) cm, respectively. Although no significant between-group differences were observed for changes in BMI (p = 0.134) or WC (p = 0.136) differences between groups for weight neared significance (p= 0.055).
CONCLUSION(S): Interventions to deliver adapted dietary guidelines were successful in reducing weight outcomes. However, the inclusion of a PA component (education and a pedometer) did not increase the effectiveness of the intervention. This short term, low burden intervention could be an effective strategy to increase adherence to the Dietary Guidelines.

P199 Phase one of a cluster randomised trial to prevent weight gain in women living in rural communities
Lombard CB, Harrison C, Kozica S, Ng N, Teede H

PURPOSE: Halting excess weight gain in all population groups is an international public health priority. Women living in rural communities gain greater weight than their urban counterparts. Despite the recognized need, few weight gain prevention interventions in adults have been reported. Our group has developed a weight gain prevention intervention for women (HeLP-her) which significantly prevented weight gain compared to a control group at one year. The primary aim now is to adapt the program, engage the community and implement this evidence based behavioral intervention and prevent weight gain in women living in small rural communities in Australia.

METHOD: Between September 2012 and March 2013 we aim to engage 42 small communities and recruit 800 women aged between 18 and 50 years and deliver phase one of the project. Primary endpoints are measured weight and secondary endpoints are diet, physical activity behaviors and self-management behaviours measured at baseline, one year and two years.

RESULT(S): Forty-two towns have been randomized to intervention (n=21) or control (n=21) and 610 women have been recruited to March 2013. We have successfully engaged communities through a comprehensive communication and media strategy, although recruitment varied between towns. Despite the complexity, the program has been successfully adapted and implemented.

CONCLUSION(S): Community prevention interventions in real life settings are complex and challenging to engage, recruit and deliver. To our knowledge this is the largest lifestyle related randomized controlled trial in women in Australia and the learnings from this project will impact on population weight gain prevention strategies internationally.

P200 Lifestyle counselling to reduce overweight in professional male drivers – RCT (NCT00893646)

PURPOSE: Long-distance drivers have irregular working hours and lengthy periods of sitting, both of which may predispose to obesity. The aim was to reduce overweight in obese drivers
by structured counselling on nutrition, physical activity and sleep.

**METHOD:** Men aged 30-62 with waist circumference >100 cm were randomised into a lifestyle (LIF) and control (CON) group. LIF participated in individual monthly counselling for 12 months. Thereafter, CON participated in 3-month counselling. Assessments took place at 0, 12, 24 months. The primary outcome was weight loss at 12 months (target 10% of initial weight).

**RESULT(S):** Hundred thirteen voluntary men were randomised, 95 participated in assessments at 12 months and 80 men at 24 months. At baseline the mean weight was 106.3 kg (SD 16.3) and waist 114.4 cm (9.9). At 12 months the mean weight change (vs. baseline) was -3.4 kg (6.6) in LIF and +0.7 kg (3.9) in CON. The net difference of changes between the groups (adjusted with baseline) was -4.0 kg (CI -6.2; -1.9) in weight, -4.7 cm (-6.6; -2.7) in waist, -3.1 kg (-4.9; -1.4) in fat mass (DXA) and -0.4 min (-0.7; 0.01) in 2-km walking time. Between 12-24 months CON decreased weight by about 3 kg while LIF did not change. At 24 months compared to baseline, there were no significant differences in changes between the groups in body composition and walking time.

**CONCLUSION(S):** Weight loss at 12 months was moderate despite intensive counselling. Difficulty in changing living habits may partly be related to challenging working conditions.

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**P201**

**A trans-national research agenda and Priorzaalities for integrated action in physical activity and healthy diets at regional level in Europe**


**PURPOSE:** The AFRESH project was developed to tackle non-communicable diseases related to unhealthy diet and physical inactivity and seeks to drive regional economic growth and employment through knowledge and innovation. AFRESH developed a trans-national research agenda or Joint Action Plan (JAP) that outlines priorities for integration of physical activity and healthy diets at the regional level in Europe.

**METHOD:** Research-driven clusters in the fields of nutrition and physical activity from 8 different European regions were mobilized and identified priorities for research driven regional development in Europe. For this purpose, participatory and consensus building approaches were applied in various workshops. Each cluster contained representatives from the private sector, academia and regional government.

**RESULT(S):** Thirty-four research and project ideas were identified for the JAP. These included innovative, attractive and marketable research solutions which are interesting to investors from public and private sectors, as well as new concepts and strategies for product and service innovation. The priorities address four key challenges i.e. children & young people; ageing; disadvantaged people and health at work.
CONCLUSION(S): The AFRESH project is a sizable effort to identify a common vision for research driven and health-sensitive strategy at European level. The JAP is a strong call for action towards policy-makers at the regional, national and European level to integrate physical activity and health diet in strategies for regional development in Europe.

P202 The tension between innovation, politics and evidence generation in environmental approaches to tackling obesity: the Healthy Towns example
Goodwin D, Cummins S, Sautkina E, Ogilvie D, Petticrew M, Jones AP, Wheeler K, White M

PURPOSE: In 2008 the Department of Health commissioned nine ‘Healthy Towns’ in England to test whole-town approaches to tackling the obesogenic environment. Healthy Towns were encouraged to include ‘innovative’ interventions as part of the overall programme. This research examines the role evidence played in programme development and the stimulation of innovative interventions.

METHOD: Twenty qualitative interviews with local programme stakeholders and national policy actors were conducted. Interview transcripts were coded and thematically analysed. Initial analyses were guided by research questions regarding the nature and role of evidence in the development and implementation of the Healthy Towns programme and the capacity for evidence generation to inform future policy and practice.

RESULT(S): Local anecdotal and observational evidence was predominantly used to guide intervention development. While the programme was considered by stakeholders as an opportunity to trial new and innovative approaches, the requirement to predict likely health impacts and adopt evidence-based practice was viewed as contradictory to this aim. This was exacerbated by political change and the impact of austerity measures during programme delivery.

CONCLUSION(S): The development of innovative population-level programmes to tackle obesity is beset by tensions and contradictions. A strong emphasis on relying on existing evidence based practice and producing positive outcomes may have impeded the opportunity to implement truly innovative programmes because of fear of failure. As determinants of obesity are complex and multi-factorial, governments should be realistic about the likely effects of single interventions and allow for the formative piloting of innovative projects that are not necessarily driven by targets.
P203  Wider than obesity prevention? Defining outcomes in the Healthy Towns Programme in England
Sautkina E, Cummins S, Petticrew M, Goodwin D, Jones AP, Ogilvie D, White M

PURPOSE: In 2008, £30M was invested by UK Government in the Healthy Towns (HT) Programme in England. Nine urban areas developed and implemented interventions to tackle the obesogenic environment. These involved multi-sector, environmental approaches to promoting physical activity and improving diet. In this paper, we explore how stakeholders defined programme outcomes in relation to national and local priorities, and across multiple policy sectors.

METHOD: We undertook semi-structured, interviews with 65 HT stakeholders. Interviews lasted 50 to 110 minutes and were recorded, anonymised and transcribed verbatim. Participants were asked about: the main outcomes and benefits of HT, and synergies with other policy areas. Thematic analysis was undertaken; three authors developed and discussed the coding framework, coding outputs and agreed the resultant main themes.

RESULT(S): Programme staff conceptualised outcomes as extending beyond obesity-related behaviours and identified multiple, complementary policy areas that they were attempting to address through the initiative. Four broad categories of outcomes were articulated: [1] direct obesity-related outcomes (healthy diet, physical activity); [2] indirect obesity-related outcomes (obesity awareness, infrastructure provision); [3] wider health-related outcomes (air quality, social capital); [4] non-health outcomes (environmental sustainability, monetary savings). Stakeholders emphasised the interrelatedness of these four categories of outcomes.

CONCLUSION(S): When planning programmes and their evaluation, consideration of the impact on outcomes that extend beyond the focus of a particular programme could be beneficial. Stakeholders believed that interventions could address a range of complementary policy areas, which were all equally important. Taking such a ‘joined-up’ perspective could help increase the efficiency and acceptability of policies and interventions.

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P204  Managing diabetes with physical activity and healthy eating: the cultural relevancy of diabetes supportive care for aboriginal peoples in Ontario
Baillie CPT, Yocom AA, Lévesque L

PURPOSE: Systematic oppression has contributed to a dramatic rise in diabetes that disproportionately affects Aboriginal populations in Canada (MacMillan et al., 2003). Given
the success associated with cultural tailoring in health initiatives, programs that support healing need to consider Aboriginal cultural values. With no prior description of culturally appropriate programming, this study explored the strategies that Ontario Diabetes Education Centres (DECs) use to improve the cultural relevance of care offered to Aboriginal peoples.

METHOD: Each DEC respondent (n = 56) was given a questionnaire informed by a framework developed by Kreuter and colleagues (2003) that categorized cultural strategies into peripheral, evidential, linguistic, constituent-involving and sociocultural strategies. Items developed for each cultural strategy were subsequently pilot-tested to improve clarity and comprehension. Data were analyzed using SPSS.

RESULT(S): Of the five strategies outlined above, DEC respondents reported using evidential strategies most often (46.5%), providing clients with evidence about diabetes (72.2%), obesity (44.4%), diet (41.5%) and physical activity levels (27.8%) in Aboriginal populations. Socio-cultural strategies were used least often (30.8%). The most common sociocultural strategies used were discussing traditional Aboriginal foods (59.3%) and herbal medicines (38.9%). The use of cultural strategies was significantly related to the number of Aboriginal clients served per month (H(2)=27.53, p<.001).

CONCLUSION(S): Data suggesting that DEC professionals use evidential strategies more than sociocultural strategies is consistent with providers acknowledging that they lack knowledge about Aboriginal culture. These findings can help guide Diabetes Educator training to enhance interventions for healthy eating and PA promotion within Aboriginal communities.

P205 Using results of the Office-based Physical Activity and Nutrition (OPAN) project to inform workplace health promotion
Blackford KD, Jancey JM, Howat PA, Ledger M, Lee A

PURPOSE: Office environments encourage sedentary behaviour, increasing workers’ risk of overweight/obesity by limiting time available for physical activity (PA) and nutritious meals. As the basis for planning a program to reduce prevalence of overweight/obesity, this study aimed to identify barriers/enablers and intervention strategies relevant to health promotion (HP) in office-based workplaces.

METHOD: This project consisted of three stages. Qualitative data collection consisted of four focus groups (stage 1) with office-based employees (n=37) and 10 telephone interviews (stage 2) with managers (n=10). Verbatim transcriptions of focus groups and interviews were analysed using a thematic analysis approach. Quantitative data collection consisted of an online survey (stage 3) with office-based employees (n=111). Data analysis included frequencies, chi square tests, and multiple regression.

RESULT(S): Qualitative data analysis (stages 1 & 2) informed development of the online survey (stage 3). Major findings of quantitative data analysis included the following: • Identification of barriers/enablers as significant predictors of PA/nutrition behaviours in the
workplace; • Ranking of the most and least preferred individual, environmental, and policy intervention strategies; and • Age/gender differences in barriers/enablers and preference for strategies.

CONCLUSION(S): The major benefits of the project are: • identification of barriers/enablers for adopting/maintaining positive PA/nutrition behaviours in the workplace; • identification of potential intervention strategies to inform development of HP for office-based employees; and • contribution to obesity prevention in the long-term. There is a need to utilise findings, as those presented, to develop comprehensive evidence-based HP programs that consider environmental and policy influences as well as the individual.

P206 Healthcare utilization and out of pocket expenses of participants in a combined lifestyle intervention in the Netherlands
Hendriks MRC, Berendsen BAJ, Rutten GM, Savelberg HHCM

PURPOSE: Overweight and obesity are related to chronic diseases, and subsequent healthcare utilization. Due to scarcity of resources interventions that increase health and quality of life, and reduce costs are preferred. Economic evaluations are preferably done from a societal perspective, meaning that all costs and effects are taken into account, including patients’ out of pocket expenses. However, these are often not assessed. To gain insight in lifestyle related out of pocket expenses, we explored health expenditures and health statuses of participants in a lifestyle intervention.

METHOD: Within a clustered RCT we are evaluating cost-effectiveness of two intensities of a Dutch lifestyle intervention promoting physical activity and healthy diet. Data (n=411) was collected via self-administered questionnaires at baseline. Descriptive statistics were used to assess patient characteristics, quality of life and healthcare utilization.

RESULT(S): Participants’ mean age is 55 (sd 12), mean BMI is 33 kg/m2 (sd 4.5), and mean utility based on Euroqol-5D is 0.74 (sd 0.2). Most participants (81.4%) reported one or more GP consultations in the past three months, 67.3% visited allied healthcare professionals, 45.5% specialty care and 6.5% was hospitalized. In addition, most participants reported out of pocket expenses (38% over the counter medication, 18% other expenditures up to €2000 for an E-Bike).

CONCLUSION(S): In overweight and obese patients with relatively good utility, healthcare expenditure is high, but out of pocket expenses are also substantial. Therefore, we recommend including out of pocket expenses in future economic evaluations of lifestyle intervention, for example via patient questionnaires or diaries.
P207  Expectations of a behaviour change intervention and subsequent increase of competence and confidence after “Healthy Conversation Skills” training


PURPOSE: Southampton health and social care practitioners were trained in “Healthy Conversation Skills” to enhance their skills in supporting parents to improve their lifestyles. Presented here are findings related to trainees’ pre-training expectations and post-training confidence and competence in using the skills.

METHOD: Before training, practitioners recorded their expectations on post-it notes which were collated at group level. Before and after training, trainees individually recorded their confidence in using the skills on a 10-point scale, high score indicating high confidence. One-to-three months post-training, trainees received a follow-up telephone call which was coded for evidence of competence in using the 5 skills; creating opportunities, asking open discovery questions, reflection, listening and SMARTER goal-setting.

RESULT(S): From 156 trainees, 213 expectations were recorded and analysed using content analysis. The most common expectations were that the training would: a. Increase trainees’ confidence in talking to parents (29% of responses) b. Provide trainees with skills to talk to parents about healthy lifestyles (39% of responses) Before and after confidence ratings were analysed for 145 trainees and data showed 57% of trainees were more confident having conversations about healthy lifestyles following training. Competence data from the follow-up telephone calls were available for 139 trainees showing 60% demonstrated moderate-high competence in using the skills.

CONCLUSION(S): The training was successful in meeting the trainees’ needs of learning new skills to support parents in a health and social care environment to improve their lifestyles. Increased confidence and competence of individuals reflected the groups’ expectations, indicating acceptability of the training and the new skills.

P208  Training in skills to support behaviour change induces sustained changes in the practice of health and social care practitioners


PURPOSE: The Southampton Initiative for Health has trained health and social care practitioners in skills to support behaviour change, with the aim of improving lifestyle choices of the parents with whom they work. Termed “Healthy Conversation Skills” these are: (1) ability to identify/create opportunities to initiate a healthy conversation; (2) use of ‘open discovery questions’; (3) listening skills; and (4) supporting SMARTER goal-setting (Specific, Measurable, Action-oriented, Realistic, Timed, Evaluated, Reviewed). Presented here is evidence of long term impact of training on staff practice.

METHOD: One year post-training, conversations were observed between trained
practitioners and parents (intervention site) to assess use of skills. Comparisons were made with observations in matched neighbourhoods where no training had taken place (comparison site). A random effects logistic model compared the frequencies with which these skills were used, taking account of the fact that some practitioners were observed in multiple conversations.

RESULT(S): 168 conversations with parents were observed being conducted by 70 of the 148 trainees in Southampton; 89 conversations conducted by 41 untrained practitioners were observed in the comparison area. The first three skills were used significantly more by staff in the intervention site than by staff in the comparison site: (1) 48%:29% (p=0.02); (2) 59%:20% (p<0.001); (3) 84%:60% (p=0.02). Whilst SMARTER goal-setting was observed more often in the intervention site, this difference did not reach significance (10%:1%; p=0.053).

CONCLUSION(S): Healthy Conversation Skills training induces long-term changes in the practice of health and social care staff who demonstrate an empowering communication style known to be supportive of behaviour change.

P209 Clinical practice change intervention increasing community health clinician provision of preventive care

PURPOSE: In Australia, Community Health Services (within primary care) represent a key setting for the provision of preventive care; specifically assessment, brief advice and referral regarding inadequate fruit and vegetable consumption and physical inactivity. However such preventive care is not routinely provided and there are limited data in this setting regarding the effectiveness of intervention strategies to increase its provision. The current study aimed to determine the effectiveness of a clinical practice change intervention in increasing community health clinician adherence to preventive care guidelines.

METHOD: Design. A two group (intervention versus control), non-randomised study assessed the efficacy of the intervention in increasing clinician provision of preventive care (risk assessment, brief advice, and referral/follow-up) for inadequate fruit and vegetable consumption, and physical inactivity. The intervention strategies included: leadership and consensus, systems change, manager and clinician training and support, audit and feedback, and community promotion. Participants. 1989 clients. Measures. Preventive care provision outcomes were assessed using cross sectional telephone surveys of randomly selected clients at baseline and following the 12 month intervention. Analyses. Logistic regression was used to test whether there was a significant intervention effect.

RESULT(S): Preliminary results suggest significant increases within the intervention group compared to the control group for assessment of physical inactivity and inadequate fruit and vegetable consumption, and for brief advice for inadequate fruit and vegetable consumption. There was no significantly differential change regarding referral/follow-up.
CONCLUSION(S): While the intervention resulted in some significant increases in preventive care provision, further intervention is required to increase referral/follow-up, a crucial element of preventive care.

P210 The WILMA (Weight Loss Maintenance in Adults) trial: recruitment challenges
Simpson S, Randell E, McNamara R, Kelly M, Cohen D, Espinasse A

PURPOSE: This is the first large trial of a weight loss maintenance intervention in the UK. During the initial phase we faced a number of recruitment challenges which we will describe along with an examination of the effectiveness of different strategies used to improve recruitment.

METHOD: The study is a 3 arm (intensive, less intensive, control) RCT. Those allocated to the intervention groups will receive a 12 month individually tailored intervention. We planned to recruit 950 obese adults aged 18-70 who have lost at least 5% body weight. The primary outcome is BMI at 3 years post randomisation. Initially we recruited from GP surgeries, Exercise on Referral schemes and commercial weight loss groups but due to recruitment challenges we broadened this.

RESULT(S): Of the 1266 approaches made to the study team, only 222 (17.5%) fulfilled the eligibility criteria. The majority of approaches (79%) were by those who either didn’t have 5% weight loss yet or were not able to evidence it. Key issues included GP record systems unable to accurately identify patients fitting eligibility criteria, lack of engagement ‘on the ground’ from commercial slimming club staff and inadequate financial and personnel resource to be able to launch a mass media advertising campaign. The most effective routes of recruitment were via Slimming Clubs and face to face GP sessions.

CONCLUSION(S): Data from this trial has provided evidence for the importance of implementing a variety of strategies for recruiting this group. Careful consideration needs to be given to the viability of entry criteria at the outset.

P211 How to make obesity prevention projects last – Critical factors for success from a qualitative study
Hanssen-Doose A, Matthes J, Willhöft C

PURPOSE: While temporarily funded obesity prevention projects concentrate on developing, implementing and evaluating interventions, limited effort is invested in transferring projects or certain elements into permanent structures (e.g. by long-term employment of project staff) to ensure sustainability. Profound project transfer knowledge in this area is rare. This paper presents identified critical factors for successful project transfer into permanent structures.
METHOD: The German Federal Ministry of Food, Agriculture and Consumer Protection funded 16 local model projects for a second period only to develop and implement transfer strategies. The evaluation of the transfer strategies followed a qualitative approach, including semi-structured interviews, expert interviews, focus groups, direct observations and document analysis.

RESULT(S): In total, 30 strategies were implemented (1 - 3 strategies per project), which could be classified into 4 clusters: institutionalisation, network strengthening, dissemination and stabilisation of the prevention activities. Generally indispensable factors of success were: needs assessment, concept existence, positive recognition of the project, qualifications of the project holder team (e.g. project management skills, social and communication skills, networking competences), and a visible benefit for the involved stakeholders (e.g. enhanced image).

CONCLUSION(S): Right from the planning stage project holder teams should consider the indispensable factors for a successful transfer of an obesity prevention project into permanent structures. As starting conditions may change during the course of a project, the project holder team should remain sensitive and flexible for optimizing, adjusting, and refining the indispensable factors’ specific content.
P212  **No difference in physical activity and sedentary time among those resistant or susceptible to obesity**  
Cooke RT, Brown RC, Richardson SL, Farmer VL, Taylor RW

PURPOSE: Most research examining the cause, treatment and prevention of obesity has focused on the characteristics of obese individuals. An alternative approach is to study those who have remained lean, seemingly resistant to the obesogenic environment (Obesity Resistant Individuals (ORI)). Information from this group may allow us to develop novel strategies to benefit those who continually struggle with weight maintenance. Physical activity and reduced sedentary behavior are purported to be protective against unhealthy weight gain. Therefore our objective was to compare physical activity levels and sedentary time in ORI versus Obesity Susceptible Individuals (OSI).

METHOD: ActicalTM (Phillips Respironics, Bend, OR) accelerometers were worn on the right hip of 29 ORI and 25 OSI for 7 consecutive days, except when sleeping, bathing, or engaging in activities harmful to the device. Data were scored and interpreted using the MeterPlus Version 4.3 software from Santech, Inc. (www.meterplusoftware.com).

RESULT(S): No significant differences were observed between ORI and OSI for any measures of physical activity including time spent in sedentary, light, moderate or vigorous activity; average daily MVPA (Moderate and Vigorous Physical Activity) or MVPA as a percentage of wear-time (all p≥0.311). BMI was significantly lower in the ORI versus OSI (p<0.001).

CONCLUSION(S): Despite having a significantly lower BMI, ORI appear to engage in a similar level and intensity of physical activity as OSI. Additionally, sedentary time did not differ between the two groups. Perhaps dietary intake and eating behaviour are more important factors for determining resistance to obesity.

P213  **Individual factors affecting preferences for feedback message tactics in the contexts of physical activity**  

PURPOSE: Tailored feedback on personal physical activity behaviour has been used in informing individuals and promoting physical activity among different populations. This study aims to increase understanding of factors associated with young men’s preferences for feedback message tactics in the context of physical activity and exercise. How preferences vary is analyzed in terms of the self-reported physical activity, stage of exercise behaviour change, exercise self-efficacy, objectively measured physical health status and socio-demographic characteristics of young Finnish men.

METHOD: Population-based survey data (questionnaire) and physiological measurements
(n=525, 41.7%) were collected at the Finnish Defense Forces’ call-ups of the City of Oulu, Finland, in September 2011 among young men (mean age 17.9). Data was analysed statistically.

RESULT(S): Stage of exercise behaviour change, exercise self-efficacy, physical health status and educational level are associated with preference for normative and ipsative comparison. Multivariate logistic regression models show that advanced stage of exercise behaviour change and education at the academic track of upper secondary school are independent predictors of preferring ipsative and normative physical activity feedback among the young men.

CONCLUSION(S): The study provides new insights into how stage of behaviour change influences health information behaviour and accord with studies emphasizing social factors, including education, as important in shaping health-related behaviours. In designing health promotion these factors could be used as a basis to tailor health information.

P214 The association between implicit processes and physical activity: a systematic qualitative review
Koeneman MA, van Stralen M, Chorus A, Hopman-Rock M, Chin A Paw MJM

PURPOSE: Dual process models assume that physical activity behaviour can be explained by both explicit and implicit processes. To date, physical activity research has mainly focused on the role of explicit cognitive, reflective, processes in explaining behaviour. The knowledge of implicit, automatic, processes in physical activity behaviour is limited. Hence, the aim of this review was to systematically summarise experimental research investigating the association between implicit processes and physical activity behaviour.

METHOD: We performed a systematic literature search and qualitatively summarised experimental research. We included studies 1) using an experimental design; 2) assessing the association between implicit processes and physical activity behaviour; and 3) written in English.

RESULT(S): In total, 12 studies were identified. Because of the heterogeneity of the determinants under investigation, we provide a qualitative overview of the available studies and evidence categorised by outcome. The reported outcomes were categorised into 1) habitual physical activity (N=2); 2) motor task performance (N=5); and 3) intention/motivation towards physical activity (N=5). Effects were commonly measured among student samples, within the experimental setting, immediately following the manipulation. Ten out of twelve studies found a significant positive association between implicit processes and physical activity behaviour.

CONCLUSION(S): The field of implicit processes and physical activity behaviour appears to be promising, with most studies reporting statistically significant positive results. Nevertheless, for developing effective physical activity promotion strategies, future research in this field should focus on different age groups, assessing habitual physical activity in real-life settings, and over longer periods of time.
**P215**

Tablet-based data collection for participatory assessments of walkability and bikeability of communities

Götschi T

PURPOSE: As part of the project "Community on the move [Gemeinde bewegt]" - a pilot project to promote physical activity through structural changes of primarily the built environment - a tool suitable for participatory assessment of problematic locations for pedestrians and cyclists had to be developed.

METHOD: The Android-based software platform opendatakit.org for mobile data collection was used in combination with a user-friendly web-interface formhub.org to develop a simple form to assess aspects of the built environment. The form automatically captures geo-location information and allows users to specify the issue of interest, type of infrastructure, problem at hand and suggested solutions. In addition, pictures can be taken. After data collection, data is uploaded via wireless connection to formhub.org, where it can be visualized on a map and downloaded for further analysis. GPS accuracy was evaluated in a separate effort comparing three different tablet types. Community audits were conducted and are planned with stakeholder groups in ten small to midsized communities.

RESULT(S): The software platform has proved to be easily manageable and user-friendly. Changes to forms and creation of new versions is simple and does not require programming skills. GPS measurements are within feasible accuracy of under 10m up to 30m and suited to identify locations of interest in combination with attribute data and photos. Community audit events have been conducted successfully with a group of students and disabled people.

CONCLUSION(S): Opendatkit and formhub provide free, highly flexible open source option for collection of spatially distributed data of interest to researchers investigating various environmental determinants.

**P216**

Distinct physical activity trajectories in heart disease patients: the importance of gender from an intensity perspective

Blanchard C, Reid RD, Morrin L, Pipe A, Plotnikoff R

PURPOSE: Limited research exists examining the long-term physical activity (PA) trajectories of people living with heart disease from a gender perspective. The first purpose was to identify distinct PA growth trajectories for light and moderate to vigorous PA after hospitalization for heart disease. The second purpose was to determine if gender predicted sub-group membership for each PA intensity.

METHOD: A total of 406 males (37.2% ≥ 65; 35.5 had a MI; 32.0% were obese) and 144 females (43.1% ≥ 65; 39.6 had a MI; 38.2% were obese) completed a questionnaire that included the Godin Leisure Time Physical Activity scale in hospital and at 2, 6, 12, and 24 months after hospitalization.

RESULT(S): Latent class growth curve analyses showed two classes of patients emerged for light intensity PA that were labeled Inactive Maintainers-Light (72.2% of the sample remained inactive for the 2-year period) and Low Active Maintainers-Light (27.8% engaged
in some light PA for the 2-year period). For moderate to vigorous PA, 87.8% of the sample were labeled Inactive Maintainers (i.e., remained inactive for the entire 2-year period), whereas 12.2% were labeled Active Maintainers (i.e., their MET levels were > 24 per week for the 2-year period). Gender did not predict light intensity PA group membership, however, females were significantly more likely to be in the inactive Maintainer group for moderate to vigorous PA compared to males (odds ratio = 3.47).

CONCLUSION(S): The association between gender and PA trajectories after hospitalization for heart disease may be intensity dependent.

P217  The relationship between weather and physical activity during cardiac rehabilitation

PURPOSE: The relationship between weather and physical activity (PA) during cardiac rehabilitation (CR) has strictly examined seasonal differences, which paints an incomplete picture. The purpose of the present study was to examine the relationship between daily PA and daily average temperature and precipitation on a given day at the end of CR.

METHOD: A total of 241 patients (mean age = 60.98; 66.0% male; 25.7%; had a MI; mean BMI = 30.93) wore a pedometer and recorded the date and their daily steps in a log book for 1 week at the end of CR. The average daily temperature and whether or not there was precipitation on a given day (0 = no; 1 = yes) was obtained from Environment Canada.

RESULT(S): A multi-level model was created such that a random intercept was included with fixed effects for the linear, quadratic, and time varying covariates (i.e., daily average temperature and daily precipitation) at Level-1 controlling for the time invariant covariates (i.e., age, gender, and season) at Level-2. Results showed that temperature was non-significant (beta = 25.66, p = .25), whereas precipitation was significant (beta = -.710.12, p = .00). On the days when there was precipitation, patients engaged in 710 less steps compared to days when there was no precipitation.

CONCLUSION(S): The relationship between PA and weather during CR needs further exploration. At this point, it appears that precipitation may be the more important correlate compared to temperature on a given day.

P218  Park visitation and physical activity
Veitch J, Ball K, Crawford DA, Abbott G, Salmon J

PURPOSE: Parks are important settings for physical activity across the lifespan; however, few studies have examined associations between frequency of park visitation and different domains of physical activity. This study examined associations between park visitation and
physical activity (walking or cycling for transport, leisure-time walking, leisure-time moderate- to vigorous-intensity physical activity (MVPA), and total physical activity) among adults living in a socioeconomically disadvantaged neighbourhood of Victoria, Australia.

METHOD: Adults (n=202) self-reported park visitation over the past 6 months and completed the transportation and leisure-time components of the International Physical Activity Questionnaire. Tertile splits were used to categorise participants as having engaged in ‘low’, ‘medium’, or ‘high’ amounts of time in transportation physical activity, leisure-time walking, and total physical activity. Participants were categorised as having engaged in ‘none’ or ‘some’ MVPA. Logistic regression analyses examined associations between park visitation and physical activity.

RESULT(S): The mean number of park visits per week was 3.3 (SD=3.8). Each additional park visit per week was associated with 23% greater odds of engaging in high transportation physical activity, 26% greater odds of engaging in high leisure-time walking, and 40% greater odds of total physical activity. Park visit frequency was not associated with leisure-time MVPA, although there was a trend towards an association (OR 1.08; 95% CI 1.00-1.17).

CONCLUSION(S): Acknowledging the cross-sectional study design, park visitation may be an important predictor and/or destination for transportation and leisure-time walking and total physical activity. Findings highlight the potentially important role of parks for physical activity promotion.

P219 A note of caution: the possible carbon costs of recreational physical activity
Goodman A, Brand C, Ogilvie D

PURPOSE: Promoting walking and cycling for transport (‘active travel’) is widely advocated as a measure that would both increase physical activity and decrease carbon dioxide (CO2) emissions from motorised travel. We sought to examine for the first time the association between recreational physical activity and transport CO2 emissions, and so examine whether the same health-environmental ‘co-benefits’ apply.

METHOD: 3463 adults (18-91 years, 45% male) completed questionnaires in the baseline iConnect survey at three study sites in the UK, which included measures of past-week physical activity and travel behaviour. Together with data on car characteristics, past-week travel behaviour was used to estimate CO2 emissions.

RESULT(S): As expected, spending more time walking or cycling for transport predicted lower CO2 emissions in multivariable linear regression models. By contrast, higher walking for recreation and higher leisure-time physical activity independently predicted higher CO2 emissions (e.g. an effect size of 0.17 standard deviations of CO2 emissions (95% CI 0.09 to 0.26) for those reporting ≥150 min walking for recreation in the past week vs. none). This association with recreational physical activity reflected the fact that these recreational activities were associated with more motorised travel, and in particular with more motorised
travel for ‘social or leisure’ purposes.

CONCLUSION(S): Recreational physical activity may not bring the same health-environmental ‘co-benefits’ as active travel. Instead, attention should also be paid to identifying and mitigating potential areas of tension, for example promoting low-carbon recreational activity by providing facilities that can be reached without motorised travel.

P220  Distance to physical activity locations: the role of home and work neighborhoods on meeting MVPA recommendations in working women
Gell NM, Wadsworth DD, Robinson LE, Marzen LJ

PURPOSE: Prior assessments have used an arbitrary reference from the home to evaluate influences of the built environment on moderate-to-vigorous physical activity (MVPA), which may exclude other areas in which MVPA is performed. The purpose of this study was to identify the average distance from both home and work employed women engage in MVPA.

METHOD: This was a case-control observational study of 103 employed women (mean age: 44.4±11.8) from two neighboring small cities. Measures included MVPA bouts of ≥ 10 minutes by accelerometry with location of home, work, and MVPA bouts by the Global Positioning System. Cases were defined as participants who met minimum physical activity recommendations over one full week. The average distance between MVPA locations and home and work was calculated based on Euclidean distance. Analyses included case-control comparisons and distribution of average distances.

RESULT(S): The average distance between home and MVPA locations and work and MVPA locations for all subjects was 6.6 km (SD=8.1) and 7.4 km (SD=7.5), respectively. There was no significant difference in distances for cases compared to controls. Thirty-six percent of MVPA bouts took place within 2 km from home, but 48% were 5 km or more from home.

CONCLUSION(S): Measurement of associations between the built environment and physical activity may be better served by considering a larger geographical area than arbitrary home neighborhood delineation. Capitalizing on opportunities to use the built environment encountered over the course of a typical day, and not just the home neighborhood, may be useful to include in physical activity promotion programs.

P221  The effect of obesity on physical activity during cardiac rehabilitation
Jason T, Blanchard C, Rainham D, Giacomantonio N, Lyons R

PURPOSE: To date, little data exists that relates obesity to objective measures of physical activity (PA) during cardiac rehabilitation (CR). Thus, the purpose of this study was to
examine the relationship between obesity and minutes of sedentary, light, and moderate-to-vigorous PA at the beginning and end of CR.

METHOD: To date, we have recruited 162 participants as part of a larger study examining PA in CR patients. For this submission, we report results based on 100 participants (mean age = 63 years; % male = 76%; % myocardial infarction = 49%) who completed a survey that included demographics, and wore an Actigraph accelerometer for nine days at the beginning and end of their CR. The first and last days were excluded in order to obtain the total minutes of sedentary, light, and moderate-to-vigorous PA at each time point.

RESULT(S): Multiple regression analyses controlling for age, gender, and diagnosis showed that obesity (0 = no; 1 = yes) was significantly associated with moderate-to-vigorous PA (β = -.265), but not sedentary (β = -.065) or light (β = -.122) at the start of CR. At the end of CR, obesity was also significantly associated with moderate-to-vigorous PA (β = -.271), but not sedentary (β = -.048), or light (β = -.121).

CONCLUSION(S): Obesity appears to be associated with moderate-to-vigorous PA at the beginning and end of CR; however, its relationship with sedentary and light PA remains unclear.

P222 Motivation to physical activity in obese psychiatric patients
Carraro A, Ferri I, Gobbi E, Fiorellini A

PURPOSE: Obesity is frequently comorbid with psychiatric disorders, representing a crucial question in terms of the compliance to treatments and of several medical complications. The aim of this study was to compare the modifications in motivation to physical activity (PA) of seriously overweight and obese psychiatric patients, with normal weight psychiatric patients, during a multidimensional residential treatment which included daily group-based exercise programs.

METHOD: A pre-post comparative design was used. Participants were 32 seriously overweight (BMI: 27.5-29.9) or obese (BMI ≥ 30), and 71 normal-weight or moderate overweight (BMI ≤ 27.4) psychiatric patients, consecutively admitted to a middle term (45-60 days) residential treatment. The 6 Minutes Walking Test (6MWT), the Situational Motivation Scale, the Physical Activity Enjoyment Scale and the Decisional Balance Questionnaire were used. T-tests, ANOVAs and regression analyses were conducted on the different variables.

RESULT(S): Despite overweight and obese patients reported at the admission significantly lower level in the 6MWT and in motivation scales compared to moderate overweight and normal weight patients, at the end of the treatment they improved significantly exercise tolerance, as measured by the 6MWT, intrinsic motivation and identified regulation, enjoyment in PA and decisional balance. Improvements in the 6MWT seem to predict positive changes in motivation.
CONCLUSION(S): The organization of exercise programs appears a cost-effective strategy to change, in the short time, the attitudes toward PA of obese psychiatric patients, increasing their motivation and enjoyment. Exercise should be regularly included in psychiatric treatment protocols and strategies to facilitate and stimulate participation should be implemented also at community-based levels.

P223  A comparison of physical activity correlates across breast, prostate and colorectal cancer survivors in Nova Scotia
Forbes C, Blanchard C, Mummery K, Courneya K

PURPOSE: Physical activity (PA) correlates may vary across cancer survivor groups but few studies have directly compared cancer sites. The purpose of this study was to compare the medical, demographic and social cognitive correlates of PA in breast (BC), prostate (PC) and colorectal (CRC) cancer survivors.

METHOD: A stratified random sample of 2062 BC, PC and CRC survivors diagnosed between 2003 and 2011 was identified by the Nova Scotia Cancer Registry and mailed a questionnaire assessing PA, social-cognitive constructs from the theory of planned behavior (TPB), and demographic and medical variables. Path analysis was used to test the TPB within each cancer survivor group.

RESULT(S): 741 completed surveys were analysed. Overall, 42% of cancer survivors were meeting PA guidelines with no differences among the cancer sites. Treatment-related variables were strong correlates of PA in PC survivors but not for BC or CRC. Body mass index was strongly associated with PA in BC survivors but not PC or CRC. Intention was significantly associated with PA for all three cancer survivor groups; however, planning was only significant for BC and PC. Finally, perceived behavioral control and instrumental attitude were significant correlates of intention in all three cancer survivor groups whereas affective attitude was significant for BC and CRC only; and descriptive norm was significant for PC and CRC only.

CONCLUSION(S): Although BC, PC, and CRC survivors have similar levels of PA, the correlates of their PA may differ. These findings may inform cancer site-specific interventions to promote PA in cancer survivors.

P224  Modelling mediated relationships between habit and physical activity: a cross-lagged panel design study in older adults
van Bree R, Bolman C, van Stralen M, Mudde A, de Vries H, Lechner L

PURPOSE: Habit can be considered both a cause and a consequence of behaviour. Thus, it could both be hypothesised that habit mediates the relationship between prior and later behaviour, and that behaviour mediates the relationship between prior and later habit. This study aimed to test both mediation mechanisms simultaneously in the context of physical
activity (PA), with the purpose of providing insight into the causal relationships between PA and habit.

METHOD: This study was conducted among 1976 adults, aged 50 years or older (Mage = 63.63, SDage = 8.61). At baseline (T0) and after six (T1) and twelve months (T2), measures from PA and habit strength were obtained, using questionnaires. Habit strength was assessed using both the Self-Report Habit Index (SRHI) and the Self-Report Behavioural Automaticity Index (SRBAI). Causal relationships were tested in a model with cross-sectional, autoregressive, and cross-lagged longitudinal paths, using path analyses.

RESULT(S): Significant mediated effects were found for the paths PA(T0)-SRHI(T1)-PA(T2) (βPA(T0)-SRHI(T1)*βSRHI(T1)-PA(T2)=.011, p=.002) and SRHI(T0)-PA(T1)-SRHI(T2) (βSRHI(T0)-PA(T1)*βPA(T1)-SRHI(T2) = .019, p < .001), as well as for the paths PA(T0)-SRBAI(T1)-PA(T2) (βPA(T0)-SRHI(T1)*βSRHI(T1)-PA(T2) =.005, p=.037) and SRBAI(T0)-PA(T1)-SRBAI(T2) (βSRHI(T0)-PA(T1)*βPA(T1)-SRHI(T2) = .014, p < .001).

CONCLUSION(S): Mediated effects from both prior PA through habit to later PA and from prior habit through PA to later habit exist simultaneously. Mediated effects from prior habit through PA to later habit are larger than effects from prior PA through habit to later PA. Implications of these results will be discussed.

P225  Habit as mediator of the relationship between Priorzaal and later physical activity: a longitudinal study in older adults
van Bree R, van Stralen M, Mudde A, Bolman C, de Vries H, Lechner L

PURPOSE: Habit is hypothesised to be at least a partial solution to the residual variance problem, that refers to the question why prior behaviour is a strong predictor of later behaviour. This longitudinal study examined whether habit strength mediates the relationship between prior and later physical activity (PA), within the framework of the attitudes-social influences-efficacy (ASE) model and the theory of planned behaviour (TPB).

METHOD: This study in adults, aged 50 years or older (N = 1976, Mage = 63.63, SDage = 8.61), employed a longitudinal design with four measurements using questionnaires on social cognitive constructs and PA at baseline measurement (T0), intention at three months measurement (T1), habit strength at six months measurement (T2), and PA at twelve months measurement (T3). Habit strength was assessed using both the Self-Report Habit Index (SRHI) and the Self-Report Behavioural Automaticity Index (SRBAI). Mediated effects were estimated for both measures separately using path analyses.

RESULT(S): Significant mediated effects were found for both the path PA(T0)-SRHI(T2)-PA(T3) (βPA(T0)-SRHI(T2)*βSRHI(T2)-PA(T3) = .061, p < .001, 19.18% of total effect) and the path PA(T0)-SRBAI(T2)-PA(T3) (βPA(T0)-SRBAI(T2)*βSRBAI(T2)-PA(T3) = .025, p = .002, 8.47% of total effect).
CONCLUSION(S): Results indicate that both the SRHI and the SRBAI offer a partial solution to the residual variance problem. The mediated effect of prior on later PA through the SRHI is more than twice as large as the mediated effect through the SRBAI, which may be due to items referring to prior behaviour in the SRHI. Implications of these results will be discussed.

P226 Socio-demographic influences on knowledge of physical activity guidelines  
Knox ECL, Sherar LB, Esliger DW, Biddle SJH

PURPOSE: Physical activity (PA) guidelines state 150 minutes/week of PA is necessary for optimal health benefits. In their UK-wide report the Chief Medical Officers identified health inequalities in relation to PA within disadvantaged groups and highlighted these groups as important targets for intervention. This research investigated demographic disparities in knowledge of PA guidelines in a UK adult population.

METHOD: The 2007 Health Survey for England provides data on 14,385 individuals from the UK. Individuals were excluded if they were <18 years old and if they had illnesses/disorders likely to restrict PA, leaving a sample of 4,491. 3,379 had a valid response to the question ‘Do you know the official recommended level of PA?’ The sample was 56% female, 88% White and 61% under 45 years. Chi-squared analysis and standardised residuals were used to examine demographic differences between adults that know and don’t know the PA guidelines.

RESULT(S): 28% of the sample reported that they knew the recommended level of PA, 41% said they could not recall the recommended level of PA and 31% did not know there were PA guidelines. Differences were identified for social class (p<.001), gender (p<.05), education (p<.001), ethnicity (p<.05), age (p<.05) and self-assessed health (p<.001). Males from lower social classes, with lower education (NVQ2/GCE O Level or below), Chinese/Other ethnic groups and with self-assessed ‘fair’ health were more likely to be unaware that guidelines exist.

CONCLUSION(S): Disadvantaged population groups engage in less PA and have less knowledge of PA guidelines. Efforts are needed to promote health information amongst these groups.

P227 Developing a measure of sources of physical activity information  
Berry TR

PURPOSE: There is no validated measure of where people find information about physical activity (PA); such a measure is needed for further research regarding the effects of multiple sources of information about physical activity. The purpose of this research was to develop such a questionnaire.
METHOD: Based on previous research (Berry et al., 2011) a draft questionnaire was developed and sent to academic experts for review. The revised questionnaire asked about frequency of looking for PA information on the internet, in magazines and newspapers, and from public health agencies, friends, family, fitness professionals, and health practitioners. The believability of each source was rated. The top three reasons why each source is accessed was rank ordered from a list of 12 possible reasons (e.g., health, weight loss, appearance). Participants named their three favourite of each source (e.g., 3 magazines). The questionnaire was piloted with 145 students.

RESULT(S): Friends were the most popular source of information (69.2% talked to friends monthly or more about PA), followed by the Internet (49.3% monthly or more frequent access). The least frequently accessed sources were health practitioners (65.7% never talked to them), and public health agencies (51.7% never accessed them). Participants most frequently talked to friends about PA for appearance, and went on the Internet for health and appearance reasons equally.

CONCLUSION(S): There are a number of popular PA information sources. They were all rated quite believable, but whether the information from all the sources is objectively credible needs to be determined.

P228 Resilience levels of long and ultra-long distance runners: an internal consistency analysis
Ruiz-Barquín R, De la Vega R, Rivera O, Borges P, Cabanas-Sánchez V

PURPOSE: Firstly, to describe resilience characteristics of long and ultra-long distance runners. In addition, to analyze internal consistency levels of resilience scale.

METHOD: A total of 329 long and ultra-long distance runners (59 women; 39.8±9.6 years) participated voluntary on this study. Participants were recruited through the on-line registration application before a long distance race. All participants completed a socio-demographic questionnaire and the Spanish version of the Resilience Scale. A descriptive-correlational design was used for the study purposes. Mean and standard deviations were calculated for the total scale values and for each factor. Internal consistency of the scale was measured through the Cronbach’s alpha coefficient.

RESULT(S): Results showed that long and ultra-long distance runners presented high resilience levels, both for total scale score (138.5±15.9) as for Factor I (Personal competence; 97.1±11.3) and Factor II (Self and life acceptance; 41.4±5.9). The internal consistency level obtained for the total scale score was 0.885. The Cronbach’s alpha coefficient was 0.880 and 0.619 for Factor I and Factor II, respectively. These internal consistency values are higher than those obtained in similar previous studies.

CONCLUSION(S): Results showed that the Spanish version of the Resilience Scale was useful and adequate to assess the resilience levels of long and ultra-long distance levels. Moreover,
these athletes showed high resilience levels. The scale internal consistency was increased compared to previous studies.

**P229**  
Changes in perceptions of the environment and changes in active commuting over 12 months: longitudinal results from the Commuting and Health in Cambridge study  
Panter J, Griffin S, Ogilvie D

**PURPOSE:** To assess the associations between changes in perceptions of the route environment and changes in active commuting.

**METHOD:** 655 commuters in Cambridge, UK reported perceptions of their route to work and commuting trips in the previous week via postal questionnaires at similar times in 2009 and 2010. We computed changes in time spent walking and cycling, changes in the proportion of car trips and switches away from the car as the usual mode of travel. Associations between changes in perceptions and changes in active commuting were modelled used linear or logistic multivariable regression models as appropriate.

**RESULT(S):** Mean changes in commuting were relatively small (walking: +3.0 min/week; cycling: -5.3 min/week; car trips: +1.33%). Those who reported that it became less pleasant to walk on average reported a 6% increase in car trips and a 12minute/week decrease in walking to and from work. Those who reported an increase in the perceived danger of cycling or crossing the road also reported increases in car trips of +8% and +6% respectively. Those who reported an increase in the perceived convenience of public transport (OR: 3.24, 95%CI: 1.28, 8.14) or safety of cycling (OR: 2.50, 95%CI: 1.07, 5.86) were more likely to switch away from the car.

**CONCLUSION(S):** Changes in only a few specific perceptions of the physical environment were associated with changes in travel behaviour. Interventions that focus on improving the perceived safety and pleasantness of routes and providing convenient public transport may help to promote active commuting.

**P230**  
Safety in numbers: the neighbourhood social environment, perceived safety and physical activity among women living in disadvantaged neighbourhoods. A mediation analysis  
Timperio A, Veitch J, Carver A

**PURPOSE:** The neighbourhood social environment may be an important influence on women’s physical activity. However the mechanisms by which the social environment influence physical activity have not been explored. This study aimed to examine associations between the neighbourhood social environment and leisure-time physical activity (LTPA) among women, and whether these associations are mediated by perceived personal safety.
METHOD: This paper is based on cross-sectional data from the READI study. Women (n=3784) living in disadvantaged neighbourhoods completed a survey on social environment variables, perceived personal safety, their LTPA and walking. The IPAQ-L was used to assess LTPA and walking, both of which were dichotomized (<150 mins/wk vs ≥150 mins/wk). Social environment variables included items regarding violence, crime, seeing others walking or exercising and social trust/cohesion within the neighbourhood. Potential mediating pathways were assessed using MacKinnon’s product-of-coefficients test.

RESULT(S): All social environment variables were positively associated with engaging in at least 150 mins/week of LTPA. A perceived lack of violence (OR=1.16), safety from crime (OR=1.18), seeing others walking (OR=1.38) and exercising (OR=1.56), and social trust/cohesion score (OR=1.28) were associated with higher odds of sufficient LTPA. Perceived personal safety mediated each of these associations. Results were less consistent for walking ≥150 mins/week.

CONCLUSION(S): The neighbourhood social environment is important for promoting physical activity among women living in disadvantaged neighbourhoods. Various elements of the social environment influence women’s feelings of safety and perceived safety therefore needs to be examined separately in future studies.

P231 Anticipated regret and moral norms in the context of the Theory of planned behaviour: predicting leisure-time physical activity intention and behaviour among individuals with type 2 diabetes
Boudreau F, Beaulieu D

PURPOSE: Anticipated regret and moral norms are widely used in the context of the Theory of planned behaviour (TPB), yet few studies have tested them regarding leisure-time physical activity (LTPA) among individuals with type 2 diabetes (T2D). The primary purpose was to identify the determinants of both intention and behaviour to participate in LTPA. The following hypotheses were formulated: (1) attitude, subjective norm, and perceived behavioural control will be significant determinants of intention (2) anticipated regret and moral norms will explain a significant portion of variance beyond the main determinants in the prediction of intention; (3) intention and perceived behavioural control will be significant determinants of LTPA.

METHOD: A total of 127 individuals with T2D selected randomly completed the baseline questionnaire measuring the theoretical constructs. The Godin Leisure-Time Exercise Questionnaire was used to measure LTPA one month later.

RESULT(S): Subjective norm (beta = 0.15, p < 0.01), perceived behavioural control (beta = 0.38, p < 0.0001), and moral norms (beta = 0.48, p < 0.0001) were significant determinants of intention, explaining 65% of the variance. Intention (beta = 0.30, p < 0.01) was the only significant predictor variable of LTPA, explaining 16% of the variance.
CONCLUSION(S): The determinants under investigation offers a good starting point on which to design appropriate messages to promote regular LTPA among individuals with T2D. More specifically, moral norms should be given a high priority given that this variable was found to be the most important determinant of intention, which in turn is a key determinant of LTPA.

P232 Impact of compliance with different guidelines on physical activity during pregnancy

PURPOSE: Physical activity (PA) has been reported as a protective factor in pregnant women’s health. However, PA generally declines during pregnancy. This study aimed: (1) to analyze PA engagement during the 1st and 2nd trimesters, considering the different guidelines published on PA, (2) document the individual characteristics associated with the accomplishment of guidelines

METHOD: A prospective study was conducted with a sample of 133 pregnant women in two stages: at 10-12 weeks’ gestation - T1 and 20-24 weeks’ gestation - T2. PA was assessed, by accelerometry, during the T1 and T2 evaluation stages. The pregnant women were divided into four groups, according to different PA guidelines ACOG, CDC, ACSM and USDHHS. Socio-demographic characteristics, lifestyle factors were assessed via questionnaire.

RESULT(S): A large proportion of women (ranging from 32% - USDHHS to 96% - ACOG) did not reach the levels of PA recommended by the guidelines. There were no significant differences between the 1st and 2nd trimesters with regard to compliance with PA recommendations (p>0.05 for all). However, a decrease in PA levels from the 1st to 2nd trimesters was noted for all recommendations. No associations were found between participants’ characteristics and adherence to particular types of guidelines/recommendations in the 1st and 2nd trimesters (p>0.05 for all).

CONCLUSION(S): There were no differences between the 1st and 2nd trimesters in compliance with different PA guidelines. Individual characteristics were not associated with PA guidelines’ accomplishment. Health professionals should be alert to the impact of different recommendations. Healthy pregnant women should be encouraged to follow the physical activity recommendations.

P233 "I exercise in order to…”. Long-term changes in exercise-related goals in previously overweight women"
Silva JD, Santos I, Silva MN, Carraça E, Teixeira PJ

PURPOSE: Goal Content Theory, a sub-theory of self-determination theory (SDT) points out the importance of studying intrinsic vs. extrinsic goals for understanding motivation and wellness. This study tested effects of an SDT-based behavior change intervention on
exercise-related goals in overweight women.

METHOD: A total of 221 women (age: 37.6±7.0 y; BMI: 31.6±4.1 kg/m2) were assigned to intervention and control groups and participated in a 1-year weight management intervention. The intervention was designed to increase autonomy and intrinsic motivation for physical activity and weight control. Goals (also known as motives) were assessed using the Exercise Motives Inventory 2 (EMI-2). Repeated measures ANOVA and t-test were used to evaluate between-group differences up to two years after the intervention ended.

RESULT(S): At 3 years, compared to controls, the intervention group showed significantly higher scores in several intrinsic motives: Stress Management (d=0.47, p=0.005), Enjoyment (d=0.52, p=0.002), and Revitalization (d=0.36, p=0.028); and reduced values in Health Pressures, an extrinsic motive (d=-0.56, p=0.001). For all other extrinsic motives (appearance, social recognition, competition), for affiliation motives, and for other scales related to health, weight and fitness there were no significant differences. For Enjoyment, Challenge, Positive Health, and Health Pressures there was a significant time x group effect of the intervention (p<0.05).

CONCLUSION(S): Results show that this theory-based intervention had marked and lasting effects on intrinsic, but not on extrinsic exercise-related goals. The present findings also suggest that affiliation and health-related goals, typically viewed as intrinsic, display a more complex pattern in the motivational dynamics underlying exercise behavior.

P234 Exercise motivation, adherence and well-being: a comparative study between Freestyle and Les Mills fitness classes
Joaquim LL, Palmeira AL

PURPOSE: Every year, several new fitness classes are presented as exercise opportunities to clients of health and fitness clubs. Few studies, however, analysed their impact on motivation, adherence or well-being. This study aim is to analyse this impact, comparing two popular fitness class programs within the perspective of the self-determination theory

METHOD: The sample comprised 120 regular exercisers at two health clubs (40±12 y, 66.4% women, 29 from Freestyle and 91 from Les Mills classes). Each volunteer fulfilled a packet of questionnaires that included several self-determination theory variables, and exercise-related emotional response. Adherence was measured retrospectively by the frequency to classes within the last six-months.

RESULT(S): No differences were observed between the types of classes on motivation, adherence or well-being. Hierarchical regression analysis showed that class frequency was marginally predicted by the satisfaction of psychological needs (p=0.059) and that exercise-related psychological well-being was predicted (R2=41.7%) by autonomy support climate (p=0.038), self-determined regulations (p<0.001) and marginally predicted by the satisfaction of psychological needs (p=0.054).
CONCLUSION(S): No differences were found between the adherence to Les Mills and Freestyle classes. However, the satisfaction of psychological needs emerged as an important variable for the study of adherence and emotional responses to exercise in the fitness class context.

P235 Which environmental attributes predict walking and cycling for transport and recreation? Findings from the iConnect Study in the UK
Adams E, Goodman A, Sahlqvist S, Bull F, Ogilvie D

PURPOSE: Emerging evidence suggests that different forms of physical activity may be associated with different environmental attributes. This study aimed to examine specific associations between perceptions of the neighbourhood environment and walking or cycling for transport or recreation.

METHOD: Adults responding to a postal survey in three areas of the UK (n=2937) reported their perceptions of the neighbourhood environment using a newly developed scale, transport walking and cycling using a seven-day travel recall instrument, and recreational walking and cycling using a modified International Physical Activity Questionnaire (IPAQ). Scores for six summary environmental constructs (traffic safety, supportive infrastructure, availability of local amenities, social order, connectivity and general environment quality) were categorised into low, medium and high supportiveness. Associations between these environmental constructs and participation in each of the four behaviours were assessed using multivariable logistic regression.

RESULT(S): After adjustment for socio-demographic and other environmental characteristics, walking for transport was associated with high perceptions of supportive infrastructure (OR=1.44; 95%CI 1.08, 1.90), availability of local amenities (OR=2.14; 95%CI 1.44, 3.18) and general environment quality (OR=2.32; 95%CI 1.49, 3.60) whereas recreational walking was only associated with supportive infrastructure (OR=1.47; 95%CI 1.13, 1.92). Cycling for transport was associated with connectivity only (OR 1.92; 95%CI 1.02, 3.63) and recreational cycling was not associated with any of the environmental attributes.

CONCLUSION(S): This study confirms other findings that different environmental attributes are associated with different behaviours. Policy action to create supportive environments will require a combination of environmental improvements to promote walking and cycling for different purposes.

P236 Information behavior in stages of exercise behavior change
Hirvonen N, Huotari M-L, Niemelä R, Korpelainen R

PURPOSE: This study aims to increase understanding of young men’s needs for and practices of obtaining and avoiding information on physical activity and exercise in relation to their
stage of exercise behavior change (according to the Transtheoretical Model).

METHOD: A questionnaire survey was conducted at the Finnish Defence Force’s call-ups in northern Finland at 2010 (n = 616). Statistical analysis included calculation of distributions and mean and standard deviation values, correlation analyses, analysis of variance, and cross-tabulations with Fisher’s exact test.

RESULT(S): The results show that those who aspire to an active lifestyle are more likely to actively obtain health information while those less motivated to be active rely on passive practices of information acquisition and receive less information altogether through the various practices of obtaining information. In pre-action stages (precontemplation, contemplation, preparation) where individuals do not exercise regularly and are uninformed or lack motivation, commitment, or skills to change behaviors, information is most often encountered through the passive practice of nondirected monitoring. In the action stage, where individuals have recently changed their exercise behaviors, information is obtained most frequently by active seeking. In the maintenance stage, where individuals maintain earlier adopted behaviors, information is habitually obtained through active scanning.

CONCLUSION(S): The results add to the existing knowledge of the varying roles of information in a behavior change process. To increase the persuasiveness of health messages, health promoters might consider stage-tailored communications, where both the content and the delivery channels of interventions are tailored according to the stage of change.

P237 Sub-group analyses exploring factors associated with PA behaviour among the inactive, overweight and socially disadvantaged
Short CE, Vandenalotte C, Duncan MJ

PURPOSE: Understanding what factors influence PA is rudimentary for guiding intervention research. This study aims to contribute to this process by exploring correlates of PA among particular sub-groups of interest, including those who are inactive, overweight and socially disadvantaged.

METHOD: Participants were 803 adults recruited from the Population Research Laboratory volunteer registry at the Institute of Health and Social Sciences Research at the Central Queensland University. Multiple linear regression models were employed to identify demographic, psycho-social and health factors related to PA levels among the whole sample and sub-groups of inactive (n=352), overweight (n = 502), low income (n = 201), low educated (173), and regionally (n=291) and rural-based (n=146) individuals. Standardized beta coefficients are used to allow for comparisons between models.

RESULT(S): Results from the combined model were consistent with findings from previous research. Higher PA levels were associated with younger age, higher self-efficacy, higher perceived benefits and higher stage of change. Some overlap was found between the factors
identified as important in the combined model and those identified in the sub-group models but the associations differed in effect size and some associations that were not accounted for in the combined model were unmasked at the sub-group level (e.g., gender, attitude, income).

CONCLUSION(S): This study investigates factors associated with physical activity in population groups that are typically underrepresented in intervention research.

P238 Are dog owners more active than non dog owners: cross sectional and longitudinal data from the Swiss Sapaldia cohort
Martin BW, Bauman AE, Wanner M, Probst-Hensch N, Kriemler S

PURPOSE: Purpose: Although dog walking could contribute to total physical activity, almost all research uses cross sectional designs. This study uses Sapaldia population cohort of adults in Switzerland to examine the longitudinal correlates of dog ownership and physical activity, with a focus on patterns of dog ownership: [i] without dogs at both time points, [ii] acquired a dog; [iii] lost their dog; or [iv] maintained dog ownership at both time points, in relation to changes in physical activity.

METHOD: Methods: The Swiss Study on Air Pollution and Lung Disease in Adults (Sapaldia) wave 2 cohort in 2002, and follow up of 4522 individuals nine years later [S3]. Measures included four questions on physical activity, regarding days/week and total minutes of moderate and vigorous activities; dog ownership was asked; demographic data, allergy status and region were used as covariates. Modelling included univariate ANOVA (cross-sectional); GLM for longitudinal analyses, using SPSS-ver19.

RESULT(S): Results: Dog owners were significantly more active and met PA guidelines at both time points cross sectionally. For longitudinal data, those without dogs increased slightly over the two waves (means 246, 272 mins/week NS), but significantly declined among those losing their dog (312 to 251 mins/week, **), and significantly increased for acquiring a dog (246 to 352 mins/week**) and dog maintainers (360 to 416 mins/week**). Results were confirmed adjusting for covariates and baseline PA levels. {**p<0.01}

CONCLUSION(S): Conclusion: Longitudinal associations between dog ownership and changes in physical activity indicate a stronger causal relationship. Dog ownership could contribute to maintaining or increasing population physical activity.
P239  **Relationship of exercise self-efficacy to physical function in male and female chronic obstructive pulmonary disease patients and cardiovascular rehabilitation patients**

Rodgers WM, Selzler A-M, Haennel RG, Senaratne M, MacDonald K, Stickland MK

**PURPOSE:** The purpose of this study was to examine the relationship of task, coping and scheduling self-efficacy (SE) for exercise to self-reported exercise and to the 6 minute walk test (physical function) in male and female chronic obstructive pulmonary disease (COPD) patients and cardiac rehabilitation (CR) patients.

**METHOD:** A sample of 67 COPD patients was sequentially recruited from a pulmonary rehabilitation program. A sample of 67 CR patients was drawn from a larger sample of 200 patients, matched for age and sex to the COPD patients to balance sample size. All patients completed self-report measures of exercise and self-efficacy and completed the 6 minute walk test at the beginning of their respective programs.

**RESULT(S):** Disease x sex MANOVA (effect size = .09) revealed that male CR patients had the highest task SE and male COPD patients had the lowest scheduling SE. Pearson’s correlations revealed significant associations between all types of SE and the 6MWT and self-reported exercise in female CR patients only.

**CONCLUSION(S):** There are important differences in SE for exercise between CR and COPD patients at the outset of their rehabilitation programs. There are no associations of SE for exercise and self-reported exercise or 6MWT in male and female COPD patients or male CR patients. The reasons for the lack of association might be due to disease characteristics of each group, and to variation in their respective SE scores. It may be prudent to address these differences in this important behavioural mediator in the early days of rehabilitation programming.

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P240  **The influence of the attitude towards power saving on perceived change of physical activity**

Nakamura Y, Araki K, Harada K, Shiota K

**PURPOSE:** The purpose of this study was to investigate the relation between the attitude towards the energy saving requirements and the perceived change of physical activity under the power shortage condition during summer.

**METHOD:** An Internet-based survey was conducted to 10,444 Japanese people (20-69 years old) during 11 to 18 September 2011. Among them, 2,400 individuals (23.0%) answered the survey. In addition to the socio-demographic variables, we asked the two types of attitude, i.e. acceptable and intolerant, towards power saving behaviours required by electrical power shortage in Japan, summer 2011. Also, the respondents were asked to answer perceived changes in 4 types of physical activities (usages of steps and bicycle; household and...
occupational activities; walking behaviours; exercise and sports opportunities) by 4 choices (very increased; slightly increased; slightly decreased; very decreased), respectively. The logistic regression analyses were employed.

RESULT(S): The acceptable attitude were positively related to the usages of steps and bicycle (OR: 1.50, 95%CI: 1.12 - 2.02), and household and occupational activities (OR:1.50, 95%CI: 1.13 - 2.00). On the other hand, the intolerant attitude was negatively related to the walking time (OR: 0.80, 95%CI: 0.66 - 0.95), and the usages of steps and bicycle (OR: 0.79, 95%CI: 0.65 - 0.96).

CONCLUSION(S): These results suggested that the negative attitude toward the energy saving requirements might have inhibitory effect on the physical activity and positive one vice versa.

P241 Awareness of physical activity guidelines – Perceptions of adults intending to exercise
Murtagh EM, Archibald K, Mutrie N, Lambe B, McAdam C, Murphy MH

PURPOSE: Over the last five years various physical activity guidelines have been promoted in the Republic of Ireland, Northern Ireland and Scotland. These include the guideline that adults should accumulate 30 minutes of moderate intensity physical activity on most days of the week, 30 minutes on 5 days per week or 150 minutes per week. The extent of awareness of physical activity guidelines among adults who are interested in exercising is unknown.

METHOD: Adults from Ireland (Republic of and Northern) and Scotland completed an online or paper questionnaire which asked about awareness of current or previous physical activity guidelines and included the IPAQ. The subjects responded to an advertisement seeking adults interested in taking part in an exercise programme.

RESULT(S): Of the 427 adults (34 ± 12.9 years; 271 female) who provided complete data, 76% (n=325) were physically active (>600 MET-min/week). 58.6% (n=250) stated that they were aware of current or previous guidelines, 34.4% did not know and 6.8% were unsure. Of the 279 adults who answered yes/unsure, 25% (n=70) said the guideline was that adults should partake in 30 minutes of exercise every day, 8% (n=22) stated 30 minutes on 5 days of the week and 13 % (n=37) thought that adults should exercise for 30 minutes on 3 days each week. Only 3% (n=9) mentioned that “moderate” activity was advised.

CONCLUSION(S): Knowledge of physical activity guidelines is poor among this cohort of adults. Our results suggest the need for public information campaigns to improve knowledge of current guidelines.
P242  Exercise multi-dimensional self-efficacy and stage of change in patients with coronary heart disease
Su H, Yu H-C, Chu I-H

PURPOSE: To examine the associations between multi-dimensional self-efficacy (SE) and exercise stage of change (SOC) in patients with coronary heart disease (CHD).

METHOD: Patients with CHD were recruited for this study. Exercise stage of change questionnaire was used to assess the SOC of the participants. A multi-dimensional self-efficacy for exercise scale was used to assess participants’ task, scheduling, and coping SE. Data were analyzed using one way analysis of variance (ANOVA).

RESULT(S): The results of the 136 participants (mean age 58.4 ± 8.4 yr) showed that there were significant differences among different stages in task SE (p=.001), coping SE (p=.015), scheduling SE (p<0.001). The results of the post hoc comparisons showed that participants in the maintenance stage had significantly higher task SE (p=.001) and scheduling SE (p<0.001) as compared to those in the precontemplation stage. Participants in the maintenance stage also had higher scheduling SE (p=.042) than did those in the preparation stage. Moreover, participants in the action stage had significantly higher task SE (p=.002) and scheduling SE (p<0.001) as compared to those in the precontemplation stage. However, there was no significant difference between stages in coping SE in post hoc comparisons.

CONCLUSION(S): These findings indicated that CHD patients in the maintenance and action stages have higher task and scheduling SE than those in the precontemplation stage. Future physical activity intervention may target on enhancing CHD patients’ task and scheduling SE to increase the likelihood of physical activity participation in this population.

P243  Changes in main modes of transport and active commuting during transition to adulthood
Molina-García J, Castillo I, Queralt A

PURPOSE: The study purposes were to analyze the changes in modes of transport to high school/university and the changes in active commuting (AC) levels during transition to adulthood.

METHOD: A one-year follow-up study was designed. The sample was composed of 244 last-year high school students (58.6% female). First data collection was performed in the final year of high school. Time spent in each mode of transport to high school and to university/ workplace was assessed by self-report. The main mode of transport among participants who used mixed mode trips was assigned based on the longest portion of their trip. A weekly estimation of energy expenditure in AC was obtained.

RESULT(S): Walking was the main mode of transport of high school students (> 75% in both gender groups). At time 2, walking decreased to 19.6% in males and to 32.7% in females (p<0.01). The use of public transport (train and bus) increased during the study period (p<0.05). Results indicated a significant increase in AC levels in females (p<0.05), whereas there was no change in males.
CONCLUSION(S): Although participants reported an increase in public transport use, there was not a decrease in AC levels. This apparent difference is likely because most transit trips also included walking trips at time 2.

P244  How does retirement affect physical activity behaviour? A qualitative investigation of beliefs held by pre- and post-retired individuals  
McDonald S, Hobbs N, White M, Sniehotta FF

PURPOSE: The retirement transition may provide an important opportunity to deliver interventions to increase physical activity (PA) levels. Previous studies have shown that PA levels may change after retirement. However, little is known about the factors which determine PA trajectories after retirement. The study aimed to identify theory-based factors associated with retirement-related PA change in a pre- and post-retirement sample.

METHOD: A semi-structured interview based on the 12 domains of the Theory Domain Framework (TDF; Michie et al., 2005) was conducted to elicit perceptions of PA. Eleven participants who were still working and 15 retired participants within 24 months of retirement were recruited representing a range of socio-economic and occupational backgrounds. Interview transcripts were content and thematically analysed according to the TDF.

RESULT(S): Changes in PA associated with retirement were perceived to be favourable more often than they were perceived to be unfavourable. For example, shared perceptions about factors associated with favourable changes in PA post-retirement were increases in energy and time availability. Shared perceptions about factors associated with unfavourable changes in PA post-retirement were increased cost awareness and loss of daily structure after leaving work.

CONCLUSION(S): The retirement transition may represent a period where individuals perceive a temporal reduction in common barriers to PA. These findings can inform the future development of theory-based behaviour change interventions targeting the retirement transition.

P245  Self-determined motivation towards physical activity in patients with coronary heart disease  
Chu I-H, Yu H-C, Su H

PURPOSE: To examine the associations between self-determined motivation and physical activity in patients with coronary heart disease (CHD) in a longitudinal study.

METHOD: Patients with CHD were recruited for this study. Their motivation for exercise
were measured by the Behavioural Regulation in Exercise Questionnaire-2 (BREQ-2). Physical activity was assessed using the 7-day physical activity recall questionnaire. Duration and energy expenditure of moderate to vigorous physical activity (MVPA) were used in data analysis. All outcome measures were assessed at baseline and 4 months follow up. Data were analyzed using Pearson correlation analysis.

RESULT(S): The results of the 68 participants (mean age 58.44±8.4 yr.) revealed that there was a significant positive correlation between intrinsic motivation at baseline and duration of MVPA at 4 months (r=.245, p=.044). There was also a significant positive correlation between intrinsic motivation at baseline and energy expenditure of MVPA at 4 months (r=.258, p=.034). In addition, there was a significant positive correlation between calculated relative autonomy index (RAI) at baseline and energy expenditure of MVPA at 4 months (r=.253, p=.038). There was no significant correlation between other subscales of the BREQ-2 and duration or energy expenditure of MVPA.

CONCLUSION(S): The results of this longitudinal study showed that intrinsic motivation and the degree of autonomy are significantly associated with level of physical activity at moderate to vigorous intensity in patients with CHD. It is suggested that a physical activity intervention program may target on enhancing one’s intrinsic motivation to increase the likelihood of physical activity participation in this population.

P246 Self-determined motivation and stage of change in patients with coronary heart disease
Yu H-C, Su H, Chu I-H

PURPOSE: To examine the associations between self-determined motivation and exercise stage of change (SOC) in patients with coronary heart disease (CHD).

METHOD: Patients with CHD were recruited for this study. Their motivation for exercise were measured by the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2). Exercise stage of change was assessed using the Exercise Stage of Change Questionnaire.

RESULT(S): The results of the 136 participants (mean age 58.4±8.4 yr.) revealed that there were significant differences among different stages in amotivation (p=.002), identified regulation (p<.0001), intrinsic motivation (p<.001), and relative autonomy index (RAI) (p<.0001). The results of post hoc comparisons showed that participants in the maintenance stage had significantly lower amotivation (p<.001) and higher identified regulation (p<.0001), intrinsic motivation (p<.0001), and RAI (p<.0001) as compared to those in the precontemplation stage. Participants in the maintenance stage also had significantly higher identified regulation (p=.010), intrinsic motivation (p=.026), and RAI (p=.002) as compared to those in the preparation stage. The results also showed that participants in the action stage had significantly lower amotivation (p=.012) and higher identified regulation (p<.0001), intrinsic motivation (p=.004), and RAI (p=.001) as compared to those in the precontemplation stage. In addition, participants in the action stage had significantly higher identified regulation (p=.026) as compared to those in the preparation stage.
CONCLUSION(S): The results of this study indicated that CHD patients in the maintenance and action stages had higher identified and intrinsic motivation than patients in the precontemplation and preparation stages.

P247  Female participation profiles and reasons for physical activity stratified by gender-inequality
Balish S, Evans B, Blanchard C, Rainham D

PURPOSE: Decreasing the gender gap in physical activity (PA) will require understanding the influence of gender-inequities throughout individuals environments. This exploratory study compared participation profiles and reported reasons for PA across groups of females stratified according to the gender-inequality of their country.

METHOD: In 2007, the International Social Survey Program queried 49,729 individuals (aged 15 years and older) across 34 countries regarding their sporting and physical activities. Using the World Economic Forums gender gap index, female participants were grouped based on the level of gender inequality in their country (i.e., low, middle, high). Profile analysis was used to compare groups on the type and frequency of PA as well as perceived reasons (i.e., meeting people, health, competition, look good) for engaging in PA.

RESULT(S): Participation profiles differed significantly across groups. Although type of PA was relatively constant, frequency of PA varied across groups. Reasons females stated for participating in PA also varied. Participants with higher levels of gender inequality reported less enjoyment from PA and reported higher agreement that competing against others and looking good are reasons for sport participation. However, groups did not differ on two reasons for participating in sport: meeting people and increasing health.

CONCLUSION(S): This research adds to the converging evidence that gender inequality is meaningfully associated with females PA, including sport. Moreover, differences among groups on reasons for sport participation suggests that gender inequality is associated with differences in the way sport is perceived. Future research is needed to establish the mechanisms through which such differences manifest.

P248  The impact of coaching styles on athletes’ motivation, well-being and performance: the mediating role of perfectionism and need satisfaction
Boone L, Vansteenkiste M, Soenens B

PURPOSE: Coaching style might have both positive and negative influences on athletes’ motivation, well-being and performance. In this study, we first aimed to examine the effects of different perceived coaching styles on athletes’ motivation and performance through general perfectionism and need satisfaction in sport
METHOD: 203 Belgian top sport males (69%) and females (31%) (mean age 15.6 years) filled out questionnaires tapping into perfectionism, sport motivation, well-being, need satisfaction in sport, and perceived coaching style. Additionally, top sport students’ personal coach (n = 132) rated the performance of the athlete. Structural equation modeling will be used to examine the relations.

RESULT(S): It was found that positive perceived coaching style (i.e. autonomy support and responsiveness) were positively associated with more intrinsic motivation to participate in training and sport, positive well-being, and with a better performance as rated by the coach. These effects could be fully or partially explained by satisfaction of the athletes’ needs in sport, competence satisfaction in particular. Negative perceived coaching style (i.e. psychological control) was found to negatively relate to performances, well-being, and related more to extrinsic motivation to participate in sport. Evaluative concerns perfectionism was found to be an important mechanism through which this relation occurs.

CONCLUSION(S): This study showed that the style of coaches represent a key sources of influence on athletes’ motivation, well-being and performance. Our findings also give more insight in positive and negative dynamics that might play a role in athletic performance.

P249 Predictors of exercise maintenance among oriental older people
Chiu Y-Y, Lee L-L

PURPOSE: To investigate predictors of exercise maintenance among oriental older people living in rural area.

METHOD: A retrospective study design was used to survey a group of older people living in a rural community in Taiwan. Data were collected through fact-to-face interviewing with the use of a structured questionnaire.

RESULT(S): A total of 108 participants was recruited. There were 76% of participants self-reporting to involve in regular physical activity and 69% of participants meet our requirement of being in a maintenance stage. Three factors were included in a logistic model to explain maintenance of mild physical activity and explained 53% variance of the dependent variable. Exercise self-efficacy was an only predictor of older people’s moderate physical activity and explains a total variance of 24%.

CONCLUSION(S): Design of physical activity intervention aiming at enhancing maintenance of physical activity among older people needs to take factors of exercise self-efficacy, exercise outcome expectation and number of chronic disease into consideration. Improving exercise self-efficacy may be particularly crucial in increasing maintenance of moderate physical activity in older people.
P250 \textbf{Relationships among self-talk, self-efficacy, exercise, and the 6-minute walk test in pulmonary rehabilitation patients}
Selzler A-M, Rodgers WM, Berry TR, Stickland MK

\textbf{PURPOSE:} To determine the relationship among self-talk, self-efficacy, exercise, and the 6-minute walk test in pulmonary rehabilitation (PR) patients.

\textbf{METHOD:} In this cross-sectional study, 41 male and 37 female PR patients (M age 71 and 68 years, respectively) completed assessments at the beginning of PR: self-efficacy self-talk frequency and motivational interpretation, multidimensional self-efficacy, the Leisure Time Exercise Questionnaire (LTEQ) and the 6-minute walk test. Pearson correlations and one-way ANOVAs with sex as the between-subject factor were computed.

\textbf{RESULT(S):} In females, high self-efficacy self-talk (i.e. “I can”) frequency and motivational interpretation were significantly related to scheduling self-efficacy (\(r's = .30\) and \(.34\), respectively). In males, low self-efficacy self-talk (i.e., “I can’t”) motivational interpretation was significantly related to task, coping, and scheduling self-efficacy (\(r's = .32, .29\), and \(.32\), respectively). Task and scheduling self-efficacy were significantly related to the 6-minute walk test in males (\(r's = .41\) and \(.49\), respectively). Non-significant relationships between self-efficacy sub-types and the LTEQ were found in both sexes. Compared to males, females had higher task self-efficacy (M = 85 and 76, respectively, \(p = .05\)) and walked further on the 6-minute walk test (M = 438 and 346 metres, respectively, \(p = .000\)).

\textbf{CONCLUSION(S):} Male PR patients may engage in self-handicapping to avoid threats to self-esteem if unable to perform exercise tasks. Given the correspondence between self-talk, self-efficacy, and behaviour, self-talk may be a useful intervention technique to increase exercise in PR patients. Consideration of patient characteristics will be important to effectively change self-talk, self-efficacy, and behaviour.

P251 \textbf{Cross-sectional and longitudinal associations between physical activity motivation and physical activity behavior in women}
Santos I, Ball K, Teixeira PJ, Crawford DA

\textbf{PURPOSE:} To analyze, on the basis of self-determination theory, cross-sectional and longitudinal associations between qualitative features of physical activity motivation and physical activity in women living in socioeconomic disadvantage.

\textbf{METHOD:} The present study used data collected in 2007-08 (baseline) and 2011 (three-year follow-up) as part of the Resilience for Eating and Activity Despite Inequality study. A total sample of 1664 women aged 18-45 years was analyzed. In mail-based surveys, women reported sociodemographic characteristics, neighborhood environmental characteristics (hypothesized to influence obesity risk), motivation (intrinsic motivation and identified regulation) and goals (health/fitness, appearance/weight and relaxation/stress relief) related to physical activity behavior, weight control intentions and leisure-time physical activity. Linear regression models were used to assess the association between motivational
variables and leisure-time physical activity, and moderator effects of weight control intentions were examined.

RESULT(S): Intrinsic motivation and, to a lower extent, health/fitness, appearance/weight and relaxation/stress relief reasons to be active were consistently associated with leisure-time physical activity at baseline and follow-up. Moderated regression analyses revealed that appearance/weight goals were significantly associated with leisure-time physical activity at baseline ($\beta=0.097; p=0.011$) and intrinsic motivation was significantly associated with leisure-time physical activity at follow-up ($\beta=0.165; p<0.001$) for women actively trying to control their weight.

CONCLUSION(S): Results suggest that, especially in women trying to lose or maintain weight, reasons related to appearance/weight and intrinsic motivation (including affective and experiential elements), predict physical activity behavior, controlling for several key environmental factors. Findings are also consistent with an important role of intrinsic motivation in sustaining physical activity participation over time.
P252  Parental perception of preschool children’s weight
Torres S, Vale S, Madureira S, Mota J

PURPOSE: Parental perception of children’s weight is a topic widely studied. Even so, we find some divergent results about the influence of children’s age and sex, probably as a result of cultural differences. To clarify this question we propose to analyse the maternal ability to discriminate the weight status of children through two different methods.

METHOD: Mothers of children aged 2 to 8 years were surveyed concerning their child’s appearance. They selected the gender-specific sketch (visual scale) and the categorical classification (verbal scale), from 7 choices, that most closely matched the body image of their child. Children were grouped by body mass index using the references established by IOTF.

RESULT(S): Both scales revealed that mothers do not recognize overweight and obesity among their children, however, the percentage of weight underestimation was higher through visual scale (59.2% vs. 39.7%). The tendency to underestimate increased from 4 years of age, and with greater emphasis in boys, but only according to verbal scale.

CONCLUSION(S): The use of these different methods suggests that, in Portuguese culture, the visual image of obesity does not correspond with the concept per se. The visual impact of obesity produces a more pronounced denial. In addition, the expressions “overweight” and “obesity” are differently interpreted according to children’s sex and age, revealing a substantial influence of cultural factors. We conclude that the concept of childhood obesity and its visual image, both in different sex and age, should be worked together in order to increase mother’s awareness of children’s weight.

P253  Capability for reporting height and weight: a cross-sectional study of 11-15 year olds
Rasmussen M, Holstein BE, Melkevik O, Damsgaard MT

PURPOSE: This study proposes a new approach for understanding the validity of self-reported weight and height among adolescents. The objectives were 1) to estimate the prevalence of students with high/low response capability for self-reported weight and height in a self-administrated questionnaire survey and 2) to estimate the association between response capability and erroneous estimation of self-reported weight and height when comparing with direct measures of weight and height.

METHOD: Data was collected by a school-based cross-sectional questionnaire survey among students aged 11-15 years in 13 schools in Aarhus, Denmark. The response rate was 89%, n=2100. Response capability was based on students’ reports of perceived ability for recalling weight/height and weighing/height measuring history. Direct measuring of height and
weight was carried out by school nurses.

RESULT(S): One third of the students had low response capability for weight and height, respectively, and every second student had low response capability for BMI. Low response capability was related to underestimation of weight, BMI (z-score) and overweight prevalence among girls, and these findings seemed to be especially related to systematic underestimation of weight among girls who were not weighed recently (-2.70 kg, SD=4.11) and among girls with low recall ability for weight (-3.06 kg, SD=4.45).

CONCLUSION(S): By integrating items on response capability in surveys without direct measures available girls with low response capabilities can be identified whereby analyses and conclusions can be adjusted and evaluated accordingly. We propose repetition of this study in other and less selected study populations.

P254 Challenges of anthropometric data collection in schools using standardized protocols across 12 countries
Harrington DM, Katzmarzyk PT

PURPOSE: To document the challenges faced, and solutions used, when collecting school-based anthropometric data in a multi-center international study.

METHOD: The International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE) is currently collecting data from 6000 children in 12 countries from five major regions of the world. Site coordinators completed an online questionnaire that queried the issues, problems and solutions to collecting height and weight in ISCOLE schools. Specifically, questions queried IRB application process, parent and participant reactions, and solutions being used to overcome barriers.

RESULT(S): Of 12 sites, the IRB from 5 sites had concerns surrounding anthropometric measurements and 5 sites reported using sex-specific or female technicians only. Sites reported no resistance from parents, teachers or school administrators. While some children (based on their body mass index and sex) resisted weight measurement, only one site reported an impact on recruitment/data collection. The key theme was concern for children’s privacy and comfort. Strategies that are being used in ISCOLE sites to ensure children feel comfortable include explaining the procedures fully to the child, creating privacy (screens, separate anthropometric measurement and changing areas), reiterating confidentiality, not showing the child their weight and wiping the scale after each use. For height, oversized hairstyles are the most common barrier to measurement.

CONCLUSION(S): Resistance from child participants can hinder the collection of valid anthropometric data. However, the strategies being used in ISCOLE sites are culturally specific to optimize participation rates and ensure privacy and comfort. Such strategies should be considered when collecting similar data.
P255  Weight-related terminology: what do pre-health professionals think?
Greenleaf C, Paly N

PURPOSE: To explore undergraduate students’ beliefs about the appropriateness of and the motivating, stigmatizing, and blaming nature of varying weight-related terminology.

METHOD: 162 undergraduate students in health-related majors read a scenario in which they imagined themselves as professionals in a fitness setting working with overweight and obese individuals. Participants considered the extent to which they believed that 10 weight-related words (e.g., morbidly obese, chubby, high BMI) would be appropriate, motivating for weight loss, motivating for physical activity, stigmatizing, and blaming (Puhl et al., 2012). Words were rated on a 5-point Likert scale.

RESULT(S): The terms “weight” (M = 4.31) and “high BMI” (M = 4.27) were rated as most appropriate. “Unhealthy weight” (M weight loss = 4.14; M physical activity = 4.07) and “overweight” (M weight loss = 3.90; M physical activity = 3.88) were considered most motivating for weight loss and physical activity. The most stigmatizing and blame terms were “fat” (M stigmatizing = 4.11; M blaming = 4.18) and “morbidly obese” (M stigmatizing = 4.08; M blaming = 4.25).

CONCLUSION(S): The results of this study provide preliminary indications that pre-health professionals perceive varied meanings for weight-related words and recognize associated connotations. A post-hoc comparison with data from obese participants in Puhl et al.’s (2012) study indicated some differences in magnitude of the ratings, but similarities in relative rankings of terms. Future research is needed to confirm these results and to determine the effect of using varying weight-related terms with health and fitness clients.

P256  Growing social inequality in BMI and overweight in Danish boys: 2000 to 2008
Matthiessen J, Stockmarr A, Biltoft-Jensen A, Fagt S, Zhang H, Groth MV

PURPOSE: Purpose: To examine the hypotheses of an overall levelling off in the development of childhood overweight during the time period 2000-2008 and increasing social inequality in development of overweight. Nationally representative data on Danish children since the year 2000 have not previously been published.

METHOD: Methods: The study population comprised a random sample of 4-14 year old children who participated in the Danish National Survey of Diet and Physical Activity 2000-2008. Parental education was chosen as an indicator of children’s socioeconomic status (SES). BMI was calculated from parent-reported weight and height of 1848 children. Participants were classified as overweight and obese according to the international age and gender specific BMI cut-off values for children.
RESULT(S): Results: Overall, BMI decreased during the survey period (p=0.01) for girls. For boys, a polarization in BMI across SES groups was observed between 2000 and 2008 with a less favourable development in boys of parents with short education. For girls the crude prevalence of overweight (including obesity) did not change (17.6 vs. 15.9%) while a significant increase was found in boys (12.8 vs. 21.7%). The prevalence of overweight rose significantly in boys of parents with short education only.

CONCLUSION(S): Conclusion: The present study showed an increase in the prevalence of overweight in Danish boys, but not in girls. This increase was a result of growing social inequality in BMI and overweight among boys. Public health initiatives aimed at preventing and reducing childhood overweight and obesity should consider gender difference and especially target boys with parents of lower SES.

P257 Weight status in 12- to 14 year old Dutch adolescents: differences between a 2003 and 2011 cohort
van Nassau FF, Singh AS, van Mechelen WW, Brug J, Chin A Paw MJM

PURPOSE: The aim of this study was to compare anthropometric measurements of 12-14-year old Dutch pre-vocational educated adolescents measured in 2003 with anthropometrics of same aged and educated adolescents measured in 2011.

METHOD: Following the same measurement protocols, body height, body weight, skinfold thickness (i.e. m.triceps, m.biceps, m.suprailiacalis, m.subscapularis), waist and hip circumference were measured in 2025 Dutch adolescents in 2011. Their scores were compared with data of 957 same aged adolescents measured in 2003. Multivariate multilevel linear regression analyses (levels student, class & school), adjusted for age and ethnicity, were used to examine differences in anthropometric measurements between the two cohorts.

RESULT(S): Dutch 12-14 year olds in 2011 were significant taller (2.1 cm for boys and 2.2 cm for girls) and heavier (3.3 kg for boys and 2.9 kg for girls) than their peers in 2003. In 2011, both boys and girls showed significantly higher BMI scores (0.8 for boys and 0.6 for girls) as well as significantly higher waist and hip circumference scores (5.0/3.1 cm for boys and 4.1/3.2 cm for girls). The prevalence of overweight/obesity in 2011 was significantly higher (+4.5%/+2.9%) in boys compared to the 2003 cohort, but not in girls. No significant difference in sum of skinfold thickness in boys was found and results for girls were not consistent with the other anthropometric results.

CONCLUSION(S): Body composition measurements of Dutch adolescents were less favourable in 2011 compared to 2003. We will discuss about the differences found in this study.
P258  Tracking of body size from birth to 7 years of age in the Norwegian Mother and Child Cohort Study (MoBa) – Preliminary results
Kristiansen AL, Andersen LF

PURPOSE: Overweight and obesity in childhood are important public health concerns because of increased short- and long-term health risks. The objective of the present study was to examine tracking of body size from birth to 7 years of age among children participating in the ongoing Norwegian Mother and Child Cohort study (MoBa).

METHOD: The prevalence of overweight was calculated based on the age and sex specific BMI cut-off points determined by the International Obesity Task Force (IOTF). Moreover, tracking of body size was assessed by the children’s relative position in rank from birth to 7 years of age, while Cohen’s Weighted Kappa was used to measure the tracking coefficients.

RESULT(S): In total, 3768 participants had complete information on weight and length at birth, at 1 year of age, at 3 years of age and at 7 years of age. About 51% of the participating sample was boys. The prevalence of overweight among boys at 3 and 7 years of age were 11.9% and 11.1%, respectively. The corresponding numbers for girls were 13.2% and 16.8%. Moreover, the results pointed to fair (0.36) to moderate (0.43) tracking of body size from birth to 7 years of age among girls and boys, respectively.

CONCLUSION(S): The results indicated that boys and girls maintained their relative position in rank of body size over time, when grouped by ponderal index at birth.

P259  Association between waist circumference, body mass index and body dissatisfaction among the female students of the University of Coimbra
Antunes A, Santana AM, Melo Rodrigues PR, Ferreira C, Padez C

PURPOSE: The aim of this study is to analyze the relationship between body dissatisfaction, waist circumference and body mass index (BMI) in female university students of Coimbra.

METHOD: A cross-sectional study was done in 252 female university students of Coimbra. Weight, height and waist circumference were measured following standard procedures. BMI (kg/m2) and WC were classified according WHO cut-offs. Figure Rating Scale was applied to assess body dissatisfaction, considering the discrepancy between the silhouette chosen as representative of the own body and the one desired, taken as measure of body dissatisfaction. Chi-square test and linear regression models were used to analyze if body dissatisfaction (desire to have a smaller silhouette) is associated with BMI (considering whether or not overweight) and waist circumference.

RESULT(S): It was found a positive association between body dissatisfaction (desire to have a smaller silhouette) and waist circumference and BMI. High waist circumference (>0.8 cm)
prevalence was greater among the dissatisfied participants, compared to the satisfied ones (9.4% vs. 0.7%; p<0.01). The same pattern was found concerning BMI, with greater prevalence of overweight and obesity among the dissatisfied participants (27.4% vs. 1.5%; p<0.01). Also, participants dissatisfied with their bodies have greater waist circumference (\( \beta = 5.71; IC=4.19-7.23; p<0.01 \)) and greater BMI (\( \beta = 3.30; IC=2.65-3.95; p<0.01 \)) compared to the satisfied participants.

CONCLUSION(S): Considering the enormous effect of body image on woman’s eating habits, influencing the type and food intake, it’s plausible to consider body dissatisfaction as an important factor on public health nutrition in the feminine population.

**P260 Trends in relative weight over one year in US urban youth**  
Lawman HG, Mallya G, Vander Veur S, McCoy T, Sanders T, Wylie-Rosett J, Foster GD

PURPOSE: While national data describe the prevalence of childhood obesity cross-sectionally, few large-scale longitudinal datasets exist, particularly in low-income and minority youth. Longitudinal data allow for the examination of incidence and remission to further aid in understanding changes in the prevalence of childhood obesity. The purpose of the current study was to describe recent data on one-year changes in measures of relative weight in a large sample of diverse, low-income youth.

METHOD: Youth were sampled from 55 schools in high-risk areas that were identified based on health, crime, and income data from a large urban city. Measured height and weight were collected in n=18,046 first through sixth graders at baseline and 18,829 first through seventh graders at follow-up (approximately 65% African American and 52% male). Within those samples, longitudinal data were available for n=13,645 youth.

RESULT(S): Approximately 23.0% of youth at baseline and 23.2% of youth at follow-up had a body mass index at or above the 95th percentile. Longitudinal data showed that 86.2% of youth remained in the same weight category as their baseline weight category while 7.2% moved to any heavier weight category (incidence) and 6.6% moved to any improved weight category (remission). Results showed that over the course of one-year, youth were significantly more likely to be in a lower weight category compared to their weight category at baseline.

CONCLUSION(S): These data indicate that the relative weight status of youth in an urban city is showing signs of small but significant improvement over a one-year follow-up period.
P261  Changes in weight and body composition during the first semester at university: a prospective explanatory study
Deliens T, Clarys P, Van Hecke L, De Bourdeaudhuij I, Deforche B

PURPOSE: The purpose of this study was to objectively assess changes in weight, body mass index (BMI), body composition and waist circumference (WC) during the first semester at university in Belgian students, as well as to identify correlates of change in BMI and fat%.

METHOD: Weight, height, body composition and WC were measured at baseline (October/November 2011) and follow-up (February/March 2012) in 101 first year university students. Additionally, a health behaviour questionnaire was completed at follow-up. Paired samples t-tests were used to analyse anthropometric changes over time and linear regression analyses were conducted to identify correlates of changes in BMI and fat%.

RESULT(S): After 1 semester at university, students gained on average 1.0kg (range=4.1kg,+7.7kg) of body weight (p<0.001) consisting of 0.8kg of fat mass (p<0.001). In contrast, fat free mass and WC did not change. Students with an increased BMI (n=67) gained on average 2.0kg (p<0.001) of body weight, consisting of 1.4kg of fat mass (p<0.001). Regression models showed that being male (β=-0.233), higher amount of TV/DVD watching (β=0.211) and higher frequency of eating at a friends’ place (β=0.224) were contributors of BMI increase, whereas living in a student residence (β=0.269) and lower frequency of reading and studying (β=-0.289) was related with higher increases in fat%.

CONCLUSION(S): The first semester at university is a critical period for weight and fat gain in Belgian students. Future intervention studies should have special attention to male students and students living in student residences, and focus on promoting healthier food choices when eating outdoors.

P262  Food behavior and physical activity among school children in Algeria
Tebbani F, Oulamara H, Agli A

PURPOSE: Estimate the prevalence of overweight and obesity in our study population, Study the food behavior and physical activity.

METHOD: A study was conducted on a sample of 340 children (153 girls and 187 boys) aged 6 to 12 years old, enrolled in the commune of Constantine in 2011. Data included anthropometric measurements, dietary habits and physical activity. The IOTF criteria were used to assess overweight and obesity. Statistics were performed using the software StatviewTM. The significance level was set at 0.05.

RESULT(S): The overall prevalence of overweight is 21.76%. That of obesity is 5%. A significant association was observed between obesity and female gender (p = 0.007). Seventy-three percent (73%) of children reported snacking often between meals. Foods the most frequently nibbled are sweets for 85% of children, cookies (83.53%), peanuts (51.76%),

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pizza (50.29%), chips (48.53%) and cakes (35.88%). Sugary drinks are taken by 15.59% of children. A percentage of 30% of children do not respect the regulation of intake. Obese children are less likely to play sport outside school hours compared to normal ones (88.23% vs 11.76%, p = 0.07). Thus, 100% of children report watching television.

CONCLUSION(S): Our study reveals the existence of behaviors associated with an increased risk of overweight and obesity, including unhealthy eating habits and sedentary. A nutritional education program is necessary to adopt a healthy lifestyle (healthy diet plus physical activity).

P263 The relationship between asthma, body mass and 20m shuttle run performance
McNarry MA, Boddy LM, Stratton G

PURPOSE: Asthma is frequently associated with a greater body mass and a limited exercise tolerance in children. The purpose of the present study was to investigate whether this limited exercise capacity is attributable to asthma per se or whether it is a reflection of the higher body mass concomitantly reported.

METHOD: 18,033 healthy (HC; 9322 boys) and 2,157 asthmatic children (AC; 937 boys) were recruited over a seven year period, yielding a 12% prevalence rate in accord with the national averages. Participants underwent an anthropometric assessment (standing and sitting height, weight and skinfold thickness) before completing a 20m shuttle-run test until volitional exhaustion. Total shuttles completed were recorded. The influence of, and interactions between, asthma, body size and exercise performance were assessed by a Factorial ANCOVA.

RESULT(S): Asthma and BMI exerted significant, independent influences on shuttle run performance. Specifically, total shuttles completed were significantly lower in those children with asthma (HC: 34±18 vs. AC: 31±17 laps; P<0.05) and in heavier participants (P <0.05). There was no interaction between these factors.

CONCLUSION(S): These results demonstrate that the reduced exercise tolerance typically observed in children with asthma is attributable to both the condition per se and the concomitant influence of body weight. These findings may be related through insufficient physical activity.
Fitness and BMI in 5-6 year old children; a study on a sub sample of children from the West Midlands Active Lifestyles and Healthy Eating in School Children (WAVES) study, UK
Griffin TL, Balanos G, Lancashire E, Knowles G, Adab P

PURPOSE: Children’s fitness levels have declined in recent decades, whilst obesity has increased. It has been proposed that fitness is an important factor in obesity development. Despite early school years being a critical period for developing obesity, little is known about fitness levels at this age. The aim of this study was to assess the practicality of fitness testing with children aged 5-6yrs, investigate whether gender differences exist, and identify the relationship between fitness and BMI.

METHOD: Children (n=314, 50% boys) completed fitness tests (6-minute run/walk, standing jump, 1kg medicine ball throw and grip strength) during a school P.E. lesson. Where possible height and weight measures were collected.

RESULT(S): The sessions were feasible and practical. In children who completed both the walk/run test and height and weight measures (n=163), BMI was negatively correlated with distance travelled in 6 minutes, (rs= -0.26, p<0.01). Overweight/obese children (n=29) on average travelled 99.6m less than other children (n=134). On average, compared to girls, boys travelled 65.4m further in 6 minutes (p<0.01), jumped 8cm further (p<0.01), threw a medicine ball 23.3cm further (p<0.01) and had a grip strength 0.6kg greater (p=0.02).

CONCLUSION(S): It is possible to undertake fitness testing in schools with children aged 5-6yrs. Further investigation into gender difference in fitness may help to identify whether early intervention could help to avert the decline in physical activity and fitness into adolescence, especially in girls. Overweight/obese children demonstrated poorer cardio-respiratory fitness, which has been associated with increased health risk; intervention may help to improve fitness, weight and health status.

Validity of instruction leaflets for parents to measure their child’s weight and height at home
Huybrechts I, De Vriendt T, Slimani N, De Coene A, De Bacquer D, De Henauw S, Himes JH

PURPOSE: Previous research raised concerns about the validity of parental weight and height reports. Therefore, the authors developed instruction leaflets to instruct parents how to measure their child’s weight and height at home. The aim was to compare the validity of parent-reported height, weight and BMI values of children (4-10 y-old), when measured at home by means of instruction leaflets in comparison with simple estimated parental reports.

METHOD: Subjects were 164 Belgian children (53% male). Parents completed a questionnaire including questions about the height and weight of their child. Parents included in the intervention group received instruction leaflets to measure their child’s
weight and height at home. Classes were randomly allocated to the intervention and control groups. Nurses measured height and weight following standardised procedures. International age- and sex-specific BMI cut-offs were employed to determine BMI-categories.

RESULT(S): On the group level, small differences in accuracy of reported weight and BMI were identified between parent-reported values, with higher mean differences for the intervention compared to the control group. However, for all 3 parameters, the correlations between parental reports and nurse measurements were higher in the intervention group. Sensitivity for underweight and overweight/obesity were respectively 75% and 60% in the intervention group, and 67% and 43% in the control group. Weighed kappa for classifying children in BMI-categories was 0.30 in the control group while 0.51 in the intervention group.

CONCLUSION(S): Diagnostic measures were more accurate when parents measured their child’s weight and height at home using the instruction leaflets than parental reports without instructions.
P266 A comparison of objectively measured and self-reported physical activity and sedentary time among South Asian women in the United Kingdom
Babakus WS, Thompson JL

PURPOSE: To describe physical activity (PA) and sedentary time (ST) in two generations of South Asian women in the United Kingdom (UK), and investigate the feasibility of the International Physical Activity Questionnaire (IPAQ-SF) in a sub-sample with low English literacy.

METHOD: Height, weight, waist circumference (WC), %body fat (%BF) were measured and BMI calculated in 73 first generation (FG) and 29 second generation (SG) women. Participants wore an accelerometer for 7 days; 38 completed the IPAQ-SF. PA and ST were derived from a minimum wear time of 3 days and 600 minutes/day, with PA categorized into light, moderate, and vigorous intensity. IPAQ-SF data were compared to accelerometry using Metabolic Equivalent Task minutes/week (MET min/week) and minutes at each PA intensity.

RESULT(S): Mean age(yr)=47.4(+/-13.1) and 32.4(+/-6.0), BMI(kg/m2)=29.1(+/-5.2) and 27.9(+/-4.5), WC(cm)=96.1(+/-12.0) and 89.0(+/-10.4), and %BF=53.4%(+/-3.9%) and 54.9%(+/-3.7%) for FG and SG, respectively. Mean minutes of ST, moderate and vigorous PA were 542.3(+/-70.2) and 498.9(+/-99.9), 30.4(+/-16.3) and 34.0(+/-11.0), and 0.9(+/-1.7) and 1.0(+/-2.6) for FG and SG, respectively. Mann-Whitney tests for mean difference comparisons between FG and SG indicated no difference in ST (p=.246), moderate (p=.344) or vigorous PA (p=.340). Spearman’s correlation indicated no relationship between IPAQ-SF and accelerometer-derived METmin/week for ST (rs=-.013, n=38, p=.966), moderate (rs=-.069, n=38, p=.823), or vigorous (rs=-.074, n=38, p=.810) PA.

CONCLUSION(S): Results indicate high ST in two generations of South Asian women, confirming a critical need for intervention. Findings suggest the IPAQ-SF may be inappropriate for use with participants having low English literacy and limited cultural contextualization of minimizing sedentary behaviours.

P267 Measuring activity energy expenditure: Accuracy of the GT3X+ and Actiheart monitors
McMinn D, Acharya R, Rowe DA, Gray SR, Allan JL

PURPOSE: To determine the accuracy of the GT3X+ and Actiheart monitors for estimating energy expenditure (EE) and steps. Additionally, to investigate agreement between waist- and wrist-mounted GT3X+ EE outputs.

METHOD: 19 participants (mean age=30) completed three treadmill walking trials at self-
selected slow, medium, and fast speeds while wearing two GT3X+ (waist and wrist) and an Actiheart. Activity monitor EE was compared to indirect calorimetry criterion EE using correlations and ANOVAs. A Bland-Altman plot was used to investigate agreement between GT3X+ waist- and wrist-determined EE. GT3X+ determined steps were compared to researcher-counted steps using ANOVAs.

RESULT(S): EE estimates from all monitors correlated highly with the criterion (r ranged from .72 to .82). However, the GT3X+ (waist and wrist) underestimated EE during slow walking and overestimated EE during fast walking. There were no differences among GT3X+ estimates of EE and the criterion during the medium trial. Actiheart-determined EE was not significantly different from measured EE during all trials. The Bland-Altman plot indicated that at EE rates above 4 kcal•min\(^{-1}\), the GT3X+ worn on the wrist underestimated EE compared to when it was worn on the waist. There were no differences between GT3X+ waist-determined steps and researcher-counted steps for all trials.

CONCLUSION(S): GT3X+ EE correlates highly with measured EE, but has poor absolute agreement during slow and fast walking. GT3X+ step estimates are accurate across the continuum of walking speeds when waist (but not wrist) mounted. Wrist-mounted device outputs are not comparable to waist-mounted outputs. The Actiheart is an accurate measure of EE.

**P268 The comparison of two different accelerometers for monitoring free-living physical activity**

Kroff J, Odendaal WT, Lambert EV

PURPOSE: Accelerometers are devices that quantify free-living physical activity (PA) for prolonged periods of time, but little is known about how different brands of accelerometers respond to each other during a free-living trial and during different levels of PA intensity. The aims of the study is to determine whether two different accelerometer brands are comparable in measuring free-living PA, and to determine what factors influence the accurate estimation of PA intensity.

METHOD: 29 Subjects wore two different accelerometers, the ActiGraph™ GT3X (Pensacola, FL) (GT) and the Actical™ Mini-Mitter (Philips Respironics, USA) (CAL) for 7 days, and during an exercise test at self-paced light, moderate and high intensity, respectively. The agreement between the brands was measured by Bland-Altman plots, coefficients of variation (CV), intraclass correlation coefficients (ICC) and linear regressions. Factors that might have influenced the accurate prediction of PA intensities were measured by chi-square analyses.

RESULT(S): GT detected a significantly greater amount of daily PA (195±129.8 vs 165±170.3 counts.min\(^{-1}\).day\(^{-1}\), P<0.0001) compared to CAL. The average difference between the accelerometers expressed as a CV, was 28.1%. ICC’s revealed better agreement between brands during lighter intensities than vigorous intensity PA. Chi-square analysis showed that age group explained the variation in the accurate prediction of light intensity PA (P<0.05).
CONCLUSION(S): Free-living PA measured by these two brands of accelerometers is not directly comparable. Participants tend to underestimate light and moderate PA intensities; thus caution must be taken when subjective measures are used in association studies of PA and health outcomes.

P269 Inside or outside? Examining the use of GPS data to differentiate physical activity location
Pearce M, Turner T, Allison P, Saunders D

PURPOSE: Global Positioning Systems (GPS) provide valuable insight about the location of physical activity. It is of particular interest to use GPS to determine whether physical activity recorded by accelerometer is located inside or outside. The signal to noise ratio (SNR) and ratio of available satellites used (ASU) are greater when outside. This study used direct observation to establish a cut point for determining inside/outside location using these GPS data.

METHOD: A free living convenience sample of eight adults in Edinburgh, UK, wore a Qstarz BT-Q1000eX GPS receiver recording position at 0.2Hz for approximately five hours. Location was coded inside/outside by an independent observer. Inside/outside location was predicted using each of the two test ratios. Receiver operator characteristic (ROC) curves were plotted to assess the discriminating ability of both test ratios. Youden’s J statistic was used to establish cut points.

RESULT(S): Eight participants recorded 31125 (24.1% outside) epochs of GPS data. Area under the ROC curves indicated both test ratios had statistically significant discriminating ability, however area under the ROC curve was greater for the SNR than the ASU (0.982 vs. 0.851; P<0.0001). Peak Youden’s J statistic for the SNR was 93.0% compared to 55.2% for the ASU. The cut point with the highest Youden’s J statistic was SNR of 212.

CONCLUSION(S): The SNR and cut point of 212 are suggested for differentiating inside/outside location using this GPS receiver. This cut point represents a compromise between predicting both inside and outside time. Future work should examine these methods in different populations and settings.

P270 Comparison of the EPIC Physical Activity Questionnaire with combined heart rate and movement sensing in a nationally representative sample of older British adults

PURPOSE: To examine the validity of the EPIC Physical Activity Questionnaire (EPAQ2) in 1688 participants (51% women) aged 60-64y from the MRC National Survey of Health and
Development in Great Britain.

METHOD: Criterion measures of PA [PA energy expenditure (PAEE), sedentary behaviour, light and moderate-to-vigorous PA (MVPA)] were obtained from a combined heart rate and movement sensor to compare against similar measures derived from the EPAQ2. Participants completed the EPAQ2, which assesses PA in 4 domains (leisure time, occupation, transportation and domestic life) during the last year and wore the combined sensor for 5 consecutive days.

RESULT(S): Negative significant inter-method different or bias (underestimation) was observed for sedentary time and light PA, and positive significant bias (overestimation) for MVPA and PAEE. Bias was smaller for women than men in all PA components but sedentary time [PAEE: 27.7 (95% limits of agreement: -39.2 to 94.6) vs. 30.5 (-61.5 to 122.6) kJ/kg/day; light PA: -61.1 (-365.5 to 243.3) vs. -171.7 (-454.1 to 110.7) min/day; MVPA: 55.4 (-117.2 to 228.0) vs. 91.1 (-159.5 to 341.8) min/day; and sedentary time (-6.0 (-10.9 to -1.0) vs. -4.6 (-10.6 to 1.3) h/day; in women vs. men, respectively]. Moreover, there were positive correlations between all self-reported and objectively assessed PA subcomponents (rho = 0.12 to 0.36). The strongest correlations were observed for MVPA (rho=0.36 women; rho=0.30 men) and PAEE (rho=0.25 women; rho=0.26 men).

CONCLUSION(S): Ranking capabilities of derived measures from EPAQ2 are similar to other PA instruments, suggesting that EPAQ2 performs well at assessing PA in older British adults.

P271 Who is most likely to consent to follow-up in a longitudinal cohort study of active travel in Irish adults?
Lambe B, Murphy NM, Bauman A, Lane A

PURPOSE: The purpose of this study was to determine whether there was any difference between adult participants of a baseline survey that consented or refused consent to be followed-up 2 years later.

METHOD: An adapted version of the Global Physical Activity Questionnaire was used to assess domain-specific physical activity (PA) levels of 1710 adult parents of school-going children in South-East Ireland. 954 participants consented to follow-up after the implementation of a community-wide active travel campaign 2 years later. Differences between groups were assessed using the independent t-test and the chi square test of independence.

RESULT(S): Those that declined to be followed-up (n=756) were more likely to be male (p<0.05), have no 3rd level education (p<0.001), and engage in more total PA (p<0.01), total work activity (p<0.01), moderate work activity (p<0.05) and travel related activity (p<0.01). Despite this, only 67% of those that declined consent were sufficiently active compared with 73% of those that gave consent (p<0.05). This may be explained by differences in recreational PA where 32% of those that declined consent do no recreational PA compared
with 19% of those that consented (p<0.01). When asked about the active travel campaign, those that consented were more likely to have heard of it and have positive attitudes towards it.

CONCLUSION(S): There were significant differences between those that gave or declined consent to be followed-up. The active travel campaign had less relevance for those that declined because they were already engaging in active travel and were physically active.

P272  A pilot study with multisensors for assessment of active transport in a French urban context (ACTI-Cités project)

PURPOSE: To better understand environmental influences on physical activity, one research challenge is to measure active mobility (walking, cycling) in defined urban contexts. We performed a pilot study designed to test the use of multi-sensors combining GPS and accelerometers.

METHOD: Residents (n=28, from 2 French cities, Paris and Strasbourg) wore a GPS unit (Qstarz BT Q1000eX™) and a tri-axial accelerometer (Actigraph GT3X+™), while completing a web activity diary during 7 consecutive days. Data were processed using PALMS software (UCSD, San Diego School of Medicine and Calit2) and integrated into a GIS.

RESULT(S): On average, 115,000 data points were extracted for each subject corresponding to 30 trips over 7 days of measurement. Active mobility (walking and cycling) represented 25% of total recorded physical activity. About two thirds of the differences between reported data (web diary) and objective data for start and end times of trips were less than 5 minutes for both cities. Filling the web diary was reported as cumbersome by most subjects compared to wearing the sensors. A GIS was developed including land use, green space and various transport infrastructures in order to identify the location for each type of active transport.

CONCLUSION(S): The results demonstrate the feasibility of using such combined methods in the field. This should enable to collect such data in large-scale studies on-going in France.

P273  Can lifetime leisure physical activity recall predict current activity levels in healthy older adults?
Miller NE, Swartz AM, Cashin SE, Dondzila CJ, Strath SJ

PURPOSE: To determine if historical leisure activity predicts current levels of objectively determined physical activity (PA) in older adults.

METHOD: 142 healthy individuals (67.8 ± 9.0 yrs, 27.1 ± 5.6 kg/m2, 110 females) completed
the Historical Leisure Activity Questionnaire (HLAQ) recalling the type and amount of PA they performed during four distinct time periods (T1, 12-18 yrs; T2, 19-34 yrs; T3, 35-49 yrs; T4, 50+ yrs). Current PA level was measured via accelerometer (ACC) (Actigraph GT3X, Pensacola, Florida), worn for seven consecutive days during all waking hours. Data were analyzed using descriptive statistics and hierarchical regression analyses to determine contributions of descriptive and HLAQ T1-T4 to predict current moderate-vigorous PA (MVPA). MVPA was determined by averaging the ACC total daily accumulated minutes ≥ 760 counts/min.

RESULT(S): From the HLAQ, participants reported 43.1 ± 90.6 (T1), 27.0 ± 44.0 (T2), 35.1 ± 40.8 (T3), and 38.5 ± 46.6 (T4) MET hrs/week of PA. Participants objectively accumulated 94 ± 43 mins/week of MVPA. The strongest hierarchical regression model of the four indicated 31% of the variance [F (4, 136) =15.285, p<0.001] was explained by age, gender, education level, and T2 HLAQ. Further, unique contributions of HLAQ significantly contributed to 3.6% (p=0.009) for T1, 4.2% (p=0.005) for T2, and 2.4% (p=0.033) for T4 of the overall 29-31% of the variance explained.

CONCLUSION(S): In general, results indicate that recall of past participation in leisure activity by the HLAQ is not a strong predictor of current objectively determined PA in this sample of older adults.

P274 Cross-cultural validation of the “Short questionnaire to assess health enhancing physical activity” (SQUASH)
Nicolaou M, Stronks K, Engelbert RHH, Terwee C, Wendel-Vos W, Gademan MGJ

PURPOSE: Physical inactivity is one of the biggest public health problems of the 21st century. In the Netherlands only 61% of the population meets the physical activity recommendations. In ethnic minorities this percentage is much lower, e.g. only 18% among Turkish residents. In the Netherlands, the SQUASH (short questionnaire to assess health enhancing physical activity) is commonly used. The SQUASH has been validated among the ethnic Dutch population but it is not known whether it performs equally well among ethnic minorities. Aim: To cross-culturally validate the SQUASH among four main ethnic minority groups in the Netherlands.

METHOD: Methods: Validation study including 100 persons (50 males and 50 females) per ethnic group: Dutch, Turkish, Moroccan, Surinamese Hindustani and Surinamese Creole origin. All participants will complete the SQUASH, which has been expanded with questions on sedentary activities. Participants will wear a combined accelerometer and heart rate monitor (Actiheart) for 5 days. The Actiheart will be individually calibrated based on a short aerobic step-test. To obtain insight into the difficulties encountered when filling in the questionnaire, we will carry out cognitive interviews in up to 15 persons per group. The SQUASH will be revised on the basis of these interviews and the actiheart data.

RESULT(S): N/A
CONCLUSION(S): The SQUASH questionnaire has proven its utility for research on physical activity in the ethnic Dutch population. This study will validate this widely used tool for the assessment of self-reported physical activity among ethnic minority groups and thus contribute to our understanding of ethnic differences in physical activity and health.

P275 The influence of physical activity on the discrepancy between self-reported and objectively measured walking times
Dewulf B, Neutens T, Van Dyck DD, De Bourdeaudhuij I, Van de Weghe N

PURPOSE: Doing regular physical activity has positive effects on health. Several environmental factors are identified as important correlates of physical activity. However, there seems to be a difference between perceived and objective measures of the environment. This study examines the influence of physical activity, neighbourhood walkability, and socio-demographic characteristics on the correspondence between self-reported and objectively measured walking time to urban destinations of adults in the city of Ghent (Belgium).

METHOD: Previously collected survey data was used from 1164 respondents in the city of Ghent who reported walking times to various closest destinations in the neighbourhood of residence. These were compared with corresponding walking times that were objectively measured through geographical information systems. Physical activity was recorded over a 7-day period using accelerometers. Neighbourhood walkability was assessed on the basis of residential density, connectivity, and land-use mix.

RESULT(S): We observed a relatively poor agreement between objective and perceived walking times. Stronger agreements were noted amongst the most physically active group, while low-level walkers tended to overestimate walking time. Surprisingly, however, people residing in a low-walkable neighbourhood underestimated walking times more frequently relative to those in high-walkable neighbourhoods.

CONCLUSION(S): Researchers investigating the influence of environmental attributes on physical activity behavior should thus be cautious when using only self-reported environmental data, since these are a priori influenced by physical activity levels and various socio-demographic factors.

P276 Does housework keep you healthy? The contribution of domestic physical activity to meeting current guidelines
Murphy MH, Donnelly P, Breslin G, Shibli S, Nevill AM

PURPOSE: Lifestyle approaches to physical activity include the promotion of domestic physical activities such as do-it-yourself, gardening and housework. The purpose of this paper was to report the contribution of domestic physical activity to total weekly physical
activity and the relationship between domestic physical activity and leanness.

METHOD: 4563 adults participated in a survey of physical activity behaviour. Data were collected through face-to-face computer assisted interviews. Gender and age group differences in time spent doing moderate-to-vigorous domestic physical activity (MVPA) and percentage time in domestic MVPA activity as a ratio of total MVPA were explored using Kruskal-Wallis tests. Self-reported volume and intensity of physical activity in the home and self-reported height and weight were used to determine the association between domestic physical activity and leanness using an ANCOVA (controlling for age, gender, socio-economic and smoking status).

RESULT(S): 42.7% of the population meet or exceed current United Kingdom activity guidelines. Domestic activity accounts for 35.6% of the reported MVPA. Females and older individuals reported higher levels of moderate-to-vigorous physical activity than their male and younger counterparts. Time spent in domestic physical activity at moderate-to-vigorous intensity was negatively associated with leanness (p=0.02), [R Squared = .13].

CONCLUSION(S): Domestic physical activity accounts for a significant proportion of daily MVPA, particularly among females and older adults however such activity is negatively associated with leanness suggesting that such activity may not be sufficient to enhance health.

P277 Physical activity guidelines – What’s the “point”? Rowe DA

PURPOSE: To a) summarize briefly the historical development of “time in intensity category” physical activity guidelines, and b) present an alternative method of interpreting “time in intensity category” guidelines that simplifies promotion of and feedback on appropriately intense, health-enhancing physical activity.

METHOD: Review of methods for translating current guidelines into a points system that is easily understood by the general population and is scientifically supportable. Present data demonstrating: a) real-life physical activity patterns interpreted using current “time in intensity category” methods and a new activity points system; b) why the new activity points system represents overall level of physical activity more accurately than current methods; and c) that the activity points system can be easily interpreted using ubiquitous technology, and can facilitate implementation into everyday lives.

RESULT(S): Using the common assumption that physical activity above 3 METs is moderate and above 6 METs is vigorous, simulated physical activity data from objective methods were translated using two recent sets of national guidelines, and the activity points system. Interpretation using the “moderate only” guidelines underestimated physical activity level compared to the “moderate and vigorous” guidelines, which in turn underestimated physical activity using the activity points system. Similarly, the activity points system was more sensitive to increases in physical activity levels.
CONCLUSION(S): An activity points system can be used to simplify activity messages, while simultaneously enabling a more accurate assessment of “time in intensity” of physical activity. The previous use of points systems in nutritional intervention settings (e.g., WeightWatchers) can be applied to physical activity intervention settings.

P278 How active are active video games? Energy expenditure of active gaming on the Kinect in young adult males
Simons M, Taytelbaum S, Doedens C, De Vet E

PURPOSE: Active video game play may contribute to meeting physical activity (PA) recommendations if the energy expenditure (EE) can meet the threshold for moderate-to-vigorous PA. Many studies evaluated the intensity of active gaming of the first generation active games (e.g., Nintendo Wii, Sony EyeToy), but very little research has been done on the newest active game device, namely Xbox Kinect. Therefore, the purpose of this study was to assess EE of playing active Kinect games compared to a non-active Xbox game.

METHOD: Eighteen young adult male gamers (19-25 years old) were included in the study. Oxygen consumption (VO2) was assessed using a portable gas-exchange system (Cosmed Quark k4b2). First while lying in a supine position for 30 minutes, next during non-active gaming (Fifa 11) and thereafter during active gaming (Sonic Free Riders, Kinect Adventures Reflex ridge and Dance Central), for 10 minutes each game. EE in METs was calculated by dividing VO2 during game play by VO2 during rest.

RESULT(S): Energy expenditure averaged 1.3 (± 0.2), 5.2 (± 1.2), 6.6 (±1.8), 7.9 (±1.1) METs during playing Fifa11, Dance Central, Sonic Free Riders and Kinect Adventures (Reflex ridge), respectively.

CONCLUSION(S): Mean EE of all three included Kinect games was shown to be sufficiently high to meet the threshold for moderate-to-vigorous PA (≥ 3 METs). Sonic Free Riders and Kinect Adventures (Reflex ridge) can even be considered as vigorous PA (>6 METs). When played regularly, Kinect gaming may be effective in contributing to meeting PA recommendations in adult males.
Sedentary behavior

**P279** Reducing occupational sitting time and improving worker health: the Take-a-Stand Project, 2011
Pronk NP, Katz AS, Lowry M, Payfer JR

PURPOSE: This practice-based study had 2 objectives: to study the effect a sit-stand device has on reducing sitting time at work and to assess the effect of reduced sitting time on select health-related outcomes, mood states, work performance and office behavior.

METHOD: Project implementation occurred over 7 weeks with a baseline period of 1 week (period 1), an intervention period of 4 weeks (period 2), and a postintervention period of 2 weeks (period 3). The intervention group (n = 24) received a sit-stand workstation during period 2, and the comparison group (n = 10) did not. We used experience-sampling methods to monitor sitting behavior at work during the entire study period. We estimated change scores in sitting time, health risk factors, mood states, and several office behaviors on the basis of survey responses.

RESULT(S): The Take-a-Stand Project reduced time spent sitting by 224%, reduced upper back and neck pain by 54%, and improved mood states.

CONCLUSION(S): Our findings suggest that using a sit-stand device at work can reduce sitting time and improve health, mood states and work performance.

FUND SOURCING: The study, conducted March—May 2011, was a partnership among sit-stand workstation manufacturer, Ergotron, Inc, Eagan, Minnesota; HealthPartners, a large nonprofit, health system in Bloomington, Minnesota; and employees of HealthPartners’ Health Promotion Department.

Intervention group participants received an Ergotron WorkFit Sit-Stand workstation, which raises and lowers to an appropriate height and gives employees the option to work in either a seated or standing position at any time during the work day.

**P280** Parent’s outcome expectations of children’s TV viewing, parent TV restriction, and children’s screen media use
O’Connor TM, Chen T-A, del Rio Rodriguez B, Baranowski T

PURPOSE: Parent Outcome Expectations for child TV Viewing (POETV) may account for variability in parental TV rules and ultimately children’s TV viewing. Assess the psychometrics of a new POETV instrument.

METHOD: Cross-sectional internet survey of parents of 6-12 year old children. Parents reported their POETV, TV restrictive parenting practices, and their child’s typical screen media use. Confirmatory factor analyses (CFA) assessed model fit of second order models for
negative (N-) and positive (P-) POETV. Spearman correlations assessed associations of sub-factors with parental TV restriction and children’s screen media use.

RESULT(S): 311 parents qualified to participate and completed the POETV scale. 94% were female caretakers and 58% had a boy. The final CFA model fit parameters were acceptable for both POETV scales. N-POETV had 3 sub-factors: Exposure to Inappropriate Content (a =0.82), Negative Effect Health (a =0.87), and Negative Effect on Activities and Family Dynamics (a =0.82). P-POETV had 2 sub-factors: Child-Centered (a =0.63) and Parent-Centered (a =0.84). Parent-centered P-POETV was negatively associated with parent restriction of TV (p<0.05); child centered and parent centered P-POETV were positively associated with child total screen time on weekends (p<0.05). ‘Negative Effect on Activities and Family Dynamics’ was negatively associated with child TV viewing and total screen time for weekends (p<0.01) and weekdays (p<0.05).

CONCLUSION(S): The psychometrics of N- and P-POETV scales were acceptable and the correlations with children’s screen media use provided criterion validity. N- and P-POETV should be further characterized and may be potential targets for screen media reduction and obesity interventions.

P281 Sedentary behavior and risk of future depression and cognitive decline: the English Longitudinal Study of Ageing
Hamer M, Stamatakis E

PURPOSE: It is unclear if the adverse effects of sedentary behavior on mental health are being driven by physiological processes linked to excessive sitting or the passive nature of the activity. The aim of this study was to examine the association between several types of sedentary activities (TV viewing, internet use, reading), and different aspects of mental health.

METHOD: We analyzed data from 4880 initially depression-free men and women (aged 64.7 ± 8.9 yrs at baseline) from the English Longitudinal Study of Ageing, a prospective study of community dwelling older adults. Self-reported TV viewing time, reading, and use of the internet was assessed at baseline. Two years later mental health was assessed using the 8-item Centre of Epidemiological Studies Depression (CES-D) scale, and neuropsychological tests of memory and verbal fluency to assess cognitive function.

RESULT(S): A SD increase in TV time (1.1 hrs/d) was associated with increased risk of depressive symptoms (CES-D>3) at follow-up (odds ratio =1.08, 95% CI, 1.00 – 1.17) although use of the internet was protective (0.75, 0.63 – 0.90) after adjustment for a range of covariables including physical activity. There was a linear inverse association between TV time and global cognitive function score at follow-up (β = -0.32, 95% CI, -0.39, -0.25) after adjustments, although a positive association for internet use (β = 1.01, 95% CI, 0.87, 1.15).
CONCLUSION(S): Prolonged passive sedentary activity (TV viewing) in older age is associated with increased risk of adverse mental health, although sedentary activity that is cognitively stimulating appears to be protective.

**P282**  
Associations with change in waist circumference of TV viewing time and leisure-time physical activity accumulated over 12 years  
Oka K, Shibata A, Sugiyama T, Salmon J, Dunstan D, Owen N

PURPOSE: This study examined the associations of TV viewing time and moderate-to-vigorous physical activity (MVPA), accumulated over 12 years, with change in waist circumference among adults in the Australian Diabetes, Obesity and Lifestyle (AusDiab) study.

METHOD: Men and women aged 25 to 74 years at baseline (1999-2000) attended two follow-up measurements (2004-05, 2011-12; N=3,663, 44.7% men, mean age 49.6 years). The outcome variable was the change in waist circumference from baseline to the second follow-up. The exposure variables were self-reported mean MVPA (hour/week) and TV viewing time (hour/day) calculated from 3 surveys over 12 years. Multilevel linear regression analyses examined relationships of MVPA time and TV viewing time (adjusted for each other) with waist circumference change, separately for men and women.

RESULT(S): On average, men increased waist circumference from 96.6 to 100.9 cm, and women from 83.6 to 89.8 cm over the 12 years. After adjusting for baseline socio-demographic attributes, waist circumference, and diet quality, each additional hour of MVPA per week was significantly associated with less increase in waist circumference in both men (β=-0.11, 95%CI:-0.19, -0.04) and women (β=-0.22, 95%CI:-0.30, -0.13). For women only, an additional hour of TV viewing time per day was significantly associated with a greater increase in waist circumference (β=0.36, 95%CI: 0.01, 0.72).

CONCLUSION(S): For understanding and influencing age-related increases in waist circumference (a marker of abdominal adiposity and associated cardio-metabolic health risk), there is the need to consider the accumulated volume of both MVPA and TV viewing time, especially so for women.

**P283**  
Changes of familial correlates of children’s screen-based behaviors over a two-year period in Hong Kong  
Huang WYJ, Wong SH, He G

PURPOSE: This study aimed to investigate two-year changes in the familial correlates of screen-based behaviors ([SBBs] TV viewing, electronic games playing and Internet use) and to examine whether these changes predicted the changes in SBBs for Chinese children in Hong Kong.
METHOD: Approximately 1,900 grade 1–3 schoolchildren were recruited in 2009 in a longitudinal study Understanding Children’s Activity and Nutrition (UCAN). At baseline and two-year follow up, the responding parents reported their child’s SBBs and familial correlates, i.e. parental co-participation in the three SBBs, sedentary opportunities at home, parental rules and guidance on SBBs. Repeated-measures ANOVA was used to assess changes in SBBs. Tracking of correlates were assessed using Pearson product-moment correlations between baseline and follow-up measures. Multiple regression analyses were conducted by using residualized scores of SBBs and correlates to determine the associations of changes in correlates with the changes in SBBs.

RESULT(S): Low tracking scores were found in most of the familial correlates. Significant increase was detected in parental co-participation in watching TV whilst a decrease was found in parental rules and guidance on SBBs. Change scores of all the familial correlates were predictors of changes in TV viewing for girls. However, none of the correlates change scores were associated with changes of the Internet use for boys.

CONCLUSION(S): Changes of familial correlates were predictors of screen time changes over a two-year period for Chinese children in Hong Kong. Interventions to reduce screen time should have family members involved and be introduced in early childhood.

P284  Correlates of sedentary behaviour in adults using a survey conducted in the workplace
Chen Y-L, Biddle S, Almond L

PURPOSE: To examine differences in four types of sedentary behaviours across two types of job: sedentary and physically active.

METHOD: Data were collected by survey including questions about physical activity (PA), type of job, working hours and sedentary behaviour (SB). A broad range of participants were surveyed and were grouped into three age groups: 20-29 years, 30-49 and 50+.

RESULT(S): A total 703 responses were analysed. 56% of participants were aged 30-49. 83.6% of participants had a sedentary job. Overall, the highest percentage of TV viewing appeared on the category of “1-<3h/day”. For computer use, sedentary transport and other SB, it appeared on the category of “<1h/day”. The only difference between types of job was found in young adults on “other SB”. More participants (47%) with a physically active job spent <1h/day. However, most sedentary job workers (45%) spent <1h/day on other SB. In general, participants with a physically active job were more likely to meet physical activity guidelines than those with a sedentary job.

CONCLUSION(S): This study shows that most participants spend more time on TV than any other types of SB. There was no significant difference in SB between types of job or age groups. However, all the data were ordinal and limits the statistical analyses. Most of the participants were aged 30-49 years with a sedentary job and hence affected the uneven distribution of the data. Further studies on the same topic but assessing SB by reporting exact times among all ages and types of job are required.
P285 Validation of a Danish measure to characterize everyday sedentary behaviour among adults with sedentary office-based work
Danquah IH, Petersen CB, Tolstrup JS

PURPOSE: Sedentary behaviour among working adults includes occupational time, leisure time and time used on transportation. To cover all aspects of sedentary behaviour in this group breaks in sedentary time and prolonged sedentary periods should be considered as well. The purpose of this study is to develop and test the validity and reliability of a questionnaire that assesses everyday sedentary behaviour among Danish adults with office-based work.

METHOD: Participants will be a convenience sample of 40 subjects from a Danish workplace. Participants will complete a questionnaire consisting of four parts: 1. Workforce Sitting Questionnaire (WSQ) asking about sedentary time on a typical workday in 5 domains (transport, work, TV, leisure time computer and social activities), 2. Number of breaks during a typical workday. 3. Number of prolonged sedentary periods during work and leisure time. 4. The modes of transport used. The questionnaire will be completed twice, with a 7-days interval during which the participants will wear a thigh-born accelerometer and record their working and sleeping hours in a logbook. Test-retest reliability will be assessed with correlation coefficients and criterion validity will be tested against accelerometer data using correlation coefficients and Bland-Altman plots.

RESULT(S): Data collection is in progress, preliminary results for the validity of the occupation part of the WSQ will be presented.

CONCLUSION(S): If reliability and validity are considered to be sufficiently high the questionnaire will be a cheaper and easier alternative to the use of accelerometers to assess sedentary behaviour among working adults in future intervention and population-based studies.

P286 Markers of healthy and unhealthy eating and sedentary behaviors in adolescents
Muraro AP, Dias PJ, Domingos IP, Márcia FG, Gonçalves-Silva RMV, Sichieri R

PURPOSE: To evaluate the association between consumption of food group markers of healthy and unhealthy eating and sedentary behavior.

METHOD: The study included adolescents aged 10-17 years old from a birth cohort (1994-1999) followed until 2009-2011. The study was conducted in the city of Cuiabá-MT, Brazil. Three healthy food groups (fruits, vegetables and dairy) and eight unhealthy foods groups (high in sugar and/or sodium: breads and savory biscuits. sweets. chocolate, cookies, soda, pizza, sandwich and snacks) were assessed using a qualitative Food Frequency Questionnaire. Sedentary behavior was measured by hours of screen time greater than or
equal to 4 hours/day.

RESULT(S): Among 1716 adolescents were evaluated, 50.7% were male and 27.7% with excessive weight (BMI z-score >1). The prevalence of sedentary behaviors was 58.1% and there was no difference by gender. The prevalence of sedentary behavior was higher among those who had a lower consumption of fruits (<4 times/week compared with those who consumed more than 2vezes per day) and a higher frequency of breads and crackers, candy, chocolate, soda and sandwiches.

CONCLUSION(S): The risk of sedentary behavior among adolescents was associated with lower consumption of health foods and increased consumption of foods high in sugar and sodium. Association of both behaviors may explain the high prevalence of excessive weight.

P287 Increased sedentary behaviour is associated with unhealthy dietary patterns in European adolescents participating in the HELENA study

PURPOSE: To examine dietary patterns (DPs) in European adolescents and their relationship with several indicators of sedentary behaviour.

METHOD: A multinational cross-sectional study was carried out in 2,202 adolescents (45.4% boys) aged 12.5 to 17.5 years. A self-reported questionnaire with information on sedentary behaviours, separately for weekdays and weekend days, and two non-consecutive 24 hour-recalls were used. Principal component analysis (PCA) was used to obtain DPs, and linear regression examined the association between DPs scores and sedentary behaviour indicators.

RESULT(S): Four DPs for boys (“plant based”, “snacking”, “breakfast” and “health conscious”) and five DPs for girls (“confectionary and snacking”, “plant based”, “breakfast”, “animal protein” and “health conscious”) were obtained. Boys who spent > 4 hours/day watching television (TV) had lower adherence to the “plant based”, “breakfast” and “health conscious” DPs, and higher adherence to the “snacking” DP. Higher computer use and internet use for recreational reason were associated with higher adherence to the “snacking” DP. In girls, TV viewing and using internet for recreational reasons for > 4 hours/day was associated with higher adherence to the “confectionary and snacking” and lower adherence with “health conscious” DP. Also, studying between 2-4 hours during weekend days was associated with lower adherence to the “snacking” and with higher adherence to the “plant based” and “breakfast” DPs.

CONCLUSION(S): Adolescents’ DPs are related with the time spent in several sedentary behaviours. Such findings may help to generate interventions focusing on decreasing unhealthy dietary habits and specific sedentary behaviours.
Feasibility of standing desks to reduce occupational sitting and CVD risk factors in male office workers
Mummery K, Duncan MJ, Fenning A

PURPOSE: The purpose of this pilot study was to investigate the feasibility of the use of standing desks in a university workplace and to examine the effects of the introduction of a standing desk and standing work protocol on physical activity and sedentary behaviour as well as markers of cardiovascular disease in a sample of male university employees.

METHOD: A sample of 10 inactive healthy adult males (M = 47.1 ±8.33) were recruited from a regional university. Participants were randomly allocated into two groups – a standing desk intervention group who were instructed to progressively increase their use of the workstation at the standing height from 2 hours/day in week 1 to 4 hours/day in week 2 to 5 hours/day for weeks 3 through 12 – and a control group who were asked were asked to continue to use their seated office desk as per normal for the duration of the intervention.

RESULT(S): Occupational sitting time significantly reduced in the intervention with no change observed in the control group (p ≤ 0.01). BMI significantly reduced in the control group, but not in the intervention group (p ≤ 0.001). Non-significant increases in the amount of leisure-time sitting were found in the standing workstation group.

CONCLUSION(S): Outcomes indicate that standing desks are effective at reducing occupational sitting time, however the nature and direction of the CVD risk factors and the increase in occupational sitting indicate the need for future study regarding the effectiveness of the standing workstation to reduce overall sedentary behaviour and related effects.
P289 Gross motor skills in South African preschool children: effectiveness of a preschool-based intervention, and the impact of socioeconomic status
Bernstein S-L, Draper CE, Micklesfield L, Lambert EV

PURPOSE: This study aimed to evaluate 1) the effectiveness of a preschool-based gross motor skills intervention, and 2) the impact of socioeconomic status on the gross motor skills of preschool children in Cape Town, South Africa.

METHOD: Gross motor skills of 137 participants (3-6 years of age) were assessed using the Test for Gross Motor Skills - Version-2 (TGMD-2) in a post-test only study design. Group one (intervention group, n=47), who were exposed to a preschool-based gross motor skills intervention, and group two (control group, n=44) were from a disadvantaged community. Group three (n=46) was a comparison group of children from advantaged communities. Height and weight were measured for all participants.

RESULT(S): Locomotor scores were not significantly different between the three groups. There was a significant difference between the object control scores of the three groups (p=0.01580), with group one and three performing better than group two. According to the categories of the TGMD-2 gross motor quotient, group one performed significantly better than the other groups (p=0.0474). No significant differences were found between the gross motor skills of the disadvantaged and advantaged groups, although disadvantaged participants were significantly shorter, and had a higher mean BMI.

CONCLUSION(S): This study provides evidence for the effectiveness of preschool-based gross motor skills interventions in disadvantaged communities. Although socioeconomic status had no significant impact on gross motor skills in these preschool children, the anthropometric disparities were concerning, and highlight the double burden of over- and under-nutrition in disadvantaged South African children.

P290 Physically active play in non-walkers: an evaluation of practitioners’; understanding and provision in early years settings the UK
Goad M, Newport A, Adams E

PURPOSE: To date there has been little research assessing provision of physically active play (PAP) in early years settings. This study aimed to assess early years practitioners’ understanding and determine current provision of PAP in the UK for non-walkers.

METHOD: A cross-sectional survey was sent to all nurseries in Scotland, Northern Ireland and Wales and a sample of nurseries in England (n=4640) to assess provision of indoor and
outdoor PAP. Additionally, a convenience sample of local nurseries (n=10) were invited to participate in qualitative interviews to further assess practitioner’s current practice and understanding of physical activity. Interviews were conducted with six practitioners from four nurseries. Survey and interview data were analysed using a thematic approach.

RESULT(S): Sixty audits were returned (2% response rate). Data showed there was confusion over activities that are considered ‘physical’ activities as opposed to those which develop fine motor skills. PAP provision in non-walkers included a heavy focus on action rhymes/songs, sensory equipment, soft play, tents and tunnels, ball pools and crawling and walking but lacked references to ‘tummy time’. Interviews highlighted practitioners thought PAP was very important, but most had a limited understanding of why. Examples of PAP frequently included exploration, messy play and outdoor play. Two practitioners specifically mentioned ‘tummy time’.

CONCLUSION(S): Nurseries are providing PAP opportunities for non-walkers, but there are gaps in practitioners’ knowledge and understanding of PAP. There is a need and opportunity to increase training for practitioners and provide resources to help improve provision of PAP.

P291 Preschool children’s fundamental motor skills: review of significant positive determinants
Livonen S, Sääkslahti A

PURPOSE: The purpose of this systematic review was to identify determinants that may be positively associated with Fundamental Motor Skills (FMS) development in preschool-aged (3–6 years) children.

METHOD: A systematic search of five electronic databases (ERIC, PsycINFO, MEDLINE, SPORTDiscus, and Physical Education Index) during August and September 2012 was conducted. Parallel search terms for preschool children and for FMS were used. The first search yielded 2484 documents, whose titles were screened. The inclusion criteria were: quantitative examination of at least one FMS, aged 3- to 6-years, published 1.1.2000–30.8.2012, English-language, peer-reviewed journal, and normal children. A total of 209 remaining documents’ abstracts were screened with by the applied exclusion criteria. This screening process yielded 60 full text documents, of which 31 articles were included in the review.

RESULT(S): Based on the preliminary examination of the 31 full text documents, the included studies were cross-sectional, longitudinal or experimental studies or controlled trials. They identified at least one positive FMS determinant. Determinants were classified as individual characteristics (e.g. gender, age, ethnicity, typical type of behavior, habitual physical activity and physical fitness), education-related determinants (e.g. movement program, intervention, participation in organized sports, specific practice, type of preschool), and environment-related social (e.g. socioeconomic background, parents’ behavior and attitudes, siblings) and physical (e.g. population density, preschool play-area, use of a certain
type of footwear).

CONCLUSION(S): By promoting individual and environment-related determinants of childhood motor skills, educators may support children to adopt a physically active and healthy lifestyle.

P292 Fundamental movement skills, body mass index and objectively measured physical activity in preschool children
Foweather L, O’Dwyer MV, Harrison C, Fairclough SJ, Knowles Z, Stratton G

PURPOSE: To examine cross-sectional relationships between fundamental movement skills (FMS), body mass index (BMI) and physical activity in preschool children. A secondary purpose was to explore gender differences in FMS.

METHOD: Fifty-seven children aged 4 to 6 (Mage: 5.2±0.5 years; 30 boys) were measured for height and weight (to determine age and gender specific BMI z-scores), had their FMS video assessed (Champs Motor Skills Protocol), and their physical activity objectively assessed using accelerometers for 7 days (Actigraph GT1M). Pearson’s correlations determined relationships between FMS, BMI z-score and physical activity. Independent sample t-tests were used to explore gender differences in FMS.

RESULT(S): No significant relationship between FMS and BMI-z-score existed. No relationships were found between FMS and percentage of time in moderate-to-vigorous physical activity or total physical activity. Boys demonstrated significantly more object-control skill components than girls over two trials (46.6±8.3 vs. 37.3±7.1; p=<0.01). No gender differences were found for locomotor skills (boys, 45.1±4.8 components vs. girls, 45.1±5.1).

CONCLUSION(S): The findings highlight the need to provide early opportunities for girls to receive practice and instruction to develop object-control skills. That FMS was not related to physical activity or BMI z-score indicates that FMS competence may not influence health markers in preschool children or vice versa. However, these findings await confirmation in a larger sample size. Nevertheless, previous research suggests that relationships between FMS and health indicators develop and strengthen in later childhood and adolescence, highlighting the importance of early intervention programmes.

P293 Developmental trajectory of the relationship between perceived motor competence and actual motor competence in children
Brian A, Goodway JD, Stodden DF, True L, Ferkel R

PURPOSE: Actual motor competence (AMC) and perceived motor competence (PMC) are hypothesized to be developmentally related to physical activity (Stodden et al., 2008). This study examined the developmental trajectory of the relationship between PMC and AMC in...
children. It was hypothesized the relationship between PMC and AMC would strengthen with age.

METHOD: Subjects (N=382) were grouped into: 4-5, 7-8, and 10-11 year olds. PMC was determined by the physical/athletic competence subscale (Harter & Pike, 1984). Multiple measures of AMC were utilized: Test of Gross Motor Development-2 (Ulrich, 2000), hop, throw & jump developmental sequences, hop and jump distance, and run, throw and kick velocities. Correlations were run along with backward elimination regression with multiple AMC measures & BMI predicting PMC.

RESULT(S): There was a developmental trajectory for the number of significant correlations between PMC and different measures of AMC across age (4-5 yrs=3, 7-8 yrs=5, 10-11 yrs=7). In 4-5 and 7-8 yr olds significant AMC correlations were all locomotor measures. In 10-11 yr olds the correlations consisted of 5 locomotor measures and 2 object control measures. For the full regression model R2 increased in strength from 4-5 to 10-11 yr olds but dipped for the 7-8 yr olds (4-5 R2=.21, 7-8 R2=.19, 10-11 R2=.26).

CONCLUSION(S): There is a developmental trajectory in the strength of the relationship between PMC and measures of AMC. In early to middle childhood locomotor skills are more strongly related to PMC. By late childhood (10-11) both locomotor and object control skills are correlated with PMC.

P294 Validity and reliability of the ‘multimove for kids’ questionnaire for parents assessing their knowledge, attitude and behavior concerning broad motor development of their children
Huyben F, De Martelaer K, Terryn J, Bardid F, Seghers J, Lenoir M

PURPOSE: Recent studies report a decline in physical activity as well as motor skills of young children and therefore emphasize the need to stimulate varied and adequate physical activity within this population. The Flemish project ‘Multimove for kids’ attempts to fulfill this need. One of the main purposes of this project is to examine if an awareness campaign has a positive effect on parents’ knowledge and attitude, and behavior with regard to varied and adequate movement opportunities for 3-to-8-year-old children.

METHOD: A written questionnaire was developed to examine the effect of the parents’ awareness during the campaign ‘Multimove for kids’ (September 2012 to May 2013). The questionnaire was constructed based on existing and validated questionnaires with specific additional information. Content and construct validity was assessed, by content discussion with an expert panel and communication with parents of young children. Test-retest reliability was examined using a pilot group of 58 randomly selected parents of young children.

RESULT(S): In total, 44 parents completed the questionnaire whereof 19 % by both father and mother, 33 % only by fathers, and 49 % only by mothers. For each item of the questionnaire, Intraclass Correlation (ICC) values were calculated. The majority of the items...
and subitems were found to be reliable (0.5 ≤ ICC ≤ 1).

CONCLUSION(S): Present study reports that the questionnaire is proved to be reliable and valid. Therefore, the questionnaire is suitable to be used in the project ‘Multimove for kids’ where a sample of ± 1500 parents, using a pre-post test design, will be achieved.

**P295** Does a proficiency barrier exist in childhood? Developmental differences in motor skill proficiency, physical activity, and body mass index in children
Getchell N, Nelson S, Golden D, Liang L-Y, Logan SW

PURPOSE: A long held assumption is that young children naturally become more motor proficient with age, negating the need for early structured physical activity experiences. Recently, a more dynamic, complex relationship among motor proficiency, physical activity, and body mass index has been suggested. We wanted to compare these measures across childhood.

METHOD: Two groups of children participated, younger (mean age = 4.47yrs + .68; n = 22) and older (mean age = 11.61yrs + .50; n = 28) children. All children completed the Test of Gross Motor Development (TGMD-2) and wore an Actical accelerometer for 4 days. Both raw and standard scores for 6 locomotor and 6 object control sub-test items and total test quotient scores were compared between groups, as were average and total activity counts, percent time in moderate to vigorous activity (MVPA), and BMI.

RESULT(S): Groups differed significantly on all measures except object control standard score and Quotient. The younger group had significantly lower BMI, scored higher on both subtests raw scores and locomotor standardized score, had higher activity counts and more time in MVPA. Further, TGMD percentile rankings declined between the younger and older groups while the percentage of children defined as overweight or obese increased from 9% to 21%.

CONCLUSION(S): These results suggest that children may not become more proficient simply as a function of time. In addition, similar or declining motor proficiency appears to coexist with lower physical activity levels and higher BMI in older children, as predicted by the developmental model of Stodden et al (2008).

**P296** Physical activity and self-perceived competence among children with and without developmental coordination disorder
Yu J, Sit CHP, Ha AS, Burnett AF, Huang WYJ

PURPOSE: Children with developmental coordination disorder (DCD) present with poor motor coordination that interferes with their daily activities. Physical self-perception has
been identified as a correlate of physical activity (PA) in typically developing (TD) children. The purpose of this study was to examine the relationship of PA with self-perceived competence (SPC) in children with DCD. This association was also examined in TD children.

METHOD: Sixty four children (32 DCD, 32 TD) aged between 7 and 10 years (mean age: 8.5 ± 1.0 years) were recruited. Levels of PA were assessed with accelerometers over seven consecutive days. SPC was measured using physical self-description questionnaire (Marsh et al., 2007). ANCOVAs controlling for age and body mass index (BMI), were used to determine differences in PA and SPC between groups. Pearson’s product moment correlations were used to examine the associations between PA and SPC.

RESULT(S): Compared to the TD group, children with DCD spent significantly less time in MVPA and scored significantly lower in general physical concept, global self-esteem, and perceived competence including physical health, coordination, body fat, appearance, flexibility, endurance, and sporting ability. For the TD group, SPC such as flexibility was negatively related to sedentary behavior, and endurance was positively associated with time spent in light PA. For the DCD group, no significant PA-SPC relationship was found.

CONCLUSION(S): Children with DCD are less physically active and have poorer SPC than their TD counterparts. There is a weak PA-SPC relationship in children with DCD. Future research is needed to examine moderators or mediators of these relationships.

P297  
Assessment of water safety skills among elementary school children preparing them for lifelong physical activity in an aquatic environment
De Martelaer K, Soons B, Van Iseghem T

PURPOSE: The aim of the study is (1) to analyse the relevant basic skills relating to water safety for lifelong learning and (2) to evaluate a test assessing aquatic competences of children.

METHOD: Pupils who succeeded a traditional swimming test of 50m were asked to perform also a water safety skill test of 10 aspects with a maximum total score of 20. This test was evaluated among 52 pupils and scored individually by an expert and the teacher who received details on the testing. Moreover a perceived water safety score (5 point Likert scale) was given after both swimming tests.

RESULT(S): Relevant skills of water safety, as described in the literature and found in international basic swimming programs, are: entering & leaving the water, floating, aquatic breathing, moving in prone position and on the back, rotations along different axes (=our water safety test). When comparing the average total score for the water safety skill test, the teacher (m=16,15; SD=3,02) gave significantly (t(df=51)=7,366; p<0,0005) higher scores than the expert (m=13, 62; SD=2,79). Also water safety perception scores differed significantly t(df=51)=6,39; p<0,0005 between teacher (m=3,21; SD=0,72) and expert (m=2,65; SD= 0,80).
CONCLUSION(S): The fact that several pupils who succeeded for 50m swimming test, were not able to perform all the aquatic skills of the second test, indicates that a traditional swimming test shouldn’t be treated as a golden standard of ‘being able to swim’. Teachers overestimate pupils’ aquatic skills and should be trained better in teaching and evaluating water safety skills.

P298 Effectiveness of a preschool physical activity intervention on gross motor skills: the Colorado LEAP study
Bellows L, Gavin W, Johnson SL, Boles R, Davies P

PURPOSE: The level of children’s motor skill proficiency may be an important determinant of their physical activity behaviors. In an intervention study designed to prevent early childhood obesity in rural Colorado, USA (The Colorado LEAP Study), gross motor skills were assessed to determine efficacy of the Food Friends: Get Movin’ with Mighty Moves program.

METHOD: Children (n=218; 56% girls; 56.1 ± 4.2 months; BMIz (weight status)= 0.49 ± 1.2) attending five preschool centers (2 treatment and 3 control) were assessed on gross motor performance (Bruininks-Oseretsky Test of Motor Proficiency, 2nd Edition; BOT-2) and BMIz at baseline and 6 months post-intervention (time 2). Treatment schools participated in the 18 week physical activity intervention. Analyses included t-tests at baseline and repeated ANOVA for baseline and time 2 comparisons.

RESULT(S): A significant group by time interaction was found for balance (p=.006) and speed/agility (p=.017), indicating that the intervention group demonstrated a significant increase in these skills compared to the control group. Upper limb coordination approached significance (p=.077). For strength, only a significant time effect was found. Results did not differ when gender and BMIz were used as covariates. No significant differences between groups at baseline were found for the four BOT-2 subtests, BMIz, or gender.

CONCLUSION(S): Interventions focused in the early childcare setting can have an impact on motor skill development. Assessments will be repeated in both kindergarten and 1st grade to examine the long term impact of the gross motor intervention in early childhood.

P299 Association between injury incidence and indicators of physical activity, motor coordination and aerobic fitness in 7-9 year old school children
Martin-Diener E, Wanner M, Martin BW, Kriemler S

PURPOSE: To assess activity-related correlates for injuries in children of the general population under the age of ten while taking exposure to objectively assessed physical activity (PA) into account.
METHOD: Cross-sectional study with 246 7-9 year old children from 20 school classes. All-cause injuries were assessed with a parental questionnaire, asking for injuries that had occurred during the past 12 months, had needed treatment by a medical professional or a guardian and had caused the child to stop the current activity for the rest of the day. PA exposure was measured with accelerometers for seven days, aerobic fitness with the 20m shuttle run test and motor coordination with the KTK test. To describe injury risk factors the number of injuries per 1000h of moderate to vigorous physical activity (MVPA) for different categorical variables were calculated and a multivariate logistic regression model accounting for clustering within classes was developed.

RESULT(S): For 15% of the children an injury was reported, the incidence rate was 0.29 injuries/1000h of MVPA. Levels of PA were not associated with injury risk. After controlling for sociodemographic characteristics and accounting for exposure to PA, children with medium and high compared to those with low levels of aerobic fitness were at decreased injury risk (OR=0.33 (0.13-0.83); OR=0.29 (0.14-0.64). Children with high motor coordination scores were at increased injury risk compared to those in the normal range (2.65 (1.05-6.73).

CONCLUSION(S): Low aerobic fitness and high motor coordination skills, but not PA were related to injuries in prepubescent school children.

P300 Physical activity and motor skill competency in preterm and full-term toddlers 

PURPOSE: The purpose of this study was to examine the relationship between motor skill competency and physical activity level in toddlers and how it may be impact by preterm birth.

METHOD: Twenty-three healthy preterm and 16 full-term children aged 2 to 3 years were included. Children’s gross motor competency in stationary, locomotion, and object manipulation skills was assessed using Peabody Developmental Motor Scales, Second Edition. Physical activity was objectively measured using Actigraph accelerometers over a 7-day period. The mean time of physical activity (PA) and moderate-to-vigorous physical activity (MVPA) per day were calculated. Children’s body mass index (BMI) was also measured.

RESULT(S): Both preterm and full-term toddlers showed increased amount of PA and MVPA as well as better gross motor skills as age increased (all p<0.05). No significant difference was found between preterm and full-term toddlers (p>0.05). BMI was found lower in preterm toddlers than in those of full-term but did not change with age. Correlation analysis revealed that the amount of toddlers’ PA and MVPA was significantly associated with their locomotion skills (r=0.40 and 0.38, respectively, both p<0.05) but not with stationary or object manipulation skills. BMI did not show significant correlation to toddlers’ PA or MVPA.
CONCLUSION(S): Healthy preterm toddlers demonstrated gross motor competency and physical activity level comparable to full-term peers. In young children, physical activity level was particularly associated with their locomotion skill competency. Clinicians may encourage toddlers to engage in locomotion-related activities to promote motor skill development as well as to increase physical activity.

P301 Parents rarely think of fundamental movement skill development in their children
Barnett LM, Hanna L, Zask A, Rose L, Stagnitti K

PURPOSE: Movement skill ability is a potentially important determinant of physical activity, therefore it is important to understand influences on movement skill development. However it is not known what importance parents place on fundamental movement skill development or how these perceptions might influence parental decision-making around, and engagement with, their child’s physical activities.

METHOD: A qualitative descriptive interview study was carried out with twenty one parents of children 6-9 years old. In-depth semi-structured telephone interviews explored parents’ perceptions of influences on their child’s movement skill development and how these perceptions might influence parental decision-making around, and engagement with, their child’s physical activities. Interviews were recorded and transcribed verbatim. An inductive thematic analysis was carried out alongside data collection.

RESULT(S): Parents had a limited understanding of fundamental movement skills and mixed opinions as to their importance and the degree that they could be improved. Parents rarely made decisions around physical activity based on their child’s fundamental movement skills, although some parents did not enroll their child in certain activities if they perceived them as having poorer skills than other children. Parents saw their role as an enabler of physical activity opportunities based on child preferences and enjoyment, rather than a provider of specific opportunities to develop certain skills or teach fundamental movement skills in a targeted way.

CONCLUSION(S): Parents could be educated about the range of fundamental movement skills and the importance of such skills to more specific sports skills and overall physical activity, including how to teach specific skill components to their children.

P302 Face validity and reliability of a pictorial instrument for assessing perceived competence in 12 fundamental movement skills in young children
Barnett LM, Ridgers ND, Zask A, Salmon J

PURPOSE: To assess the face validity and reliability of a pictorial instrument designed to
assess perceived fundamental movement skill competence (FMS) in young children. Few instruments assess perceived movement skill competence in young children and these do not correspond closely (in terms of skills assessed) to instruments which assess movement skills objectively.

METHOD: A Pictorial Instrument based on skills in the Test Gross Motor Development-2 was developed. Newly created items assessed locomotor and object control competence using the format and item structure from the physical competence subscale of the Pictorial Scale of Perceived Competence and Acceptance for Young Children. Children completed subscales twice seven days apart. Cronbach’s alpha assessed internal consistency. An intra-class correlation (ICC) was performed for each subscale. Face validity was determined by asking children at the end of the test-retest what was happening in each picture and were they reminded of a sport/game or activity.

RESULT(S): In May 2012, 32 children (18 boys and 14 girls) aged 5-7 years (M = 6.0, SD = 0.78) completed the object control subscale at both time points. In October 2012, 23 of these same children completed the locomotor subscale at both time points. Internal consistency was good (object control Test 1:α = 0.63, Test 2:α = 0.72, locomotor Test 1:α = 0.64, Test 2:α = 0.68) as was the ICC (object control 0.77, locomotor 0.82). Children demonstrated they could understand the pictures.

CONCLUSION(S): This study has provided preliminary evidence for face validity and reliability of this instrument to assess perceived FMS in young children.

P303 13-year trends in child and adolescent fundamental movement skills; 1997-2004-2010
Hardy LL, Reiten-Reynolds T, Barnett LM, Espinel P, Okely A

PURPOSE: To describe 13-year trends in children’s mastery of fundamental movement skills (FMS).

METHOD: Secondary analysis of representative, cross-sectional, school-based surveys conducted in 1997-2004-2010 in Australia (n = 13,752 children aged 9-15 years). Five FMS (sprint run, vertical jump, catch, kick and over-arm throw) were assessed using process-oriented criteria at each survey. Children were classified as having mastery or no mastery of each FMS. Covariates included sex, age, cardiorespiratory endurance (20m shuttle run test), body mass index (kg/m2) and socioeconomic status (postcode of residence).

RESULT(S): At each time point, children’s FMS mastery was low, with prevalences rarely above 50%. Between 1997 and 2004, mastery significantly increased in 4/5 FMS with the greatest gains for the vertical jump and catch. Since 2004, mastery of FMS was either stable (over-arm throw), increased (sprint run, vertical jump, catch kick (girls)) or decreased (vertical jump).
CONCLUSION(S): Overall, mastery of FMS was low, independent of survey year. The observed increase in FMS mastery since 1997 was attributed to changes in practice and policy to support the teaching of FMS in schools. In 2010, FMS mastery remained low, implying that the current delivery of FMS programs requires stronger positioning within the current school curriculum. Additionally, strategies to improve children’s physical activity should consider ensuring children have mastery of the necessary FMS in order to be physically active.

P304 Physical activity behaviour and propensity for conscious control of body movements in children
Ling FCM, McManus AM, Masters RSW, Morris T, Polman RJC

PURPOSE: The aim of this study is to examine the extent to which the propensity to consciously control body movements (termed ‘movement reinvestment’) may predict physical activity behaviour in Chinese children. Movement reinvestment is evidently associated with disruption in automated movements in adults, however, whether its influence may extend to physical activity behaviours in children is unknown.

METHOD: Chinese Hong Kong children aged 6-12 (n=291; 48.5% boys, mean age = 9.04yr ± 1.73) completed the Movement Reinvestment Scale for Children – Chinese and the Physical Activity Subscale of the Physical Self-Description Questionnaire (short version). Age and the two factors of movement reinvestment, movement self-consciousness (MSC) and conscious motor processing (CMP), were entered into a regression model for each gender, with self-report physical activity level as the dependent variable.

RESULT(S): Significant predictors of self-report physical activity level are MSC (β = -.46, p < .01) for boys and age (β = .72, p < .01) and CMP (β = -.47, p < .01) for girls.

CONCLUSION(S): While the relationship between age and physical activity level in girls somewhat contradicts previous findings, the role of movement reinvestment in affecting physical activity behaviours in children is within our expectations, despite that the mechanism behind its influence in the two genders appears to be different. Taken together, our findings seem to suggest that movement reinvestment may negatively impact young children’s physical activity behaviours.

P305 Active electronic game use can improve perceived and actual motor competence in children with developmental coordination disorder
Straker LM, Larke D, Jensen L, Campbell A

PURPOSE: Between 5 and 10% of school children have poor motor competence due to Developmental Coordination Disorder and are at greater risk of poor physical and mental
health. A vicious cycle may develop of less confidence leading to withdrawal from activities providing motor skill practice and thus relative declines in motor skills and further loss of confidence and increase in health risks. Active electronic games may provide an alternative pathway for these children to practice motor skills and thus gain motor confidence. Therefore the purpose of this study was to examine the impact of access to active electronic games in children’s homes on their confidence and motor skill.

METHOD: 21 children (11 females) aged 11.0 (sd 1.0) years participated in a within subjects randomised, controlled study. Children were recruited from the general community and screened to be < 16th percentile of motor competence on the MABC-2 assessment. Children were provided with X-Box Kinect and PlayStation 3 consoles to play a range of active electronic games for 4 months. Children rated their motor skills, parents completed the DCDQ-07 questionnaire and clinician ratings using the MABC-2 assessment were compared pre and post active electronic game exposure.

RESULT(S): Following active electronic game use for 4 months children rated improved motor skills (2.9(1.4), t=9.3, p<=.001); parents rated improved functioning (40.4(13.4), t=3.6, p=.002) and clinicians rated improved coordination (17.7(14.9), t=3.3, p=.003).

CONCLUSION(S): Providing active electronic games in the homes of children with DCD appears to be an effective way to improve their perceived motor skill, functioning and motor competence.

P306 Performance in simple and choice reaction time tasks between obese and healthy-weight children and the influence of physical activity
Gentier I, Augustijn M, Deforce B, De Bourdeaudhuij I, Lenoir M, D’Hondt E

PURPOSE: This study aimed to investigate weight status related differences in reaction time tasks to determine whether or not childhood obesity is associated with impaired perceptual-motor function and to investigate whether or not this relationship is mediated by physical activity participation.

METHOD: In this cross-sectional study, sixteen obese children and sixteen gender and age matched healthy-weight peers performed a simple reaction time (SRT) and four choice reaction time (CRT) task, and completed the Flemish Physical Activity Questionnaire. Absolute mean reaction time (RT), movement time (MT) and response time (RsT) were implemented in a 2 (normal-weight vs. healthy-weight) × 2 (SRT vs. CRT task) × 2 (active vs. non-active) Repeated measures ANCOVA, with age included as a covariate.

RESULT(S): Obese children were found to be significantly slower than their healthy-weight peers during the SRT task as reflected by a significantly higher absolute RT, MT and RsT. In the CRT task, however, between-group differences were only present for RT and RsT, whereas absolute MT was comparable among obese and healthy-weight participants. These weight related differences in performances on both the SRT and CRT were not mediated by
children’s physical activity level (active vs. non-active).

CONCLUSION(S): Our study strongly suggests that childhood obesity is associated with a different perceptual-motor function independent of children’s physical activity level. Only by means of a comprehensive understanding of the underlying mechanisms, intervention programs aimed at enhancing neuromuscular function and motor skill performance can be developed and implemented within the obese childhood population, entailing indirect benefits in health-related behaviors and outcomes.
Nutrition interventions in adults

P307  Predictors of adherence to online dietary habit changes: the participant knows best
Kaipainen K, Wansink B

PURPOSE: Adherence to behavioral advice improves intervention outcomes by facilitating establishment of new habits, but predictors of adherence to specific suggestions are not well understood. Health promoters would benefit from simple methods to predict adherence. The aim of this study is to identify psychological and demographic factors which predict adherence to habit changes in an online healthy eating and weight loss program.

METHOD: Adherence to habit change suggestions and to the program were assessed among 2053 voluntary participants (89% female, mean age 39.8 years, mean BMI 28.1) who registered to an online healthy eating and weight loss program between July 2007 and July 2009 and received targeted habit change suggestions.

RESULT(S): Strong predictors of adherence to habit change suggestions were expected adherence ($\beta = 0.398$, $P < .001$) and expected ease of the change ($\beta = 0.388$, $P = .003$). Additional predictors included high psychological well-being, college education, low income, and White/Caucasian race. 25% of participants who registered to the program returned to complete at least one follow-up survey. Compared to non-returning participants, returning participants were older and more educated, reported higher psychological well-being and lower outcome expectations, and defined their own additional habit change more often.

CONCLUSION(S): Adherence to specific habit changes was best predicted by how adherent participants believed they would be and by how easy they estimated the changes to be. Consequently, simply asking participants about their adherence and ease expectations may be the most practical way to select relevant and feasible advice for them.

P308  Seize the moment: an exploratory study to identify opportune moments in everyday life to promote healthy eating
Rabbi M, Yuan CW, Kaipainen K

PURPOSE: Opportune moments refer to situations when people are receptive to behavior change suggestions. Mobile phone sensors make it possible to detect these moments and deliver relevant messages. This study aims to identify opportune moments to promote healthy eating with smartphone messages.

METHOD: Five graduate students used a smartphone application for 7 days and received healthy eating messages at frequent and random intervals. Data about opportune moments was collected via a survey connected to each message, online diary completed at the end of each day, in-depth interviews after the 7-day period, and mobile phone sensors. Grounded-
theory approach was used to analyze the qualitative data. Features were extracted from sensor data to develop a classifier to correctly identify opportune moments.

RESULT(S): Most suitable moments for healthy eating messages occurred at the beginning or at the end of the day, between tasks, or during commuting. Messages were generally ignored or considered annoying at times of high concentration and cognitive load, or in the presence of other people. Textual messages were preferred due to convenience, but audio/video messages were more engaging. The accuracy of the classification of opportune moments ranged from 86% to 96%.

CONCLUSION(S): Mobile interventions to promote healthy eating should deliver their messages at opportune moments so that they fit the recipient’s mental, physical, and social context. The findings of this study suggest that such moments can be correctly identified with mobile phone sensors. Longer studies with larger sample sizes are needed to evaluate the impact of opportunistic messaging on actual behavior change.

P309 The feasibility and appeal of mobile ‘apps’ for supporting healthy food purchasing and consumption among socioeconomically disadvantaged women
Ball K, Mouchacca J, Jackson M

PURPOSE: This pilot study aimed to assess the feasibility and appeal of using hand-held mobile technology (ipod, ipad) ‘apps’ as tools for promoting healthy food planning, shopping and eating behaviours among socioeconomically disadvantaged women.

METHOD: A four-week trial with pre-post test measures was conducted with a convenience sample of 19 women of low socioeconomic position (SEP; low education or low income). Participants completed a pre-survey on current use and perceptions of the technology, and were then loaned an iPad2 (n=15) or an iPod (n=4) loaded with seven apps, currently available in the iTunes store, relevant to food planning, purchasing or consumption. Immediately after the trial women reported on their use and perceptions and perceived usefulness of the apps.

RESULT(S): Women reported that they used five of the seven apps at least weekly. They were confident using the apps and most reported that they would use them again. Generally women liked the portability (for ipods) and user-friendliness of the technology; they disliked the time-consuming process required to enter data by some apps. Perceptions of whether or not the apps would assist women in eating healthily varied substantially across apps, with the app most commonly reported as helpful being a ‘what’s in season’ fresh produce app.

CONCLUSION(S): Selected iPod and iPad apps are useable and appealing to women of low SEP. The findings identified particular features of apps which may be most helpful in assisting women to plan, shop and consume healthy foods, which can inform a future technology-based nutrition promotion trial in this target group.
Effectiveness of skill-building behaviour change strategies for improving fruit and vegetable consumption among low-income women: results from the ShopSmart4Health randomised controlled trial

Ball K, McNaughton SA, Le H, Andrianopoulos N, Inglis V, Crawford DA

PURPOSE: To evaluate the effects of skills-based behaviour change strategies on purchase and consumption of fruits and vegetables among low-income women in the supermarket setting.

METHOD: A randomised controlled trial was conducted over six months. Participants who self-screened as having a low income were recruited from low socioeconomic areas and randomly allocated to either a skills-based behaviour change intervention arm or a wait-list control. The skills-based intervention was delivered via eight mailed resource packs and a supermarket tour delivered by a dietitian. Outcomes were changes from baseline in fruit and vegetable purchasing and consumption, assessed using both objective transaction sales data from the supermarket, and self-report survey.

RESULT(S): 248 women completed baseline surveys, had their supermarket transaction data collected retrospectively, and were randomised to one of the two intervention arms (n=124 in each arm). After receiving the six month intervention, 244 participants completed post-intervention surveys (98% retention). Preliminary analysis demonstrated that the intervention resulted in an increase in reported consumption of almost half/serve of vegetables per day in the intervention relative to the control group, but no significant effects for fruit consumption. Full results for all outcomes will be released for the first time internationally at the ISBNPA meeting.

CONCLUSION(S): A skills-based behavioural intervention showed good success in recruiting and retaining low-income women and promising preliminary results in terms of improving vegetable consumption.

Feasibility and Impact of school farm stands on vegetable intake of low-income families

Evans A, Denis L, Nemec C, Powell K

PURPOSE: The aim of the Farm–to-Families (F2F) program is to increase easy access to fresh vegetables in low-income communities where current access to fresh produce is inadequate. The purpose of this study was to examine the technical and financial feasibility of placing farm stands at low-income schools.

METHOD: The F2F farm stand was placed at the study school (96% students socio-economically disadvantaged; 92% Hispanic) on a weekly basis over a 6-week period during the time when parents pick up children from school. A local, organic farmer supplied the vegetables. During the last 2 weeks of the intervention, consumers (n=52; 96% Hispanic;
50% food insecure) were randomly invited to complete a survey that assessed usual food purchasing, food preparation, and vegetable intake, impact of farm stand, and demographic data.

RESULT(S): Results indicated that 35% of participants are not able to purchase as many vegetables as they would like. Reasons include difficulty getting to store, too expensive, lack of quality of vegetables in store. Participants reported purchasing vegetables at the farm stand because of high quality of vegetables for sale, because they wanted to support local farmers and because they wanted their families to eat healthier. 85% of participants reported eating more vegetables after the completion of the intervention. Financial data indicated that after 6 weeks, the farm stand expenses and income were relatively stable.

CONCLUSION(S): These promising pilot results indicate that placing farm stands at schools may be an effective strategy to increase access to healthy foods and to increase consumption of healthful foods.

P312 Good food does not need to be expensive: the design of a nutrition education course for people with financial problems
Bessem K, Linssen E, Raaijmakers L, Van Assema P

PURPOSE: The course ‘Good food does not need to be expensive’ (GF) is a course for people with financial problems. Since 2000 it has been implemented as a part of an obligated budgeting course and has reached more than 3000 lower SES families. It is one of the first programs which has been certified as theoretically well founded by the Dutch Centre for Healthy Living. Program aims are to motivate people to buy healthy affordable foods and to consume healthier foods with a limited budget. In 2012 the program methods and strategies were reassessed based on newly available theoretical and empirical insights.

METHOD: The course will be evaluated from October 2012 to November 2013 using a quasi-experimental control group design (n=200) with a pretest, a posttest and a follow-up after six months. We will use telephone interviews to assess participants’ self-reported dietary intake, determinants, background characteristics and program satisfaction. Fidelity of implementation will be assessed by structured observations.

RESULT(S): The course methods and strategies, the design of the evaluation study and some preliminary findings will be presented. Some of the course strategies include reading food labels of high-fat and lower-fat snacks and tips from peers on emotional eating. Information on costs of foods are included in all program elements.

CONCLUSION(S): The results of the evaluation will be re-assessed by the Dutch Centre for Healthy Living and considered for the level “proven effectiveness”. If beneficial results are found, the program will be disseminated nationally in the Netherlands.
P313  The effectiveness of workplace dietary modification interventions alone or in combination with nutrition education at a group and individual level: a systematic review
Geaney F, Kelly C, Greiner B, Harrington JM, Perry IJ, Beirne P

PURPOSE: The workplace is an ideal setting for the promotion of a healthy diet. There is limited evidence on the impact of workplace dietary modification interventions. The objective of the review was to evaluate the effectiveness of these interventions alone or in combination with nutrition education.

METHOD: Data sources included Pubmed, Medline, Embase, Psych Info., Web of Knowledge and Cochrane Library. This review was guided by the PRISMA (Preferred Reporting Items for Systematic-Reviews and Meta-Analysis) statement. Included studies were randomised controlled trials (RCTs), controlled trials that did not use appropriate randomisation strategies and controlled before and after studies. All interventions included dietary modifications in the workplace. All interventions were implemented for at least three months. The Cochrane Collaboration’s risk of bias tool measured potential biases. Heterogeneity of all studies precluded meta-analysis. Results were presented in a narrative summary.

RESULT(S): Six studies (12 articles) conducted in the USA, Brazil, Netherlands and Belgium met the inclusion criteria and implemented workplace environmental modifications. The quality of studies was moderate or weak due to insufficient study design detail. Although a small effect size, most studies reported an increase in fruit and vegetables consumption. There is moderate evidence that environmental changes and education focused workplace interventions may be more effective in improving fruit and vegetable intakes.

CONCLUSION(S): Evidence is still inconclusive. These interventions need to be implemented at a complex level and evaluated in real-world workplace settings according to established frameworks before they can potentially influence public health nutrition policy, the food industry and reduce the burden of diet-related disease.

P314  ‘Food Choice at Work Study’ the long-term impact of workplace dietary modification interventions on dietary behaviours and diet-related disease risk; protocol

PURPOSE: Effective behavioural interventions may reduce the burden of diet-related disease. The aim is to assess the effectiveness and cost-effectiveness of workplace complex dietary interventions; focused on restricting fat, saturated fat, sugar and salt intakes alone or in combination with nutrition education in large workplace settings.

METHOD: The study design is a clustered non-randomised controlled trial involving four
large manufacturing workplaces in Cork, Ireland. The complex interventions have been designed according to the NICE guidelines and the MRC framework for developing complex interventions. No further intervention will be offered in workplace A (control). Workplace B will receive nutrition education. Workplace C will receive nutrition education and dietary environmental modification. Workplace D will receive dietary environmental modifications alone. Nutrition education will include: group presentations, individual nutrition consultations and detailed nutrition information. Dietary environmental modification will include: an intervention booklet, strategic positioning of healthier alternatives, portion size control, restriction of fat, saturated fat, sugar and salt used in food preparation. Workplace stakeholders developed aspects of the intervention. A process evaluation and a cost-effectiveness economic evaluation will be conducted. A total of 1344 participants aged 18-64 years (336 in each workplace) selected randomly but stratified by age and gender will be recruited.

RESULT(S): Study end-points: Changes in dietary intakes, nutrition knowledge, health status with measurements obtained at base-line, 3-4 months, 7-9 months and 13-16 months. A process evaluation and economic-cost evaluation will be completed.

CONCLUSION(S): This study will provide critical evidence on the effectiveness and cost-effectiveness of workplace complex dietary interventions and will influence employees’ dietary behaviours, policy-makers and food industries.

P315 Stimulating a healthy lifestyle with food taxes: a qualitative research study of the attitudes of Belgian stakeholders towards fiscal incentives to promote a balanced diet
Moncarey I, Van den Abeele S, Annemans L, Devisch I

PURPOSE: Malnutrition causes multiple health problems, such as overweight and non-communicable diseases (Heymann & Goldsmith, 2012; De Maeseneer, et al., 2012). As a result a healthy lifestyle is of crucial importance to tackle and reduce these increasing health problems (Dagevos & Munnichs, 2007; Caraher & Cowburn, 2005). Prevention is an important instrument in this context (Gostin, 2007). The government also has a decisive role (Havermans, Nederkoorn, Giesen & Jansen, 2011). They can act with fiscal measures to tackle the increasing epidemic of overweight and raise consciousness for a healthy lifestyle (Leicester & Windmeijer, 2004; Strnad, 2005). The idea behind food taxes is that a price increase of unhealthy food ensures less consumption of these products (De Clercq, 2006; Epstein et al., 2012). Food taxes have merely been investigated qualitatively until today in Belgium. In this context this research gives an overview of current knowledge and opinions of Belgian stakeholders about food taxes to promote a balanced diet.

METHOD: Evidence-based literature is used to determine the background of taxes, the expected outcomes and the food and health policy in Belgium. With semi-structured interviews, we collect evidence on the opinions of stakeholders in this debate, such as food producers, consumers and policymakers. The interviews include questions regarding the knowledge of food taxes, conceptions and validation for these conceptions, perceptions and
current policy.

RESULT(S): The research will map the position of different actors in Belgium.

CONCLUSION(S): In the conclusion it will be clear on which level food taxes in Belgium are on the political agenda.

**P316**  
**Dietitian’s perspectives of interventions enhancing adherence to dietary advice for preventing and managing chronic diseases in adults: a Delphi study**  
Lapointe A, Bissonnette-Maheux V, Deschênes S-M, Légaré F, Gravel K, Thirsk J, Desroches S

PURPOSE: To assess dietitians’ perspectives on the importance and applicability of interventions enhancing adherence to dietary advice for preventing and managing chronic diseases in adults in the Canadian context.

METHOD: By conducting a Cochrane systematic review, we identified eight promising interventions for enhancing adherence to dietary advice: telephone follow-up, feedback based on self-monitoring, portion sizes, exchange lists, individualized menu suggestions, behavioural contract, watching a video, and multiple interventions. Expert dietitians were recruited to participate through an invitation email sent to various chronic diseases-related networks from Dietitians of Canada. They were invited to participate by completing an electronic questionnaire asking them to rate the importance and applicability on a seven-point Likert scale of each of these eight specific interventions in their practice.

RESULT(S): Among the 32 dietitians who completed the three-round Delphi study, four interventions showed a strong consensus using a ≥75% level of agreement. Among those, feedback based on self-monitoring (6.97±0.18 and 6.72±0.46; means±SD for importance and applicability respectively), portion sizes (6.69±0.54 and 6.75±0.51), and multiple interventions (6.94±0.25 and 6.81±0.40) were found important and applicable, while video (4.75±0.67 and 4.84±0.72) was found neither important nor unimportant and neither applicable nor inapplicable.

CONCLUSION(S): These findings could guide the development of educational training sessions for dietitians to help them provide interventions that are likely to be adhered to by their patients but also that are applicable to their practice. Further studies should validate these findings with patients to assess whether these interventions are also relevant to their reality.
P317 Listening instead of reading: the influence of voice intonation in auditory health persuasion aimed at increasing fruit and vegetable intake
Elbert A, Dijkstra A

PURPOSE: In auditory health persuasion, the speaker’s speech becomes salient, as there is no visual information available. Intonation of speech is one important aspect that may influence persuasion. It was experimentally tested to what extent different levels of intonation are related to persuasion. Furthermore, self-affirmation is applied to investigate whether for some recipients the threat posed by the information in the message might become too strong to face. The topic of the health message referred to the intake of sufficient fruit and vegetables.

METHOD: In Study 1 (N = 130), students either listened to a health message with a low, moderate or high level of intonation. In Study 2 (N = 143), the same manipulations of intonation were applied but half of the participants were affirmed before they listened to the persuasive message. To analyze the effects, ANCOVA is used with intention to start consuming more fruit and vegetables as dependent variable.

RESULT(S): Study 1 showed that among participants who perceived their own health as poor, the high intonation led to a significant drop in persuasion. In Study 2 this effect was replicated and, in addition, the drop in intention was prevented by the self-affirmation procedure.

CONCLUSION(S): A high level of intonation seems to induce a strong self-threat in those for whom the information is personally relevant. To cope with this threat, a defensive reaction is mobilized. These findings suggest that it is important to take into account the influence of voice intonation when health messages on behavioral nutrition are communicated auditory.

P318 US federal food education program generates significant dietary changes in resource-limited families, but few predictive factors revealed
Hoerr SL, Miller SR, Leschewski A, Weatherspoon D, Newkirk C, LaShore M

PURPOSE: The purpose of this study was to examine which changes in behaviors predicted the greatest change in diet quality following a primarily home-based, peer educator taught federal program for low income families in the United States. Federal, state and local governments have funded the Expanded Food and Nutrition Education Program for the last 50 years to teach families about food shopping, planning, budgeting, preparation and food safety along with how to choose a healthy diet. There are few reports on predictors of the program’s effectiveness to improve diet quality among participants.

METHOD: Participants (n=381) from Michigan, completing at least 6 lessons in 4+ weeks, also completed a 24-hour dietary recall and 20-item behavioral checklist, before and after
the program. Diets were analyzed and energy-adjusted Healthy Eating Index (HEI) scores calculated to indicate changes in diet quality (scored 1-100, higher scores desired). Similarly, changes in the Likert-scored behavioral checklist items were analyzed.

RESULT(S): Energy-adjusted HEI scores increased from 52.4+31.5 to 65.9+61.8 (Mean+SD, p<0.001). All behavioral changes improved (p<0.01) with the exception of eating at least 1 cup of fruit/day. Nine behavior changes related to positive changes in HEI scores (r=0.137 to 0.270, p<0.01) such as food planning, shopping, preparation, health awareness and label reading. Those participants who improved their HEI score to >63 reported higher incomes within this resource-limited sample.

CONCLUSION(S): There were striking improvements in both the diet quality and health behaviors following this federal food education program, but such changes were weakly associated with each other.

P319 Promoting fruit and vegetable intake through farmers markets: perceived barriers in Virginia
Misyak S, Serrano EL

PURPOSE: As of 2010, the majority of adults and children in Virginia do not get the recommended serving of both fruits and vegetables (77% and 88%, respectively) (atlasva.com). Farmers markets are an emerging strategy across the United States to provide access to fresh fruits and vegetables, particularly for low-income populations or in food desert locations.

METHOD: A pilot study was completed in which Supplemental Nutrition Assistance Program (SNAP) (the largest government nutrition assistance program)-eligible mothers were given tours of a farmers market in Southwest Virginia accepting electronic benefit transfer and utilizing a fund matching program in which a market gives EBT users an amount of money equal to the amount they are spending in benefits at a market. The mothers participated either in a modified focus group or individual exit interviews following the tours in which they were asked about the barriers and benefits to future attendance.

RESULT(S): Barriers concerning their children included: 1) danger in crossing roads with traffic with young children, 2) trouble with controlling behavior in an open-air environment, 3) children’s discomfort with being either hot or cold in an open air market, and 4) market hours not matching up with when children are in day care or school. Benefits identified included 1) better-tasting fruits and vegetables and 2) increased willingness to try new foods.

CONCLUSION(S): Further research is needed to determine if farmers market attendance is an appropriate strategy for increasing fruit and vegetable intake, especially among low-income children.
**P320**  Do supermarket interventions improve food access, fruit and vegetable intake and BMI? Evaluation of the Philadelphia Fresh Food Financing Initiative  
Cummins S, Flint E, Matthews SA

**PURPOSE:** Structural interventions to improve access to healthy food in deprived communities are a current policy priority. This paper is a first attempt to evaluate the effect of such an intervention on perceptions of the food environment, fruit and vegetable intake and BMI in Philadelphia, USA.

**METHOD:** This study utilised a prospective quasi-experimental design comparing an “intervention” community with a matched “comparison” community. The intervention was the introduction of a large food supermarket in an underserved area. Outcomes were BMI; weekly fruit and vegetable consumption; and perception of the neighbourhood food environment. Data were analysed using an intention-to-treat (ITT) and adopters vs non-adopters (ANA) approach. Difference-in-differences analyses (DID) assessed whether significantly different changes over time existed between intervention and comparison groups.

**RESULT(S):** In ITT and ANA analyses no significant difference-in-differences in mean BMI and mean weekly fruit and vegetable consumption were found. In ITT analyses there was a significant improvement in perceptions of the food environment in the intervention neighbourhood. Using ANA, a similar result was found for adopters, with those who used the grocery store as their primary shop and those who used it for any food shopping having significantly better perceptions of the neighbourhood food environment. After adjustment, ITT & ANA analyses remained significant, but with some attenuation.

**CONCLUSION(S):** The introduction of a new grocery store has a positive effect on how local residents perceive the quality of their neighbourhood food environment. However, this did not have a significant effect on fruit and vegetable consumption or BMI.

**P321**  How does health literacy status influence enrollment and engagement in a sugar-sweetened beverage intervention?  

**PURPOSE:** To determine how health literacy status influences reach, including enrollment and engagement [i.e. attendance at 3 small group classes and completion of 11 interactive voice recording (IVR) calls], of an on-going 2-group RCT health literacy intervention targeting sugar-sweetened beverage behaviors in southwest Virginia.

**METHOD:** The eligibility screener includes 3 validated items for perceived health literacy skills and the enrollment assessment includes the Newest Vital Sign, an objective and validated health literacy measure. Descriptive statistics and ANOVAs were used.
RESULT(S): To date, 317 participants have been screened, of which 194 (61%) have been eligible and 123 (63%) enrolled. Enrolled participants include: mean age 42±14 years, 91% non-Hispanic white, 77% female, 66% annual household income <$25,000, 31% <college education, and 35% with low health literacy status. Among eligible participants, health literacy status has not been significantly different among those enrolled versus not enrolled (F=0.03, p=0.86). Of 3 small group session, attendance has not been significantly different among low (2.2+1.0) versus high (2.0+1.0) health literate participants (F=0.27; p=0.63). Similarly, the proportion of IVR calls completed has not been significantly different among low (61+33%) versus high (60+39%) health literate participants (F=0.01; p=0.93).

CONCLUSION(S): Although health literacy is linked to numerous poor health outcomes, few studies have considered how health literacy status influences intervention reach. Our findings indicate low and high health literate participants are enrolling in and engaging in this intervention at similar rates, which helps inform the potential public health impact of on-going efforts to reduce sugar-sweetened beverage intake.

P322 Nutrition assistance programs at farmers’ markets improve dietary quality in the US
Misyak S

PURPOSE: The Supplemental Nutrition Assistance Program (SNAP) is increasingly being accepted at farmers’ markets throughout the U.S. to improve access to fresh and healthy foods for limited resource populations while supporting the local food economy. The presentation focuses on the effectiveness of these efforts in reaching the designated audiences and improving overall dietary quality.

METHOD: A study was conducted on the perceptions of limited-resource mothers of young children on the use of SNAP benefits and a fund-matching program which uses private donations to match funds spent by low-income populations, doubling the amount of money they have to spend, at a farmers’ market in southwestern Virginia.

RESULT(S): Initial qualitative data indicates limited-resource mothers respond favorably to the acceptance of SNAP and the fund-matching program at farmers’ markets and that their diet is improved by shopping at a farmers’ market compared to a supermarket. Participants cite increased advertising as a strategy to bolster awareness of SNAP acceptance and fund-matching programs to increase food access for other low-income individuals.

CONCLUSION(S): The acceptance of SNAP at farmers’ markets is emerging as an approach for increasing food access and improving dietary quality for limited resource populations, although more comprehensive studies are warranted. The initial findings from this study will be examined and compared to other new and creative strategies to increase food access and improve diet quality through an interactive discussion.
P323  Development of a mobile phone application for improving iron intake and status in premenopausal women with low iron stores
Booth AO, Riddell LJ, Szymlek-Gay E, Lim K, Nowson CA

PURPOSE: To develop a mobile phone application to assist premenopausal women with low iron stores improve their dietary iron intake and iron status.

METHOD: A literature search was conducted to identify the key effective behavioural change techniques for eHealth interventions and key dietary factors associated with iron intake and or iron status in women. The findings were used to inform the development of the mobile phone application.

RESULT(S): Goal setting, tailored advice, feedback, self-monitoring, education and reminders were identified as effective techniques for dietary behaviour change. Four effective dietary change techniques that can improve iron intake, absorption and or status in women were identified. These include: increased intake of iron-fortified foods, consumption of vitamin C with meals, increased intake of iron-rich foods and avoiding drinking tea and coffee with meals. The application included: dietary goal setting and monitoring; reminders; interactive games; and information about dietary iron including iron-rich food sources, vitamin C-rich sources, and iron absorption enhancers and inhibitors. During the design of the application it was apparent there were some limitations in its ability to collect dietary intake data suitable for research; therefore, the application will be used in combination with a website.

CONCLUSION(S): A search of the literature allows for the development of an evidence-based mobile phone application for dietary behaviour change. The application will be pilot tested and, following potential modifications, its efficacy for improving iron intake and status in premenopausal women with low iron stores will be evaluated in a 12-week randomised controlled trial.

P324  EatSMART- A feasibility trial of a price incentive intervention to promote the uptake of healthy eating options in workplace canteens
Anderson AS, Mackison D, Macleod M, Mooney J

PURPOSE: To assess the feasibility of implementing and evaluating a 10-week price incentive intervention in workplace canteens to inform a future RCT.

METHOD: The intervention was informed by interviews with workplace catering staff and focus group discussions with consumers. Assessments included canteen measures of uptake and individual level measures of food habits using online pre- and post-intervention questionnaires. Qualitative measures of caterers and consumer acceptability were also undertaken.
RESULT(S): Three (of a possible 13) worksites initiated and two sites (1430 staff) completed the study. Pre-intervention findings indicated that price, product quality and quick service were key to intervention design which resulted in a meal deal (soup and sandwich/salad) with modified fat, saturated fats, sugar and salt profiles, 10-20% price reduction and a marketing programme. Till data indicated that the uptake of promoted items varied by week (range 60 to 187 items) but at all points there was greater uptake of intervention soup (range 44 to 138 items) than the price incentivised meal deal (range 4 to 31). The response rate for both pre and post questionnaires was poor. Consumers reported perceived value for money of the targeted foods and improved quality but dissatisfaction with choice and marketing. Caterers indicated that support was required to implement the intervention but they intended to continue the programme.

CONCLUSION(S): The intervention was feasible to implement but merits further investigation to develop the intervention, engage caterers and improve questionnaire response rates. Key challenges included recruitment and retention of worksites.

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**P325**  
**Impact of the UK voluntary sodium reduction targets on the sodium content of processed foods from 2006 to 2011: analysis of household consumer panel data**  
Eyles H, Webster J, Jebb S, Capelin C, Neal B, Ni Mhurchu C

PURPOSE: In 2006 the UK Food Standards Agency (FSA) introduced voluntary sodium reduction targets for more than 80 categories of processed food. The primary purpose of this study was to determine the impact of the FSA targets on the mean sodium content of processed foods in the UK between 2006 and 2011.

METHOD: Household consumer panel data from Kantar UK were used to calculate crude and sales-weighted mean (SE) sodium content for 47,337 products in 2006 and 49,714 products in 2011. Two sample t-tests were used to compare means. A secondary analysis was undertaken to explore reformulation efforts and included only products available for sale in both 2006 and 2011.

RESULT(S): Between 2006 and 2011 there was an overall mean (SE) reduction in sodium content of UK foods of -26 (2) mg/100g (p<0.001), equivalent to a 7% fall (356mg/100g to 330mg/100g). The corresponding sales-weighted reduction was -17 mg/100g (-6%). For products available for sale in both years the crude mean (SE) reduction in sodium was -23 (2) mg/100g (p<0.001), or -7%.

CONCLUSION(S): Between 2006 and 2011 the UK voluntary sodium reduction targets produced a moderate overall reduction in the mean sodium content of processed foods. Whilst encouraging, the majority of sodium in the UK diet is derived from processed foods, and thus greater reductions will be required to deliver the 6g/day UK Government target. Regular monitoring of progress and critical review of the food reformulation strategy will be essential to ensure continued downward movement of the sodium content of UK processed food products.
**P326 Correlates of energy balance related behaviours in preschool children: a systematic review**
De Craemer M, De Decker E, De Bourdeaudhuij I, Vereecken C, Deforche B, Manios Y, Cardon G

PURPOSE: Childhood overweight is a multi-factorial health problem influenced by several factors. The interaction of behaviours like physical activity, sedentary behaviour and eating behaviour determines whether or not a positive energy balance or weight gain is experienced. Knowing the correlates of these behaviours in four- to six- year old children is of major interest for intervention development.

METHOD: Relevant studies were identified by a systematic search in the electronic database PubMed from the 1st of January 1990 up to the 22nd of September 2010. In total, 3920 references were initially screened, which ended up in 33 articles at the end of all screening.

RESULT(S): According to the systematic literature search, attending a rural preschool was positively associated with physical activity. Gender, age and socioeconomic status were not associated with physical activity, while an indeterminate result was found for ethnicity. Gender and ethnicity were not associated with sedentary behaviour and indeterminate results were found for age and socioeconomic status. Preschoolers were more physically active as well as sedentary on weekdays. Watching television was associated with a higher consumption of snacks and sweet beverages.

CONCLUSION(S): Strategies aiming to influence energy balance related behaviours in preschoolers should target both boys and girls and all ethnic groups from low as well as high social status. During the week, there should be a focus on decreasing sedentary behaviour and in the weekend on increasing physical activity. Focusing on television viewing and the consumption of snacks and sweet beverages could/should also be a strategy.

**P327 Self-leadership competency in children is associated with overweight related health behaviours**
Ferland A, Chu YL, Veugelers P

PURPOSE: Despite life skills having been a component of one of the four core areas of the FRESH initiative for over a decade, scant attention in research or intervention has been paid to the role of psychosocial life skills in health. This study aims to investigate whether self-leadership skills are associated with overweight related health behaviours and outcomes in children.

METHOD: The research analyzes cross-sectional survey data from the 2012 REAL Kids Alberta survey, comprising student and home surveys for 2676 grade five students, utilizing random
effects regression models of students clustered by school and adjusted for gender, household income, parental education, and region type. Self leadership was assessed as a composite score of student survey responses assessing behaviours from the Leader in Me program. Diet quality was scored using the Diet Quality Index-International from child responses to the Harvard Youth-Adolescent Food Frequency Questionnaire, and physical activity was assessed using questions from Physical Activity Questionnaire for Children. Body-weight status was calculated by BMI from height and weight measurements collected by REAL Kids assistants according to the International Obesity Task Force cut-off guidelines.

RESULT(S): Student self-leadership scores showed strong association with both health behaviours (p ≪ 0.001), but were not significantly associated with body-weight outcomes.

CONCLUSION(S): The results indicate that personal life skill competencies of children are an important factor in their attainment of better diet quality and physical activity, warranting additional consideration in research and interventions as a determinant of health behaviours.

P328 Parenting styles and health literacy among parents in low-income areas with a high prevalence of overweight and obesity
Södergren M, Singru P, Schafer Elinder L

PURPOSE: Current research shows that parenting styles are associated with children’s dietary intake and physical activity, but less is known about the link between health behaviours and health literacy. The purpose of this cross-sectional study was to explore parenting styles and health literacy as potential explanatory factors for energy balance-related behaviours among families living in deprived areas of Stockholm.

METHOD: Parents (172) of children aged 3-6 years old were interviewed in 2012 using a questionnaire including an adapted version of the Child Feeding Questionnaire (CFQ), and the Newest Vital Sign (NVS) to measure parenting styles and health literacy, respectively. Descriptive statistics and analysis of covariance tests were used to examine survey data.

RESULT(S): The mean parent’s age was 33.7 (SD 6.7) and BMI 25.4 (SD 4.3). Preliminary results showed that 34% of participants had low health literacy, whereas 19% had adequate health literacy. Controlling for education level and BMI, the multivariate models revealed that health literacy was associated with parental restriction, e.g. restricting specific foods and sedentary time (p<0.05).

CONCLUSION(S): Parenting styles and health literacy are both important health determinants. There is limited research available on health literacy among populations known to be at increased risk of obesity. Given the emerging research indicating a relationship between restrictive parental style and child weight, this study highlights the need to explore health literacy and parenting styles further.
P329  
**Children’s understandings of healthy eating and physical activity behaviors – A qualitative study**  
Silva P, Carrapatoso S, Novais C, Queirós P, Santos P

**PURPOSE:** The purpose of this study was to understand children’s perceptions about healthy behaviors concerning nutrition and active lifestyle.

**METHOD:** The research involved a variety of qualitative methods including participant observation and focus group. This occurred along with semi-structured research conversations that were carried out with 28 children (14 girls and 14 boys) for the 1st grade, in a primary school from Porto, Portugal) throughout a game with a range of images, stressing that visual stimuli is one of activities that may be used within the context focus group to provide a basis for discussion. Twenty images of healthy (e.g. riding a bicycle; running; eating fruits, bread) and unhealthy behaviors (e.g. soft drinks, pizza, quick bread with chocolate, watching TV) concerning nutrition and active lifestyle were presented, children had to put in order 16 of the 20 images from the most important healthy behavior to the least, and had to exclude 4 (the most unhealthy behaviors).

**RESULT(S):** The five most important healthy behaviors for children were eating fruits, salads, breads, fishes and cornflakes. The following five were running, riding bicycle, walk the dog, walking with a backpack and climbing stairs. The behaviors that were excluded are related to nutrition: eating gums, cakes, pizzas and sodas.

**CONCLUSION(S):** The overall findings suggest that children recognize that healthy behaviors related to healthy eating are more important than physical activity behaviors.

P330  
**Understanding the relationship between food environments, deprivation and childhood overweight and obesity: evidence from England**  
Cetateanu A, Jones AP

**PURPOSE:** We explore the hypotheses that characteristics of the neighbourhood food environment are associated with weight status in English children and also mediate the well-known association between deprivation and weight status.

**METHOD:** This is a cross-sectional study utilising the data collected annually in English primary (4 to 5yrs) and secondary (10 to 11yrs) schools from the National Child Measurement Programme (NCMP). The primary outcomes were the percentages of obese and overweight children aged 4 to 5 and 10 to 11 in census Middle Super Output Areas (MSOAs) between 2007 and 2010. Primary exposures were measures of access to the food environment based on the location of food outlets from the Ordnance Survey Points of Interest database. Associations between weight status and the food exposure were investigated using regression models. Potential mediation was examined using the methods of Preacher and Hayes.
RESULT(S): After adjustment, the prevalence of overweight and obese 10 to 11 year old children was 0.84% (95% CI 0.54 - 1.15) higher in areas in the highest quartile of fast food outlet provision compared to the lowest. In mediation analysis, 21% of the total effect of deprivation on obesity in secondary school children in England was explained by the number of fast food outlets in the area. For primary school children this figure was just 1%.

CONCLUSION(S): Children’s weight status may be influenced by their local environment, and efforts to create healthier food environments may reduce socioeconomic disparities in obesity, particularly in older children.

P331 School-based assessment of dietary intake, physical activity, and self-perception of weight status among rural adolescents
McAllister T, Murimi M

PURPOSE: Residents of rural communities face unique challenges to maintaining a healthy weight and lifestyle. Furthermore, adolescents experience their own set of influences. The aim of this study was to determine if relationships exist between multiple lifestyle, knowledge, and weight factors among rural adolescents.

METHOD: The adolescent sample was recruited from a local school as part of a larger, longitudinal study. Students completed four questionnaires: health questionnaire, food knowledge survey, physical activity questionnaire, and food frequency questionnaire. Anthropometric data were also collected on each student. BMI-for-age percentiles, exercise frequency and intensity, attitude toward exercise, time spent engaged in sedentary activity, dietary fat intake, knowledge of dietary fat, and perception of weight status were used for this study. T-tests and Pearson’s correlations were computed using SPSS.

RESULT(S): A total of 237 students, 9-19 years old, were included in the study. Significant negative correlations were found between time spent on sedentary activity and the number of times the students reported engaging in exercise and between participants’ BMI-for-age percentile and the number of days they engaged in exercise. Students who perceived physical activity as “fun” and “looked forward” to it engaged in greater amounts of exercise versus those who perceived physical activity as “boring” and tried to “avoid” it. No significant relationships were found with knowledge, intake, and perception of weight.

CONCLUSION(S): This study shows the importance of making physical activity fun and reducing opportunities for sedentary activities in an effort to increase adolescents’ participation in physical activity and reduce BMI.
**P332**  
Home, school and GPS-derived exposures to food and built environments; associations with body weight in children  
Burgoine T, Jones AP, Brouwer R, Neelon SB

PURPOSE: Children’s dietary and physical activity (PA) behaviours, and theoretically their body weight, may be shaped by environmental exposures. However, we need to better understand how daily exposures contribute to adiposity. Features of home, school and route environments that children actually encounter whilst travelling to/from school are understudied. Using GPS data, we calculated true exposures to food, PA and built environments, and examined their association with body weight in 94 children ages 5 to 12 years in North Carolina (NC).

METHOD: Participants from the NC on the Move study wore GPS devices over one full week in 2011, whilst parents completed an accompanying self-report questionnaire. We used inverse distance weighting to define home/school environment exposures. We extracted journeys to/from school (n=775) from GPS data and then modelled measures of food/fast food outlets, PA facilities, green space, road safety/speed, street connectivity and land use encountered on route in relation to age-specific BMI z-scores.

RESULT(S): Among girls, greater home access to fast food outlets was associated with higher BMI (test for trend, $\beta=0.143$, 95% CI 0.023, 0.262), and greater school walkability with lower BMI (trend, $\beta=-23.576$, -38.787, -8.366). For both sexes, more school green space access, and greater home walkability was associated with higher BMI. We did not observe associations between BMI and route exposures.

CONCLUSION(S): This study has shown how GPS data can be used to measure actual exposure in various environments. We observed relatively few associations with BMI in this group, which may reflect the difficulty of capturing the myriad influences on body weight.

**P333**  
A qualitative study of key informant views about barriers and strategies to enhance compliance with nutrition and physical activity guidelines in Family Child Care Homes (FCCHs) in Massachusetts, USA  
Lindsay AC, Salkeld JA, Greaney M, Sussner K

PURPOSE: America’s young children increasingly have a high participation rate in some form of child care. Thus, child care providers have increasingly become a primary source of early social influence for young children, and care settings represent a potential venue to help children develop healthy eating and physical activity (PA) habits. However, care providers, particularly in small group and family home settings, may have limited skills and training resources to help foster these early healthful foundations for the young children they serve.

METHOD: We interviewed 16 supervisory staff members to serve as key informants (KI) regarding Massachusetts agencies affiliated with child care (including Family Child Care...
Homes – FCCH) licensing, training, and food program. We targeted at least one KI at the following agencies in each of four geographic regions of the state: Early Education and Care licensing regulatory office, Family Child Care System, and Child and Adult Care Food Program.

RESULT(S): State regulations stipulate that providers serve meals and snacks in compliance with USDA guidelines; also, that children in care receive 60 minutes PA daily. Several limitations and barriers were identified for effective implementation of these regulations; as well as the role of each agency in helping carry them out in Family Child Care Homes. Enhanced training and education resources are needed to improve providers’ ability to comply with State regulations regarding nutrition, PA thus improving prospect of preventing childhood obesity.

CONCLUSION(S): State FCCH agencies support potential venues for bolstering provider skills, especially those able to be economically disseminated to a state-wide audience.

P334 Development of activity based interviews to measure young children’s understanding of eating, physical activity and media effects

Lanigan J

PURPOSE: To develop a standardized process using developmentally appropriate methods to assess the knowledge that children ages 3-5 have constructed about eating, physical activity and media effects.

METHOD: In Phase 1, a qualitative study was conducted with 81 children aged 3-5 from diverse socio-economic and ethnic backgrounds to explore the capacity of an activity-based interview(ABI) to assess young children’s healthy weight knowledge. A constant comparative analysis was conducted to identify themes and subthemes and develop a coding system. Phase 2 is in process. The ABI has been analyzed to identify which items/activities elicited responses that indicated children’s level of health knowledge; three standardized ABI guides are being written to assess children’s understanding of eating, physical activity and media; and a 10 level criterion-referenced rubric to measure the continuum of development for each ABI is being developed. Pilot testing is planned for spring 2013.

RESULT(S): Phase I found that ABIs were effective in assessing children’s understanding of healthy weight issues. Children demonstrated better, though incomplete, knowledge of the benefits of healthy eating compared with physical activity. Three quarters of the children were unable to articulate reasons for healthy choices. Media was identified as the source of health understanding more frequently than caregivers.

CONCLUSION(S): Obesity prevention efforts targeting young children need to use consistent messaging across all contexts in which children develop in order to increase children’s understanding that physical activity and eating choices support health. ABIs can assess the effectiveness of such efforts and identify misconceptions or key gaps in in young children’s understanding.

PURPOSE: Determine the influence of family structure on obesogenic and lifestyle behaviors in a nationally representative sample of American children.

METHOD: The sample size for the current study was 55,094 children (52% boys) ages 6-18 years from the 2007 National Survey of Children’s Health. All child variables were proxy-reported. Family structure was classified as: two-parent biological/adoptive (referred), two-parent blended, single-mother, and other. Presence of bedroom TV (BTV) was reported. Elevated weekday TV viewing was classified as >1hr/day. Previous week insufficient physical activity (PA) was classified as <7 days of 20 minutes/day. Irregular family meals were classified as dining as a family ≤3 nights per week. Logistic regression models were adjusted for age, sex, race/ethnicity, poverty level, and number of children.

RESULT(S): Participant family structure was 63% two-parent; 11% blended, 20% single-mother and 7% other. 49% reported BTV, 50% reported elevated TV viewing, 70% reported insufficient PA, 26% reported irregular family dining. Blended (odds ratio (OR): 1.84, 95% CI 1.53, 2.20), single-mother (1.47; 1.25, 1.70), and other (1.27; 1.02, 1.59) had higher odds of BTV. Blended families were more likely to have elevated TV viewing (1.30; 1.10, 1.54). There was no difference between family structures regarding insufficient PA. Single-mother families were more likely (1.27; 1.07, 1.51) to have irregular family dinners vs. two-parent.

CONCLUSION(S): Family structure, independent of poverty, race/ethnicity, household size, age and sex is associated with obesogenic behaviors related to TV and dining rather than PA. More research is needed to understand these phenomena and to tailor family-specific interventions.

**P336** Can ethnic background differences in children’s body composition be explained by differences in energy balance-related behaviors? A mediation analysis within the ENERGY project
Fernández-Alvira JM, te Velde SJ, Singh AS, Jiménez-Pavón D, Androutsos O, Moreno L, Brug J

PURPOSE: To assess whether ethnicity differences in children’s body composition is explained by energy balance-related behaviors (EBRBs) differences in two sub-samples of the ENERGY-project whith evident ethnic differences (i.e. Dutch and Greek subsamples).

METHOD: 919 Dutch and 1083 Greek children participating in the ENERGY-project were included. Body Mass Index (BMI), and waist circumference (WC) were used as indicators of
body composition. Physical activity, sedentary, dietary behavior, and sleep duration was assessed by child and parent-report. Native and non-native ethnic background was based on language spoken at home and the parent’s country of birth. For those EBRBs presenting significant differences by ethnicity, mediation analysis (product-of-coefficients test by MacKinnon) was applied. All models were adjusted for age, gender and additionally for parental education.

RESULT(S): Greek native children presented higher BMI and WC compared to non-natives, while Dutch native children showed lower BMI and WC. Partial mediation in the associations between ethnicity and children’s body composition was found for several EBRBs, i.e. sugared drinks intake and sleep duration in the Greek sample, and breakfast in the Dutch sample (based on country of origin of the parents). Mediated effects explained between 8% and 24% of the total associations. A suppression effect was found for sports in the Greek sample. No mediation effect was found for the other EBRBs.

CONCLUSION(S): Ethnic differences in children’s body composition could partially be explained by differences in sugared drinks intake, sleep duration and breakfast. In order to reduce ethnic gradients in weight status, intervention strategies should target these behaviours.

P337 Relationship of Chinese American parental perceptions, feeding practices and feeding styles and level of acculturation to their school-age child’s weight status
Pai H-L, Contento IR, Lee H

PURPOSE: To examine the relationships among parental perceptions, concerns, feeding practices, feeding styles, level of acculturation, and children’s weight status in Chinese Americans.

METHOD: A cross-sectional study of parents across a wide SES range with children 5 to 10 years old (n=507) used a self-reported survey instrument that included the Child Feeding Questionnaire, Caregiver’s Feeding Styles Questionnaire, and Suinn-Lew Asian Self-Identity Acculturation Scale. Descriptive statistics, correlations, and analysis of variance (ANOVA) were used for data analysis.

RESULT(S): The prevalence of overweight was 11.8% and obesity 11.3%. Children’s %BMI for age was significantly positively correlated to parental perceptions of child weight (p<.001) and concerns about child weight (p<.001); and negatively correlated to the feeding practice of pressure to eat (p<.001) and with the feeding style of demandingness, but not to parental level of acculturation (PLA) likely due to lack of variance as the sample was at low PLA. PLA was, however, positively correlated with concern about child weight, the practices of pressure to eat and child monitoring, and the feeding style of responsiveness. Level of parental acculturation was also correlated with length stay in USA (p<.001), education (p<.001), and family income (p<.001).
CONCLUSION(S): Children’s %BMI is correlated to some parental concerns, but negatively to pressure to eat and demandingness, opposite to findings in other samples. The low PLA of the sample may account for these results. This finding suggests that cultural differences are important to explore in studies of parental feeding practices and feeding styles.

P338 Evaluation of the food environment and children’s weight status in a rural community
Gell NM, Marzen LJ, Wadsworth DD, Robinson LE

PURPOSE: The aim of this study was to evaluate the relationship between children’s body mass index (BMI) and the food environment where they reside, including access to healthy food options.

METHOD: This cross-sectional observational study integrated geocoded food source data, healthy food availability, and BMI for school-age children (ages 5 – 12 years) from a rural, low socioeconomic county in Alabama. All food sources in the county, including grocery stores, convenience stores, fast food outlets, and restaurants, were evaluated using the Nutrition Environment Measures Survey. Bivariate analysis was used to explore associations between weight status and average healthy food availability scores and the number of food sources within a 2-mile and 5-mile buffer of home residence.

RESULT(S): Of the 620 subjects, 28% were categorized as obese which is higher than both state and national averages. Analysis of the food sources within 2-mile and 5-mile buffers from the child’s home showed no significant differences in mean healthy food availability scores or number of food sources between normal weight and obese children. Little variance was found for healthy food options across food sources in the county with the majority, including grocery stores, having low overall scores.

CONCLUSION(S): The lack of a significant association between weight status and the food environment may be more attributable to a lack of availability of healthy food options overall in this county. Therefore, it appears that community initiatives are needed to focus on supporting healthy food options in localized regions with minimal access.

P339 Raising children with a healthy lifestyle: results of focus groups investigating parents’ reactions to their child’s unhealthy behavior
De Lepeleere S, DeSmet A, Cardon G, De Bourdeaudhuij I

PURPOSE: To support parents and improve the health and development of young children, there is a need for concrete examples to improve parenting skills related to healthy eating, physical activity (PA) and limited sedentary behavior (SB). Therefore, this exploratory study investigates experienced difficulties and perceived effective and ineffective parenting
strategies in raising healthy children.

METHOD: Four focus groups were conducted at worksites during lunch hour among a total of 21 unrelated parents of primary schoolchildren (6 fathers, 15 mothers). Typical difficult situations around healthy diet, PA and SB were based on anecdotal reports and introduced in a short written questionnaire. These situations formed the backbone for the subsequent focus group discussions. Discussions were audio-recorded and analyzed in NVivo to identify key response items using thematic analysis.

RESULT(S): Parents experienced suddenly protesting to leave for the sports club, not wanting to eat vegetables/fruit and not listening to stop playing on the Nintendo, as most difficult situations. Explaining, monitoring, being consistent, offering alternatives, reacting empathetically, modeling, motivating, increasing intrinsic value and availability, and the use of time-out were mentioned as effective strategies whereas giving in and aggressiveness were considered ineffective. Opinions were mixed about the effectiveness of giving as much freedom as possible, obliging, rewarding and punishing, and setting rules and agreements.

CONCLUSION(S): Parents identified numerous strategies to react to their child’s unhealthy behavior. Because the perceived effectiveness of those strategies is not always consistent with literature, future intervention programs should teach parents appropriate parenting skills related to healthy eating, PA and SB.

P340 Comparing health-related behavior patterns between German adolescent boys and girls
Spengler S, Peterhans E, Mensink GBM, Woll A

PURPOSE: A previous study on clustering physical activity, media use and dietary behavior in adolescents with the goal of understanding the interactions among these and identifying typical behavior patterns indicated that health-related behavior patterns may differ between boys and girls. The aims of the present study were (a) to determine sex specific health-related behavior patterns of boys and girls by identifying clusters for each sex separately and (b) to compare the socio-demographic correlates of and the prevalence of overweight within these clusters.

METHOD: Within the framework of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS) and the Motoric Module (MoMo), 832 boys and 811 girls (11–17y) completed a questionnaire assessing frequency and duration of leisure time activities and food intake. The indices ‘physical activity’, ‘media use’ and ‘healthy nutrition’ were derived and included in a cluster analysis with Ward’s Method and K-means analysis conducted separately for each sex. Chi-square tests were performed for further analysis.

RESULT(S): For each sex, four clusters with similar characteristics on the three included indices were identified: cluster 1—high physical activity score; cluster 2—relatively high healthy nutrition score; cluster 3—high media use score; cluster 4—below average scores on all indices. Cluster size, the level of their characteristics and their correlates differed
between boys and girls.

CONCLUSION(S): While there are similar behavior patterns in boys and girls, the relationship of these patterns with socio-demographic and health correlates differs between sexes. These results are particularly relevant for the characterization of target groups for primary prevention of lifestyle-related diseases.
Physical activity interventions in children and adolescents

P341  What are the needs for physical and mental health interventions for adolescents in post-conflict and low-income settings: a cross-sectional study in Gulu, Uganda
Richards JA, Foster CE

PURPOSE: Sport-for-development organisations in post-conflict low-income settings claim positive physical and mental health outcomes. These interventions are based on assumptions about the target population and evidence from peaceful high-income settings. There is a paucity of research assessing physical health needs in post-conflict contexts and how these interventions influence mental health.

METHOD: We assessed 1464 adolescents aged 11-14 years in Gulu. Physical health was measured with the multi-stage fitness test (MFT), standing broad jump (SBJ), BMI-for-age (BFA) and height-for-age (HFA). The Acholi Psychosocial Assessment Instrument was used to assess local depression-like and anxiety-like syndromes. The MFT and SBJ results were compared to global norms using an independent t-test. The BFA and HFA results were categorized according to WHO reference data and significant deviations were identified using 95% CIs. Each physical health variable was plotted against the mental health outcomes and Pearson’s r correlation coefficients were calculated.

RESULT(S): The Gulu sample performed significantly worse than global norms in the MFT for boys (p<0.05) and girls (p<0.001), but better than normative values in the SBJ for both genders (p<0.001). Approximately 90% of the Gulu sample was in the healthy range for BFA and HFA with relatively low levels of overweight and malnourishment. There were no relationships between any of the physical and mental health outcomes (r<0.1).

CONCLUSION(S): Gulu adolescents need to improve their cardiopulmonary fitness, but their muscular power and body composition appear to be healthy. Interventions thought to improve mental health solely by increasing physical activity and fitness are unlikely to be successful in this setting.

P342  Who is reached by sport-for-development programmes delivered as voluntary and community-based football leagues: a case-study in Gulu, Uganda
Richards JA, Foster CE

PURPOSE: Sport-for-development organisations claim positive physical and mental health outcomes in post-conflict low-income settings. It is not known whether these programmes actually reach those who have the greatest health needs. This study compares the physical and mental health of voluntary participants in a competitive sport-for-development league to their peers.
METHOD: We assessed 1464 adolescents aged 11-14 years in Gulu and 227 of them voluntarily registered for a sport-for-development intervention. Physical health was measured with the multi-stage fitness test (MFT), standing broad jump (SBJ), BMI-for-age (BFA) and height-for-age (HFA). The Acholi Psychosocial Assessment Instrument was used to assess local depression-like (DLS) and anxiety-like syndromes (ALS). An independent t-test was used to compare the registered vs. non-registered participants for each outcome.

RESULT(S): The girls registered for the intervention performed significantly better on the MFT \( p<0.001 \). The boys MFT followed a similar trend that was not statistically significant \( p=0.104 \). The registered boys jumped significantly further in the SBJ \( p=0.036 \) and a similar trend was observed for the girls that was not statistically significant \( p=0.130 \). The registered girls had a higher mean HFA than the non-registered group \( p=0.014 \). There was no significant difference between the groups for the boys HFA \( p=0.916 \), BFA \( p=0.831 \), ALS \( p=0.643 \) and DLS \( p=0.095 \) or for the girls BFA \( p=0.619 \), ALS \( p=0.686 \) and DLS \( p=0.702 \).

CONCLUSION(S): The sport-for-development league in Gulu appeared to have a self-selection bias for physically healthier adolescents. Interventions aiming to reach those with the poorest physical health in post-conflict contexts are unlikely to be successful using voluntary and competitive approaches.

P343 Examining the potential of a dance-based physical activity intervention for pre-school children: parents’ interests and views on content and logistics


PURPOSE: Physical activity (PA) levels of 3-5 year old children are below the recommendations of national bodies. Research suggests that increased levels of PA will improve children’s health and may improve their health and wellbeing in later childhood and adulthood. Anecdotal evidence suggests that dance classes appeal to both genders, and are seen as an appropriate means through which to engage preschool-aged children in PA. This research examines parental interest in dance classes and considers the logistical considerations that might influence participation.

METHOD: Semi-structured interviews with 20 parents of 3-5 year old children in Bristol, UK. Interviews were transcribed verbatim, anonymized and coded in accordance to a grounded theory approach.

RESULT(S): Existing provision of dance for preschoolers is considered inappropriate. Parents want their children to attend fun sessions that allow their child to be active in a creative way. Classes should explore a range of musical and dance styles, and be open to all abilities. Per session prices should not exceed £4, and there needs to be flexibility in both payment method and attendance. To increase the appeal to local families, classes should be easily accessible.
CONCLUSION(S): Parents want more opportunities for children to participate in dance classes in structured settings. When reflecting on content, logistical, and financial considerations, participants considered current provision to be largely inappropriate for their own and their child’s needs. These issues were deterrents to participation. To improve retention rates, and thus increase PA levels, dance schools/classes must be developed in light of the needs and circumstances of potential participants.

P344 The importance of school-based health promotion for children’s physical activity outside of school

PURPOSE: To assess the impact of the Alberta Project Promoting active Living & healthy Eating in Schools (APPLE Schools) on children’s physical activity (PA) levels during critical windows, including non-school hours and weekend days. In 2008, APPLE Schools was launched in 10 socioeconomically disadvantaged schools in Alberta, Canada and lasted three years. The project followed a Comprehensive School Health (CSH) framework to promote healthy eating and active living among elementary school children.

METHOD: In 2009 and 2011, we surveyed 1,238 grade five students in 10 APPLE Schools and 20 comparison schools in Alberta, Canada. Children wore time-stamped pedometers for 9 consecutive days, providing 7 full days of data. We applied multilevel regression methods, stratified by gender, to assess changes in PA during non-school hours and weekends between 2009 and 2011.

RESULT(S): In 2011 relative to 2009, boys attending APPLE Schools took significantly more steps/day on weekend days relative to boys elsewhere in Alberta (boys: 2,601, p=0.031).

CONCLUSION(S): These findings provide evidence of the effectiveness of CSH to impact children’s PA during periods when activity levels are low. Accordingly, the study provides evidence to justify broader implementation of effective CSH interventions for the primary prevention of childhood obesity.

P345 The importance of school-based health promotion for physical activity levels of sedentary and low-active children

PURPOSE: To assess the impact of the Alberta Project Promoting active Living & healthy Eating in Schools (APPLE Schools) on physical activity (PA) levels of sedentary and low active children. In 2008, APPLE Schools was launched in 10 socioeconomically disadvantaged schools in Alberta, Canada and lasted three years. The project followed a Comprehensive School Health (CSH) framework to promote healthy eating and active living among elementary school children.
METHOD: In 2009 and 2011, we surveyed 1,238 grade five students in 10 APPLE Schools and 20 comparison schools Alberta, Canada. Children wore time-stamped pedometers for 9 consecutive days, providing 7 full days of data. Sedentary children were defined as those taking <10,000 (boys) and <7,000 (girls) steps/day, respectively. Low-active children were defined as those taking 10,000-12,499 (boys) and 7,000-9,499 (girls) steps/day. We applied multilevel regression methods, stratified by gender to assess changes in PA between 2009 and 2011.

RESULT(S): In 2011 relative to 2009, boys attending APPLE Schools were less likely sedentary and girls were less likely low-active relative to boys and girls elsewhere in Alberta.

CONCLUSION(S): These findings provide evidence of the effectiveness of CSH to impact activity levels of children at high risk of obesity. Accordingly, the study provides evidence to justify broader implementation of effective CSH interventions for the primary prevention of childhood obesity.

P346 Youth leaders’ representations about the role of youth organizations in physical activity promotion
Cloes M, Wilkin S

PURPOSE: Multisectorial actions are needed to fight against sedentariness. Youth organizations (YO) gather thousands of children and adolescents each weekend. Most of them propose to develop all dimensions of the individuals and to contribute to the education of the youth. Unfortunately, very few studies are available to confirm if this is the case. The purpose of this study was to determine if the youth leaders consider that they play a role in physical activity (PA) promotion.

METHOD: A questionnaire was developed and tested by a pilot study. It comprised four parts (Introduction, Descriptive variables; Youth leader’s representations about PA; Youth leader’s representations about the role of the YO in PA promotion). Most of the questions were Lickert scales. Answers of 232 youth leaders were analysed. They were belonging to all youth movements of the Liege area.

RESULT(S): Youth leaders tended to support the idea that YO have to play a role in PA promotion: 57.3% totally agree on the fact that YO allows youth to be physically active; 40.1% consider that it is effectively the case. On the other hand, only 1.3% believes that their group attend to sports during YO’s activities and 4.7% that youth use what they learn about PA in YO in their everyday life.

CONCLUSION(S): This study emphasized that YO should be more involved as an determining actor in the overall PA promotion and that youth leaders should be more systematically informed and prepared about the potential role that they could play.
P347 Modification of cardiometabolic disease risk factors in primary school children: a pilot study
Enslin M, van Biljon A, Semple S

PURPOSE: Cardiometabolic risk is highly prevalent among overweight youth, however limited data exists on the association between physical activity and cardiometabolic risk in children. In addition, whilst physical activity guidelines have been established, little is known about the specific exercise exposures required to reduce cardiometabolic risk. Therefore, the purpose of this study was to examine the effects of exercise intensity and frequency on cardiometabolic risk among overweight/obese children.

METHOD: The 6-week quasi-experimental study consisted of overweight/obese participants that were recruited into one of two groups: group A (n=7) participated in high-frequency (5 days/wk) moderate-intensity (40%-60% of HRR) exercises and group B (n=5) was subject to low-frequency (3 days/wk) vigorous-intensity (60%-80% of HRR) exercises. Anthropometric, cardiometabolic risk and cardiorespiratory fitness measurements were conducted. Group differences were analyzed using the Wilcoxon test.

RESULT(S): Results showed improved cardiometabolic risk and cardiorespiratory fitness in both groups. Although all variables showed a trend towards improvement there were no statistically significant changes (p>0.05) between or within the groups. Percent decline in waist-to-hip ratio and cholesterol were more in group A. Percentage change in cardiorespiratory fitness (18.97%) was higher in group A than in group B (5.8%).

CONCLUSION(S): From this study it is evident that both high-frequency/moderate-intensity and low-frequency/vigorous-intensity exercise training can improve cardiometabolic health among overweight/obese children. Though, high-frequency/moderate-intensity training showed larger increases in percentage change, it was not statistically significant. Furthermore, from a practical point of view low-frequency/vigorous-intensity training interventions could encourage exercise adherence among overweight/obese children.

P348 Evaluating the effectiveness of providing coaching and technical assistance during implementation of a new school physical education (PE) law in RI
Gans KM, Risica PM, Salkeld JA, Gorham G

PURPOSE: To evaluate the effectiveness of providing training and technical assistance to RI schools to improve compliance with a new law (RI General Law 16-22-4), which mandates the amount (100 minutes/week) and type of PE (i.e. focus on developing and maintaining health-related fitness, rather than on sports/competition).

METHOD: 4 low income elementary schools were recruited and demographically matched. Baseline assessments from November 2011 to March 2012 included surveys and focus groups with 3rd and 4th grade students, key informant interviews with school staff, and
objective measures of student PA during PE using observation (System for Observing Fitness Instruction Time – SOFIT) and accelerometers. After baseline, we randomized schools to intervention or control. Intervention schools received technical assistance and coaching from March-June 2012 and September-October 2013. Follow-up evaluation began in November 2012 and will finish in March 2013.

RESULT(S): None of the schools are meeting the mandated 100 min/week of PE. Weekly PE minutes averaged 72. Baseline SOFIT data shows that 79% of time in PE class was non-vigorous PA. Similarly, accelerometer data demonstrated that only 24% of time in PE class was spent in moderate-vigorous PA (MVPA). We will present pre-post changes in student PA as well as changes in knowledge, motivation, enthusiasm, and support of school staff and students.

CONCLUSION(S): RI elementary schools fall short of state legislation guidelines for amount and type of PE. We hypothesize that schools receiving the intervention will demonstrate a larger increase in student MVPA than control schools. We will discuss the reasons for the study findings.

**P349 The cost of increasing levels of vigorous physical activity among children: the Liverpool Sporting Playgrounds Project**

PURPOSE: Vigorous Physical Activity (VPA) is related to health risks in children. The aim of this study was to assess the costs associated with increasing VPA among children through the redesign of school playgrounds in Liverpool (UK) as a precursor to assessing the value-for-money.

METHOD: The probability of children engaging in VPA following the redesign of playgrounds was assessed through analysis of accelerometer data from children prior to redesign and at 6-months follow-up. Vigorous physical activity was then related to the costs of redesign of school playgrounds and the cost per percentage increase in probability was estimated.

RESULT(S): The probability of children engaging in 5 or more minutes of VPA per day increased from 12% at baseline to 65% at follow-up. For normal weight children the increase was 58 percentage points while for overweight children the increase was 40 percentage points. The expected one off cost per percentage of children engaging in 5 or more minutes amounted to £7,457; the expected cost per percentage increase amounted to £6,896 and £10,000 for normal and overweight children respectively.

CONCLUSION(S): Strategies for prevention need to demonstrate that they are cost-effective. Enhancing levels of VPA among children through the redesign of school playgrounds suggests that they represent value for money.
Does implementation matter? A systematic review of research on implementation of school based physical activity interventions
Naylor P-J, Nettlefold L, Race D, Hoy C, Ashe M, McKay H

PURPOSE: To systematically review the available evidence surrounding implementation of school-based physical activity (PA) interventions.

METHOD: We searched MEDLINE, EMBASE, CINAHL, SportDiscus, Psych-Info, CENTRAL (Jan 1995 - Feb 2013) for controlled trials of school-based PA interventions targeting children and youth (6-18 years) that reported at least one implementation measure and linked it to at least one health-related outcome. We also conducted targeted, reference list and forward searches.

RESULT(S): We reviewed titles and abstracts of 1691 unique records. Of these, we reviewed full text for 420 articles. We added 137 articles located through supplementary searches. Sixteen papers (n=13 interventions) met inclusion criteria. All studies were efficacy trials; the majority (8/13) conducted in elementary schools. Implementation measures were dose received (8/13 studies; focusing on participant engagement/attendance), dose delivered (4/13 studies; implementation) or dose delivered + fidelity (1/13 studies; implementation of program components). Dose was associated with at least one outcome in 11/13 studies. The five studies that measured dose delivered showed a positive relationship between implementation level and outcome. Approximately two thirds of the studies referenced or provided information about implementation factors while about 25% of studies not fully meeting the inclusion criteria did.

CONCLUSION(S): There is a paucity of evidence linking implementation to outcomes in school-based PA trials. Available studies show implementation matters. The evidence is primarily from efficacy trials and from studies that target students directly. An enhanced focus on the link between implementation and outcome is needed in addition to more information on factors that influence interventions after scale up.

Needs assessment for a school-based intervention to promote physical activity among vocational school students
Kujala E, Absetz P, Liimakka S, Aistrich A, Hynynen S-T, Sniehotta FF, Hankonen N

PURPOSE: Socioeconomic health disparities may be prevented in adolescence, and school setting offers broad reach and feasibility of intervention implementation. Design of complex interventions requires comprehensive evidence synthesis. The objective of this study is to specify needs and capacities for a context-appropriate, evidence- and theory-based intervention to promote physical activity (PA) and decrease sedentary leisure-time among Finnish adolescents in vocational schools.
METHOD: Synthesis of: 1) the Active Life as Adolescent Survey (ALiAS, to be conducted in Spring 2013); 2) a literature review; 3) qualitative interviews of vocational school students (N=15) and 4) discussions with key informants (N=6).

RESULT(S): The key informants were concerned about the wide gap between active and inactive students and time spent sitting among those studying in more sedentary study fields. They also pointed out the need of providing adolescents with positive experiences of PA and aiding them to find their own ways of being physically active, which supports their ability to work. Topics emerging from qualitative student interviews described constraints (e.g. lack of time and motivation, tiredness) and motivation (e.g. friends, positive experiences such as good feelings during and after PA and experiences of personal success and development) for engaging in PA. Screentime and PA emerged as two competing activities for many.

CONCLUSION(S): Conceptual framework for PA and sedentary behaviour and theory- and evidence-based methods for behaviour change will be specified based on the needs assessment. These will be used to inform intervention design together with a group of relevant stakeholders (e.g., teachers, students).

P352 Adolescents’ physical activity in a schoolbased multicomponent intervention study: results from the SPACE Study
Toftager M, Christiansen LB, Ersbøll AK, Kristensen PL, Troelsen J

PURPOSE: The aim of this study was to evaluate the effect of a multicomponent schoolbased intervention in reducing the decline in physical activity among students 11-15 year old. The intervention aimed to change the physical and organizational environment in the schools.

METHOD: A cluster randomised trial was conducted with 14 schools (7 intervention and 7 control) located in the Region of Southern Denmark. PA was measured for seven days with accelerometer(Actigraph GT3X) at baseline in 2010 (students 11-13y), and again two years later (13-15y). Data reduction criteria used: 30 sec of epoch, 24 hours activity, 60 minutes to define non-wear time and 10 hours to define a valid day. MVPA were defined to be >2292 cpm. Linear mixed models were used to estimate the effect of the intervention.

RESULT(S): The analysis revealed no significant difference between the intervention group compared to the control group after two year follow-up. At baseline the intervention and control group had on average 55min of daily MVPA with a decline in both groups at follow-up. Adjusted for baseline, sex, age, weekend/weekdays, number of valid days accepted and clustering within schools and students the intervention group had 5 minutes less of daily MVPA (p=0.38,CI:-16.3;6.3) compared to the control group. Stratified on weekdays/weekend days we found similar results.

CONCLUSION(S): The results did not provide evidence for the overall effect of the schoolbased intervention on PA in weekdays and weekend days in adolescents. Further analyses on PA in school time will be conducted to supplement the overall analyses.
**P353** Effects of different exercise frequencies on body composition and physical fitness in overweight and obese young school-aged children

Alves A, Costa A, Martins J

PURPOSE: To evaluate short-term effects of multicomponent exercise training with different exercise frequencies on body composition (BC) and physical fitness (PF) in overweight and obese young school-aged children.

METHOD: Twenty overweight (BMI ≥ 85th percentile) young school-aged children (14.83±1.5 years old) attending an high school in Portugal were studied. A ten-week multicomponent aerobic, strength and flexibility exercise program, complementary to physical education classes was created. Two experimental groups (G1, n=10, three exercise sessions/week; G2, n=10, two sessions/week) and a control group (CG, n=20) were constituted. Body composition (body mass index [BMI] and body fat percentage [BFP]), aerobic capacity (Pacer test), muscle strength (curl-ups, push-ups) and flexibility (backsaver sit and reach test), were assessed by FITNESSGRAM®.

RESULT(S): After ten weeks, G1 and G2 decreased BMI (3.2% and 4.6%) and BFP (3.6% and 5.4 %), increased Pacer test (11.6% and 11.2%), curl-ups (21.4% and 25.2), push-ups (30% and 20.7%) and backsaver sit and reach test (6% and 9.9%) results, significantly. However, no significant differences between G1 and G2 were observed. Control group recorded any change at all assessed parameters.

CONCLUSION(S): Short-term multicomponent exercise training improves body composition and physical fitness in overweight and obese young school-aged children. However, different exercise frequencies (two and three sessions/week) appear to produce similar results over 10 weeks of training.

**P354** Examining the effectiveness and feasibility of physical activity consultations to increase physical activity in adolescent girls

Knowles A-M, Henretty J, Niven A, Fawkner S

PURPOSE: Only 11% of Scottish girls aged 11-15 meet the current recommended physical activity (PA) levels and there is a need to identify effective intervention strategies. PA consultations have been shown to be effective in eliciting behaviour change in adult populations, yet there is limited knowledge relating to their use with adolescent girls. The aim of this study was to examine the effectiveness and feasibility of using PA consultations with adolescent girls.

METHOD: 21 adolescent girls aged 13-15 years were identified in the contemplation and preparation stages of change and were randomly allocated to an 8-week PA consultation group (n=12) or a control group (n=9). Measures of PA, stage of change, self-efficacy, self-
regulatory self-efficacy and outcome expectancies were assessed at pre and post intervention. A pupil validity questionnaire was used to assess the feasibility of the consultation. The PA consultation intervention included an initial consultation at baseline (e.g., explore barriers, set goals), a follow-up consultation at week 3 and a reminder at week 6 to reinforce messages delivered during the consultations.

RESULT(S): The intervention group significantly increased their stage of change compared to the control group. There were no significant differences between the groups on changes in other outcome measures. Pupil validity feedback indicated that participants were engaged and bought into the consultations.

CONCLUSION(S): PA consultations had limited effectiveness but appear to be an acceptable strategy for adolescent girls, so future research is warranted.

**P355 Exergame-experience and energy expenditure during Xbox KinectTM and WiiTM games: a study comparing single and duoplayer modes in schoolchildren**

Verhoeven K, Gers B, Seghers J

PURPOSE: There has been growing interest in the use of exergames (i.e. active video games) to influence levels of physical activity and sedentary behaviour. Past research has almost exclusively focused on energy expenditure, concluding that these games constitute light to moderate intensity activity. However, in order to play these games regularly, children should also enjoy themselves. Therefore, this study examined exergame-experience and energy expenditure in schoolchildren. It was hypothesized (1) that Kinect play would be more fun and energy consuming than Wii play and (2) that duoplay would be more fun and energy consuming than singleplay.

METHOD: Eighty-seven children (46 boys, Mage=12.92, SD=0.87) played 6 exergames on a Kinect or Wii console, in a duoplayer and singleplayer mode. We assessed game-experience with the KidsGEQ, and energy expenditure with a SenseWear device.

RESULT(S): Repeated measure analyses showed that most participants enjoyed playing exergames, irrespective of the console type. Children, however, preferred duoplay over singleplay. Further, exergaming expended moderate physical activity, irrespective of the console type or playmode. A significant interaction effect, however, showed that Kinect play expended more energy in duoplay than in singleplay mode (p<.05). For Wii play, no significant difference was found between singleplay and duoplay mode. Wii Kinect Singleplay Duoplay Singleplay Duoplay METS 4.76 (0.91) 4.63 (0.76) 4.49 (0.79) 4.74 (0.88) Enjoyment 6.33 (1.60) 7.66 (2.03) 6.67 (1.66) 7.62 (2.10) Table 1: Energy expenditure and enjoyment

CONCLUSION(S): Children like exergaming, and prefer duoplay over singleplay. The Kinect might be more appropriate for duoplay as it expends more energy.
P356  A whole school approach in the implementation of the “Youth Physical Activity Towards Health” intervention
O’Brien W, Belton S, Issartel J

PURPOSE: Schools have been identified as the most logical environment for targeting an increase in adolescent physical activity (PA) participation and improving fundamental movement skill (FMS) proficiency. The purpose of the Youth Physical Activity Towards Health (Y-PATH) school based intervention was to increase daily PA participation and improve FMS proficiency of youth over the course of one school year.

METHOD: Using a quasi-experimental design, two mixed gender schools from a typical Irish town were selected to either the intervention or control condition. Participants (n = 192) were first year post primary students aged 12 to 14 years. Primary outcome evaluation measurements comparing the two schools during pre, post and three month follow-up included overall time spent in average daily moderate to vigorous physical activity (MVPA), and gross motor skill proficiency in FMS.

RESULT(S): Using a mixed between-within subjects ANOVA, there was a significant interaction for PA (p=0.025) over time between the two schools attended with a greater increase in daily MVPA evident in the intervention school at three months follow up. Secondly, there was also a significant interaction for FMS (p<0.01) over time between the two schools attended with a greater increase in gross motor skill proficiency occurring within the intervention school.

CONCLUSION(S): Results from this exploratory trial provide preliminary evidence for the efficacy of the Y-PATH intervention in increasing PA and FMS levels in adolescents. Further research involving a greater sample size is warranted.

P357  The effectiveness of health-related physical fitness intervention program toward elementary school children
Lin L-F, Chiu T, Lee F-H

PURPOSE: The purpose of this study was to explore the effectiveness of health-related physical fitness intervention program toward Elementary School children.

METHOD: The participants all are the grades six students a total 136, the health-related physical fitness intervention program was conduct to promotes healthy life-style and develop exercise habit. According to exercise interest of students the school children had set classified into a jogging group and dodge ball group. For the jogging group, the school teacher and exercise tutor lead student to do jogging exercise every morning for 30 minute, for the dodge ball group, the athletics teacher guided they do dodge ball exercise for 60 minutes after finish class every day. For the other students they have no intervention.

RESULT(S): The average BMI of dodge ball group was 19.28, not only lower than jogging group (19.39) and non- participants (21.25) but the percentage of overweight of dodge ball
group was also the loweros. For the non-participants, they have highest percentage of overweight (34.99%). The further evaluation the number of school-children had passed “physical fitness medal”, they get prize ratio for the students who participant in health-related physical fitness intervention program was 18.38%, it’s higher than non-participants 8.57%. According to the results, the intervention program had already show an effect.

CONCLUSION(S): This study may be of impotence in applied health-related physical fitness intervention program to promote healthy life-style among elementary school children. As well as providing health educator with a better understanding of how to promote physical fitness intervention program in elementary school.

P358 After-school sports as a vehicle to sports participation
De Meester A, Haerens L, Aelterman N, Cardon G, De Bourdeaudhuij I

PURPOSE: After-school sports programs are considered an ideal channel to reach children who are not yet active in leisure time. The purposes of this study were to evaluate whether children, who participate in after-school sports compared to children who don’t, 1) are better (i.e., more autonomously) or relatively worse (i.e., more controlled) motivated or amotivated to participate in sports; 2) participate more or less in organized sports (outside school) and; 3) are more or less physically active (PA) in day-to-day life.

METHOD: Two hundred forty-eight children (56% boys; M age=10.9 years, SD=0.06) out of 20 classes in 10 Flemish elementary schools completed validated questionnaires to assess PA (FPAQ, Philippaerts et al, 2006) and motivation (BRPEQ, Aelterman et al, 2012). Analyses were conducted with multilevel regression modeling.

RESULT(S): Children who participate in after-school sports, compared to those who don’t, had significantly higher autonomous motivation to participate in sports [β=0.34, S.E.=0.12, χ2(1)=7.55**]. The two groups showed no differences in controlled motivation [β=1.861, S.E.=0.106], χ2(1)=0.118 and amotivation [β=1.475, S.E.=0.098, χ2(1)=0.236]. Further, participators reported significantly higher PA levels (min/week) [β=168.555, S.E.=64.501, χ2(1)=6.829*] and were significantly more involved in organized sports [β=122.689, S.E.=43.698, χ2(1)=7.883**].

CONCLUSION(S): Although after-school programs are considered an optimal channel to promote sports participation and PA among children who are not yet active in leisure time (Van Acker et al, 2012), these programs seem to attract more children who are already more optimally motivated for and more engaged in sports. The question hence rises how children at risk can be more effectively reached through such programs.
**P359** The effects of an intervention conducted by school nurse and physical education tutor on promoting physical activity in adolescent girls
Lee L-L, Fanaw D, Kuo Y-C

PURPOSE: To examine the effect of an intervention conducted by school nurse and physical education tutor and combining self-efficacy theory and pedometers on promoting physical activity among adolescents.

METHOD: An experimental design was employed and junior college students were randomly sampled from four classes and, of those, one each was randomly assigned to either the intervention or the control group. Self-efficacy was used as a core theoretical foundation of the intervention design, and pedometers were provided to students in the intervention group. Physical education tutor conducted the physical activity intervention in classes and school nurse performed roles as a supporter and evaluator. Distances between each domestic scenic spot were illustrated graphically in a walking log for students to mark the extent of their walking or running. Students in the control group participated in the usual physical education programme.

RESULT(S): The mean change in aerobic steps was 371 steps and -108 steps in the intervention and control group, respectively. The difference in mean change between the two groups was 467 steps (95% CI, 117.74 to 816.77 steps, p=.009). Effects of the intervention on changes of cardiopulmonary endurance (p=.108) and perceived exercise self-efficacy scores (p=.22) were not found.

CONCLUSION(S): Among adolescent girls, an intervention designed on the theoretical foundation of self-efficacy theory and provision of pedometers was found to have an effect on increasing their physical activity. The intervention, using graphs of domestic scenic spots to represent the distance of walking or running as monitored by pedometers, might enhance motivation regarding physical activity.

**P360** Effects of a teacher training course on objectively assessed physical activity during PE in 7 to 9 year old children
Martin-Diener E, Wanner M, Frick C, Kriemler S, Martin BW

PURPOSE: A national programme for 5-10 year olds in Switzerland offers extra-curricular physical activity (PA) and sports. Teachers visit a training course qualifying them to teach these lessons. To evaluate the assumption that teachers use the methods acquired in the course also in regular physical education (PE) and thus increase PA among students, the effects of the teacher training on PA during PE were assessed.

METHOD: Quasi-experimental study with 6 intervention and 13 control classes (grades 1-3). Baseline assessments using accelerometers were conducted in April/May and follow-up assessments in September 2012, intervention teachers visited a two-day training course in
June. Children wore the devices for 7 days, teachers were not aware that PA was evaluated specifically for PE lessons. Mixed linear models adjusted for clustering within classes were used to estimate the intervention effect on PA.

RESULT(S): In the 237 children with complete data, sedentary time during 45min PE lessons decreased from 15.4 to 13.5min (p<0.001), and moderate to vigorous activity (MVPA) increased from 12.4 to 13.9min (p<0.001) in the intervention group. In the control group no changes were observed for sedentary time (14.4 to 14.1min, p=0.31) and MVPA (14.3 to 14.3min, p=0.93). In the mixed linear model effects were most pronounced for a reduction in sedentary time (p=0.04) and an increase in vigorous activity (p=0.04) in girls and an increase in MVPA in the most inactive tertile (p=0.06).

CONCLUSION(S): The intervention reduced sedentary time and increased PA in girls and in the most inactive children in the short term.
Physical activity interventions in adults

P361 The Influence of a DVD exercise program on physical function in older adults
Wójcicki TR, Gothe N, Fanning J, Olson EA, Mullen SP, Motl RW, McAuley E

PURPOSE: To examine the effectiveness of a six-month, DVD-delivered exercise intervention on the physical function of older adults. This progressive, home-based exercise program was designed for low-active individuals with the aim of improving flexibility, strength, and balance.

METHOD: Participants (N = 307; M age = 71 years) were recruited and randomly assigned to the exercise program or attentional control condition. Physical function was assessed using the Short Physical Performance Battery (SPPB), a measure of mobility and balance associated with morbidity, mortality, and institutionalization in older adults. The SPPB was assessed at 0, 6, and 12 months. Data were analyzed with repeated measures ANOVA.

RESULT(S): There was a significant time by treatment interaction for the SPPB, F (2,294) = 5.09, p = .007, η² = .03. There was a statistically (p = .006) and clinically significant (.51) effect of the DVD intervention on the SPPB over the six-month trial period but not at 12 month follow-up. There was a significant time by sex interaction, F (2,294) = 3.35, p = .04, η² = .02, with males making greater improvements over time than females. Process evaluations suggested the program to be safe, enjoyable, and appropriate for older adults.

CONCLUSION(S): Delivering exercise programs via DVD can be an effective approach to reaching low-active adults who are unable to attend center-based programs. Whether the length of the program is of sufficient duration to establish improvements which are maintained over time appears questionable. Subsequent effectiveness trials are necessary to further explore the utility of this unique mode of delivery.

P362 Effects of a walking exercise program on the individual, interpersonal and environmental older adults’ perceptions
Carrapatoso S, Silva P, Santos P, Carvalho J

PURPOSE: The promotion of physical activity in elderly has emerged as a public health priority given the negative health and economic consequences on the most inactive segment of the adult population. The study of the environmental perceptions of the physical and social environment related to physical activity can provide a strong example for the construction of physical activity promotion policy. The influences of perceptions of the environment on physical activity behavior have been well documented, although there is a need for greater understanding on how perceptions are influenced by physical activity. The aim of this study was to evaluate the effects of a regular walking exercise program on the individual, interpersonal and environmental older adults’ perceptions.
METHOD: A 10 months walking program was implemented, with a frequency of 3 times per week. After the program semi-structured interviews were conducted with 12 elderly participants of the walking program (65,25±4,33 years old). In order to inspect the interviews results, thematic analysis and interpretation was applied.

The results showed that: (i) participants developed positive perceptions about their level of physical fitness and psychological factors such as depression and self-confidence; (ii) walking become more systematic and organized (exercise); (iii) the participants begin to use new spaces (in nature) to practice walking; (iv) municipality environmental knowledge and interest was developed by the participants.

CONCLUSION(S): These results highlight the potential of walking programs in the development of individual, interpersonal and environmental positive perceptions that promote more active lifestyles, and therefore, should be promoted and implemented for older population.

FUND SOURCING: Project grant FCT/FCOMP-01-0124-FEDER 014697/PTDC/DES/11807/ 2009

P363 A randomized, controlled, five-month trial of exercise interventions in healthy older women: effects on body composition and quality of life
Klimešová I, Wittmannová J, Gába A, Elfmark M

PURPOSE: The aim of the study is to improve the conditions for increasing physical and mental condition of seniors. We used five-month exercise intervention involving Nordic walking (NW) or Hui chun gong exercise (Chinese therapeutic exercise, CE).

METHOD: A total of 48 women aged 60–69 years were randomly divided into three groups (16 persons each) subject to NW, CE, and control group (C). At the beginning and at the end of the intervention programme, all subjects participated in variety of examinations. These included a psychological test, anthropometric measurements, and a walking test. Women involved in NW and CE had tutored exercise lessons twice a week, and once a week they exercised at home.

RESULT(S): There were no significant changes in body weight, BMI, body fat and fat free mass in groups of participants CE and C. The programme NW caused significant weight gain (p < 0.05), increasing the value of BMI (p < 0.05), and fat free mass (p < 0.05). Effect of the walking test was evaluated according to changes of each participant. 20% of participants were detected worse outcome, at the same 30% and 50% improved. The most significant improvement was found in the group NW. We observed a strong positive relationship between improving the physical condition and perception of life satisfaction.

CONCLUSION(S): There was a positive effect both interventions on physical and mental health of participants. It seems that the NW program is more suitable for improving perception of quality of life compared with the program CE.
P364  Need-supportive physical activity counseling in older adults: the mediating role of autonomous motivation in long-term behavior change
Van Hoecke A-S, Delecluse C, Bogaerts A, Boen F

PURPOSE: This study compared the year-round effectiveness of three ten-week physical activity counseling strategies among sedentary older adults (n = 442).

METHOD: The first counseling procedure (REFER) consisted of a single 15-minute contact with a Health Fitness Specialist (HFS) who referred the participants to existing physical activity opportunities in the community. In the second strategy (WALK), the HFS offered an individualized walking program, in addition to the referral. It was assumed that the structured format of this walking program implicitly supported participants’ need for competence. The third counseling method (COACH) involved a multiple-contact individually-tailored coaching based on the Self-Determination Theory. In this condition, the HFS explicitly fostered the needs for autonomy, competence and relatedness. Self-reported physical activity, daily number of steps, autonomous motivation and perceived need-support were measured before (pre-test), immediately after (post-test) and one year after (follow-up-test) the intervention.

RESULT(S): Linear mixed models demonstrated significant time by condition interaction effects from pre- to post-test. More specifically, WALK and COACH yielded larger increases in daily steps and self-reported physical activity than REFER. Similarly, self-reported physical activity increased more from pre- to follow-up-test in WALK and COACH compared with REFER. Autonomous motivation mediated the effect of perceived need-support of the coach on physical activity, irrespective of counseling strategy.

CONCLUSION(S): These results demonstrate the long-term effectiveness of both a one-contact individualized walking program and a more time-consuming need-supportive coaching, especially in comparison with a simple referral to local opportunities. Furthermore, it is suggested that physical activity promotion should aim at facilitating autonomous motivation.

P365  Physical activity promotion among older adults: short term effects of a neighbourhood environment internet-based intervention
Mouton A, Rompen J, Cloes M

PURPOSE: Recent research suggests that internet-based physical activity interventions can be suitable and effective, even for older adults. Besides, neighbourhood environment internet-based interventions are currently considered as more effective than traditional motivational interventions. Therefore, the main purpose of this study was to explore the effects of a neighbourhood environment internet-based intervention on physical activity behaviours of older adults.
**METHOD:** At baseline, 87 older adults (60.69 ± 7.85 years) from the same district were assigned to an intervention (n = 41) or a control (n = 46) group. The two months intervention was composed of a comprehensive physical activity promotion website, with an emphasis on neighbourhood environment contents, and a monthly personalized email based on the stage of change theory. Physical activity behaviours were assessed by the IPAQ short-form and the stage of change questionnaire at baseline, after one and two month of the intervention, and after one month follow-up.

**RESULT(S):** Significant improvements were observed for the stage of change questionnaire in the intervention group from baseline to the end of the intervention (p = 0.003), they remained at follow-up (p = 0.012) while the control group remained unchanged. Physical activity level declined progressively in the control group as it remained constant in the intervention group, with as significant difference between groups after two months intervention (p = 0.027).

**CONCLUSION(S):** These findings suggest that a neighbourhood environment internet-based intervention can improve physical activity behaviours in older adults. Further research on this topic is needed to examine longer term effects with larger sample.

**P366 Knowledge about physical activity among older adults: short term effects of a neighbourhood environment internet-based intervention**  
Mouton A, Rompen J, Cloes M

**PURPOSE:** Despite the numerous health benefits, population physical activity levels are low and decline with age. Few studies exposed that a better knowledge about physical activity could encourage people to become physically active, which constitute a critical health challenge for older people. Moreover, neighbourhood environment internet-based interventions are recommended to promote physical activity. Therefore, the main purpose of this study was to explore the effects of a neighbourhood environment internet-based intervention on knowledge about physical activity among older adults.

**METHOD:** At baseline, 87 older adults (60.69 ± 7.85 years) from the same district were assigned to an intervention (n = 41) or a control (n = 46) group. The two months intervention was composed of a comprehensive physical activity promotion website, with an emphasis on neighbourhood environment contents, and a monthly personalized email based on the stage of change theory. Physical activity knowledge was assessed by questionnaires at baseline, after one and two month of the intervention, and after one month follow-up.

**RESULT(S):** After the intervention, knowledge of the physical activity recommendations significantly improved in the intervention group (p = 0.032), while the control group remained unchanged. Besides, knowledge about environmental opportunities for physical activity increased slightly only in the intervention group.
CONCLUSION(S): These findings suggest that a neighbourhood environment internet-based intervention can result in modest improvements of the physical activity knowledge in older adults. Further research should focus on alternative ways to improve the knowledge about local opportunities for physical activity and its relationship with long term effects on behaviour change.

P367  Which characteristics for an internet-delivered intervention to promote physical activity? Opinions and usages of older adults
Rompen J, Mouton A, Cloes M

PURPOSE: Developing, in a Belgian French-speaking community, an internet-based intervention to promote physical activity among adults over 50 years old. Determining which mediators of this intervention are the most used by participants and which mediators are the most useful to improve their physical activity level.

METHOD: At baseline, 87 older adults (60.69 ± 7.85 years) from the same district were assigned to two groups that have received the intervention. This intervention comprised a comprehensive physical activity promotion website, with an emphasis on neighborhood environment contents, and a monthly personalized e-mail based on the stages of change theory. Assessment tools included a post-satisfaction questionnaire and the measure of the number of visits of each page of the website.

RESULT(S): According to participants, all parts of the intervention were useful. Indeed, all components received a score above 3/6. The most useful parts of the website, according to participants, were the following topics: “Hiking trails maps” (4.46/6), “Set your goals” (4.14/6) and “Tips for beginning” (4.1/6). The most consulted pages of the website were the pages “My activity log” (163), “News” (137) and “Activity programs examples” (114).

CONCLUSION(S): In future actions, all parts of this intervention could be preserved. However, some elements could be added, like an online forum or regular sessions of physical activity with a coach.

P368  Giving meaning to footprints increases stair use in a worksite and a community setting
Boen F, Pelssers J, Seghers J

PURPOSE: Using the stairs instead of the elevator or escalator is an easy and cheap way to increase physical activity. The aim of this study was to test the impact of footprint markers on stair use in a company (February - May 2010) and in a mall (February - June 2011) in Flanders, Belgium. In addition, the combined effect of a message or sign giving meaning to the footprints was examined.

METHOD: A first intervention consisted of placing yellow footprints on the floor leading to
the stairs in both the worksite setting and in the mall. In a second intervention a health promotion message referring to the footprints was added. A third intervention consisted of a congratulation message.

RESULT(S): In total, 5,676 choices were registered at the company and 12,623 choices in the shopping mall. Stair use percentages during baseline, the first, second and third intervention and the follow-up were respectively 27.7%, 31.2%, 43.6%, 44.7%, and 34.6% in the company and 10.9%, 10.9%, 22.3%, 20.3% and 13.5% in the mall.

CONCLUSION(S): These findings indicate that footprint markers by itself resulted in a significant but small increase in the company, whereas no effect was found in the mall. However, stair use increased substantially in both setting when a health sign was added that gave meaning to the footprints. This increase was preserved during the third intervention with a congratulation message. Although stair use decreased significantly in both settings during the follow-up period, it was still significantly higher than at baseline.

P369 A mobile phone intervention to increase exercise in people with cardiovascular disease: results from the HEART trial

PURPOSE: To develop and evaluate a theory-based mobile phone and Internet-delivered (mHealth) exercise-based cardiac rehabilitation programme in New Zealand adults with cardiovascular disease.

METHOD: A two arm, parallel, single blinded randomised controlled trial was conducted. Participants (n=171) were randomised at a 1:1 ratio to either receive a mHealth intervention over and above usual care or to usual care alone (control). The mHealth programme was delivered over six months and consisted of text messages offering exercise prescription and behavioural change strategies and support. Participants also had access to an interactive website containing text and video messages to increase, and maintain regular, exercise behaviour. Usual care involved encouragement to be physically active and an offer to join a local cardiac club. Follow-up was at 6 months and included, peak oxygen uptake (PVO2), self-reported physical activity, six minute walk test, self-efficacy, motivation to exercise and health related quality of life (HRQOL).

RESULT(S): There were no statistical differences observed in physical fitness (PVO2), however significant differences were found in leisure time physical activity, time spent walking, task efficacy and motivation, in favour of the intervention group. There was also a statistical difference in favour of the intervention group for the general health domain of the SF36, HRQOL measure.

CONCLUSION(S): An mHealth intervention is effective at increasing physical activity levels in people with cardiovascular disease. This effect may be mediated by increases in self-efficacy and motivation. The exercise prescription was not intense enough to show a positive effect on physical fitness.
P370  Comparing personally-tailored video- and text-delivered web-based physical activity interventions: an Eye-Tracking Study
Bland S, Vandelanotte C, Persaud N, Horsley M

PURPOSE: Web-based physical activity interventions have the potential to reach large numbers at low cost, however effective ways of delivering health information over the internet is not well understood. Low participant engagement is seen in web-based interventions, which typically deliver the health information in text format. This project aims to compare the efficacy of tailored physical activity advice in text versus video format.

METHOD: Participants (n=41) were randomly assigned to receive either video- or text-tailored advice with identical content. Outcome measures included attention to the advice, measured through advanced eye tracking technology, and recall of the advice, measured through an interview. Between group ANOVA’s and Chi square analyses were conducted to compare attention and recall between the video- and text-groups.

RESULT(S): Participants in the video-group displayed greater attention to the physical activity feedback, in terms of gaze duration on the total screen (9.3min vs. 4.1min; F(1,37)= 61.38 p<001) and on the feedback area of the screen (7.6min vs. 3.6min; F(1,37)= 32.7, p<001). Women and participants who were motivated to increase their physical activity displayed greater attention levels; this was regardless of the intervention group they belonged to (7.4min vs. 6.1min; F(1,37)= 3.83 p=.049 and 6.4min vs. 4.3min; F(1,36)= 3.95 p=.05 respectively). The main message was recalled in both groups, but the details were largely forgotten. No between group differences were found in terms of message recall.

CONCLUSION(S): These results suggest that video-tailored messages lead to improved attention. More research is needed to optimise their impact so that recall and behaviour change is also improved.

P371  The effect of physical activity program to decrease physical disability indicated by musculoskeletal pain and related symptoms among workers: a pilot study
Moreira-Silva I, Santos R, Abreu S, Mota J

PURPOSE: The aim of this study was to verify the effect of PA program and musculoskeletal pain and related symptoms in different body regions among workers.

METHOD: A randomized control trial (RCT) was conducted between November 2010 and September 2011, in multinational manufacturing company with office in Portugal. The intervention lasted 6 months. The training sessions were given during work time. The experimental (EG) (n=39) consisted of 10-15 minutes physical exercise training three times a week and focused on stretching exercises and general strength. The control group (CG) (n=31) were asked to continue their daily activities. Musculoskeletal pain was assessed with the Nordic Questionnaire of Osteoarticular Symptoms. Evaluations were performed at
baseline and at the end of the intervention.

RESULT(S): After the intervention, the EG obtain some significant results regarding to a decrease of the intensity of pain in some anatomic regions evaluated, such as elbow (p=0.03) and dorsal region (p=0.015). If we compared the CG and EG after the six months of the PA program, we can verified that in elbow and thigh/ hip the pain intensity decrease significantly and there is a some tendency to obtain results statistically significant in neck (p=0.063).

CONCLUSION(S): Our intervention seems to have positive benefits to musculoskeletal pain and related symptoms in factory workers.

P372 Twelve months follow up study on the effect of a 12 week resistance training on older people’s physical fitness and reduced risks of falls – The Liveability Programme
Minou M, Stratton G

PURPOSE: This research study aimed to investigate the short-term and long-term effects of a 12-week community based exercise programme on older people’s physical fitness, improving confidence in maintaining balance and reducing the risks of falls

METHOD: The study was a randomised controlled trial with measures taken at baseline, after 12 weeks, at 6 and 12 months. Forty two participants (female=30) aged (60+), were recruited (intervention group=25, comparison group= 17). Twice weekly 1-hour resistance training was conducted in a leisure centre. Questionnaires: Physical Activity Score for Elderly, Falls Risk Assessment Tool, Confidence in Balance, Quality of Life, as well as Senior Fitness Test, Accelerometers and focus groups were used. A 2 x 2 between-groups analysis of ANCOVA was used for all measures. ActiLife version 6 was used to analyse accelerometres' data. Focus group data was transcribed verbatim and analysed thematically.

RESULT(S): The intervention group significantly (p<.05) increased physical activity levels, confidence in maintaining balance and physical fitness and reduced the risk of falls after the 12 weeks. Accelerometres data showed significant difference in light and moderate activity after the 12 weeks. The improvements were maintained at 6 and 12 months. Focus group data suggested improved mental and social health.

CONCLUSION(S): The Liveability programme included 2 hours per week of challenging activities that included a mixture of strength, flexibility and balance exercises in a structured instructor led group session. This mixture of exercises not only increased habitual physical activity but also reduced the risk of falls, improved confidence in balance and increased functional mobility and fitness.
P373  The systematic development of a Flemish intervention to improve empowerment and health behaviour in adults who visit the general practitioner
Plaete J, De Bourdeaudhuij I, Crombez G, Verloigne MM

PURPOSE: The prevalence of metabolic diseases has increased during the past decades, suggesting primary prevention about health behaviour is important. The general practitioner (GP) can positively affect patients’ behavioural choices. But often GP’s report a lack of time which makes it difficult to provide preventive counselling. The objective in this study is to develop an intervention delivered by GP’s that empowers adults (18 to 65 years old) to make changes in physical activity and dietary behaviours.

METHOD: The Intervention Mapping Protocol (IMP) was used for the systematic development of this intervention. By the elaboration of the six steps of the IMP, theoretical and empirical methods were used and program objectives (PO’s), theoretical methods and practical applications were stated.

RESULT(S): The systematic development resulted in a computer tailored intervention existing of three parts, based on the self-regulation theory: goal selection, active goal pursuit and goal attainment. The PO for patients is to develop their own action plan that states which behaviour they will perform, how, when and where. For the GP the PO is to motivate their patients.

CONCLUSION(S): The IMP resulted in the development of a computer tailored intervention, used for developing action plans by patients to achieve health goals. It is suggested that this intervention solves the problem of time burden because it automatically provides tailored information and empowers patients to change their behaviour them self. To ensure the feasibility, focus group research must be conducted in general practice. Also a pilot test to evaluate this intervention will be necessary.

P374  Towards a web-based motivational interviewing intervention for physical activity promotion
Friederichs S, Bolman C, Oenema A, Guyaux J, van Keulen H, Lechner L

PURPOSE: Current research on physical activity (PA) promotion emphasizes the importance of increasing autonomous motivation. Motivational Interviewing (MI) is a client-centered counseling method intended to strengthen autonomous motivation towards behavior change. Evidence shows that MI can be successful in getting individuals to increase their physical activity. Delivering MI in a traditional way, however, is expensive and therefore difficult to scale up. Web-based computer tailoring (CT) could be an interesting alternative delivery channel for MI. Pilot research by our group shows that web-based MI holds promise. The purpose of this presentation is to provide insight into the design of a web-based PA intervention, based on MI: the Ik Beweeg (I Move) intervention.
METHOD: Ik Beweeg is a web-based MI intervention, consisting of four intervention-sessions. In this intervention, web-based CT is used for mimicking an MI dialogue including open-ended questions, affirmations and skilful reflections. Several methods are used such as importance and confidence rulers, exploring values, identifying and affirming strengths and reviewing past successes. Feedback messages are written in a supportive, non-coercive manner. Participants can make their own action and coping plans, and adjust their plans later on. In the later sessions, changes in PA and experiences are discussed.

RESULT(S): Effectiveness and appreciation of web-based MI will be evaluated in a randomized controlled comparing 1) the Ik Beweeg intervention, 2) a traditional (TPB / Stages of Change based) web-based PA intervention and 3) a waiting list control group. Data collection will start in the autumn of 2013.

CONCLUSION(S): Not available yet.

P375 Motivational interviewing in web-based computer tailoring: what question types should be used?
Friederichs S, Oenema A, Bolman C, Guyaux J, van Keulen H, Lechner L

PURPOSE: Evidence illustrates that Motivational Interviewing (MI) can be successful in getting individuals to increase their physical activity (PA). Delivering MI in a traditional way, however, is expensive and therefore difficult to scale up. Web-based computer tailoring (CT) could be an interesting alternative delivery channel for MI. Before it is possible to develop effective web-based MI interventions, however, we need to gain more specific insight on how to integrate MI successfully in web-based CT. The aim of this study was to assess which configuration of question types (open-ended and/or multiple choice) leads to the most favorable results in terms of autonomous motivation and appreciation of the intervention in a web-based computer-tailored PA intervention, based on MI.

METHOD: A randomized trial was conducted among 465 Dutch adults, comparing three web-based computer-tailored PA interventions based on MI: 1) including exclusively open-ended questions, 2) including exclusively multiple choice questions, 3) including both multiple choice questions and open-ended questions. Measurements included motivation-related determinants of PA and process variables, measured at baseline, directly following the intervention and one month post intervention.

RESULT(S): Results suggest that open-ended questions represent an important element in web-based MI in terms of effect on autonomous motivation and appreciation of the intervention. In order to optimize appreciation of the intervention, a combination of both open-ended and multiple choice question types seems to hold most promises.

CONCLUSION(S): The findings of this study suggest that both open-ended and multiple choice questions should be included in web-based computer-tailored MI PA interventions.
P376 Results of a RCT demonstrate that an evidence based physical activity program for seniors with intellectual disabilities is effective
van Schijndel-Speet M, Evenhuis HM, van Wijck R, Echteld MA

PURPOSE: The aim of this study was to evaluate the effectiveness of a day-activity program for improving physical activity (PA), fitness and health in adults older than 45 years with mild or moderate intellectual disabilities (ID).

METHOD: The theory based program included motivational strategies such as education, tailoring grading, active learning, modelling, feedback and reward. The PA program was based on evidence based guidelines and consisted of a variety of suitable PA such as walking and gymnastics. Ten participating day-activity centers of three health care organizations were randomized. 81 older adults with moderate or mild ID participated in the program three times a week during eight months. 70 older adults with ID participated as control and received care as usual. After baseline, level of physical activity and other health outcome measurements were performed after 8 months. The program’s effectiveness was evaluated using generalized estimated equations adjusting for baseline differences.

RESULT(S): 66 participants and 65 controls completed the study successfully. The program was applicable and feasible according to the program’s executors. Drop out (20 out of 151) was mostly caused by factors not related to the program’s content. Program participants significantly improved with respect to physical activity, strength, aerobic capacity, cholesterol, whereas controls declined. Cognitive functioning deteriorated in both groups, but got significantly worse in the control group.

CONCLUSION(S): The developed program is effective and feasible for seniors with ID. The program’s content, such as the behavioral change techniques, may be used among other low IQ populations to promote PA.

P377 A health professional intervention can increase vigorous physical activity in mid-age women at 12 months: results from the 40-Something RCT
Hollis JL, Williams LT, Collins CE, Morgan PJ

PURPOSE: The 40-Something RCT aimed to examine whether a 12-month health professional intervention could improve diet and physical activity (PA) outcomes and prevent weight gain, in non-obese (BMI=18.5-29.9kg/m2) 44-50 year old premenopausal women.

METHOD: Women were randomised to either a Structured Intervention (SI) group (four Dietitian and one Exercise Physiologist consultation using motivational interviewing; n=28) or a Self-Directed Intervention (SDI) group (tailored written advice only; n=26). PA was assessed through the International Physical Activity Questionnaire (IPAQ) short form at baseline (n=54) and 12 months (n=40) to examine intervention effects and at 24 months
(n=30; October 2012) to assess maintenance of behavior change using a non-parametric Wilcoxon signed rank test and Wilcoxon rank sum test (Stata 11) for total and between group changes.

RESULT(S): The median (SD) change in total PA MET-minutes/week significantly increased from baseline (1662(1712.79)) by 514.5(1771.51) MET-minutes/week (p=0.02) at 12 months, but these effects were not maintained at 24 months (7.25(1875.11), p=0.72). There were no significant between group changes in total MET-minutes/week at 12 months (SI=522(1912.55), SDI=511(1667.30); p=0.44) or 24 months (SI=-255(1975.36), SDI=110(1867.36); p=0.98). The SI group significantly increased their vigorous PA MET-minutes/week above the SDI group at 12 months (SI=240(1410.08), SDI=-60(10429.2); p=0.04) but not at 24 months (SI=40(1041), SDI=-480(1007.16); p=0.23).

CONCLUSION(S): The maintenance phase sample size (n=30) may not have been sufficiently powered to assess IPAQ differences. A health professional intervention can increase vigorous PA in mid-age non-obese women. Greater emphasis on increasing self-efficacy and intrinsic motivation during the intervention phase may be required to maintain these effects to 24 months.

P378 Psychological predictors of compensatory responses to a structured exercise program: a pilot study
Schmidt MD, Acitelli RM, Gipson AD, O’Connor PJ, Evans EM

PURPOSE: For many people, exercise interventions for weight management do not result in the expected degree of weight loss, and some participants may even gain weight. Behavior-related compensatory responses [i.e., decrease in leisure-time energy expenditure (EE) and/or increased energy intake (EI)] outside of the intervention are thought to underlie a large portion of the observed differences between measured and expected weight loss with exercise. The aim of this pilot study was to identify possible psychological predictors of behavioral compensation to structured exercise.

METHOD: Young adults (20.6±1.5 years, n=20) participated in an 8-week exercise intervention, with an approximate dose of 120 minutes of moderate-to-vigorous structured exercise per week, where diet and outside activity were measured at three time points (Baseline, Week 5, Week 8). At each time point, subjects wore ActiGraph accelerometers for 7 consecutive days and completed three 24-hour food recalls (National Cancer Institute’s ASA24 program).

RESULT(S): There were no significant mean differences between EI and EE at baseline and Week 8; however, substantial inter-individual variability was observed in changes in both EI and EE. Among the psychological constructs measured at baseline, self-motivation was significantly correlated with change in EI (r = -.61, p<0.05) and positive urgency, a construct related to trait impulsivity, was significantly correlated with EE change (r = -.70, p<0.05). Measures of fatigue and reward responsiveness were not strongly correlated with EI or EE.
CONCLUSION(S): Select personality traits appear to be associated with compensatory responses to structured exercise and may influence the success of weight management programs which include exercise.

P379  Active environment project: methodology description of interventions for physical activity promotion for adults living in regions of low socioeconomic level
Florindo A, Salvador E, Ribeiro E, Costa E, Garcia L, Santos T, Andrade D

PURPOSE: The “Active Environment project” is intervention group for physical activity promotion in primary health care settings in Ermelino Matarazzo district, region of low socioeconomic level of Sao Paulo city, Brazil (www.each.usp.br/ambienteativo). The aim of this study was to present methodology that were used in interventions.

METHOD: Non randomized controlled study was conducted in three primary health care units in Ermelino Matarazzo District (East Zone).

RESULT(S): The first study compared two interventions for physical activity promotion. The first intervention was based in supervised exercise. The group (n=54) participated of three sessions per week with 60 minutes per session for developed of cardio respiratory fitness, strength and flexibility supervised by physical education professional during 12 months. The second intervention was based health education/lifestyle change. The group (n=54) participated of 16 subjects developed during 12 months. The subjects were developed in groups, by phone and print material. The activities were developed for multidisciplinary team (physician, psychologist, nutritionist and physical educational professional). The physical activity was evaluated for questionnaires and accelerometers in four times (initial, 6 months, 12 months and 18 months). The second study developed a methodology for physical activity promotion for community health workers. The researchers applied of course with 12 hours of duration during one month (one time per week, three hours per session). During the course was developed a home visit model for physical activity promotion. The model was developed by community health workers and researchers.

CONCLUSION(S): All interventions can be applied of physical activity promotion in primary health care settings in similar regions.

P380  Do health & fitness smartphone applications incorporate evidence-based behavior change techniques?
Direito A, Pfaeffli L, Shields E, Whittaker R, Maddison R

PURPOSE: Smartphones have potential to assist people to actively manage their health. Applications (apps) that aim to modify lifestyle behaviors such as physical activity and diet are proliferating; however their theoretical basis is unknown. The aim of this study was to
determine the frequency and types of behavior change techniques (BCTs) present in commonly downloaded smartphone apps.

METHOD: A checklist of BCTs based on Michie and Abraham’s taxonomy was applied to the top-twenty of both purchased and free apps from the New Zealand Apple App Store Health & Fitness category. Three independent coders scored “1” or “0” for the presence/absence of each of the 26 BCTs across the 40 apps. Inter-rater reliability for each BCT using Krippendorff’s alpha was calculated. Regression analysis was conducted to determine the relationship between number of BCTs and app price.

RESULT(S): Reliability coefficients ranged from -.02 to 1.0 with a mean of 0.64 (SD = 0.31), indicating modest reliability. Each app included 2 to 15 (mean = 7) of the 26 BCTs. Common BCTs were “provide instruction” (33/40), “set graded tasks” (26/40), “prompt self-monitoring” (24/40), “prompt intention formation” and “model/demonstrate the behaviour” (21/40). Price was positively associated with the number of BCTs incorporated within apps, $b = .50$, $t(38) = 2.16$, $p < .05$.

CONCLUSION(S): The BCTs taxonomy checklist can be used by independent coders to reliably identify BCTs in apps. Most applications provide information on how to perform the behavior and track it; however few incorporate BCTs to support long-term maintenance and relapse prevention.

P381 Autonomous motivation and lifestyle physical activity: results from a 3-year SDT-based randomized controlled trial
Pereira HV, Silva MN, Carraça E, Santos I, Sardinha LB, Teixeira PJ

PURPOSE: To analyse the effect of a 12-month SDT-based intervention on long-term changes in lifestyle (informal, “opportunistic”) physical activity, and its association with markers of autonomous motivation.

METHOD: 221 women (age: 37.64 ± 7.0 y; BMI: 31.58 ± 4.1 kg/m2) were assigned to intervention/control groups. The intervention group attended 30 weekly SDT-based sessions, with an emphasis on promoting intrinsic, self-regulated motivation for exercise and weight control. Assessments included several SDT variables adapted to the exercise domain (exercise intrinsic motivation, locus of causality, and behavioral self-regulation). A lifestyle physical activity index (LPAI) was specifically developed for this study as a simple self-administered instrument for measuring habitual lifestyle physical activities typical of the last month such as using stairs instead of elevators, standing more, and parking away from destinations (7 items; alpha 0.83).

RESULT(S): At 36 months, compared to controls, the intervention group showed marked increases in LPAI from baseline values ($d=0.57$, $p=0.002$). The largest effects were observed for standing instead of seating ($d=0.55$, $p=0.004$) and parking away from destinations ($d=0.57$, $p=0.003$). At 36 months, significant associations were observed between LPAI and intrinsic motivation, internal locus of causality, and autonomous regulation for exercise,
after adjustments for LPAI baseline values (rs: 0.42-0.57, p<0.001), intervention group (rs: 0.41-0.57, p<0.001) and weight change (rs: 0.39-0.55, p<0.001).

CONCLUSION(S): This theory-based intervention had significant long-term effects on informal and unstructured physical activities performed during daily living. Results highlight the potential role of more autonomous forms of motivation in changing this particular type of energy-expending non-sedentary behaviors.

**P382 Effects of two interventions for physical activity promotion in primary health care settings in a region of low socioeconomic level in Sao Paulo city, Brazil**
Ribeiro E, Garcia L, Salvador E, Andrade D, Florindo A

PURPOSE: To evaluate the effects a non-randomized controlled intervention trial designed to promote physical activity among adults attended at three primary care units in a low socioeconomic area of Sao Paulo city, Brazil.

METHOD: 157 health adults, inactive in the leisure-time physical activity were allocated in two intervention groups (supervised exercise, SE) and (health education, HE) and third control group (CG) according to the unit where they were attended. Participants of the SE group (n=54) were submitted a supervised structured exercise sessions three times per week one hour per day. Participants of HE group (n=54) were submitted a group discussions, phone support and printed material. A multidisciplinary team formed by health professionals conducted this intervention. The CG (n=49) participated in all evaluations and received the results. The interventions had duration 12 months more 6 months of the follow-up. Habitual physical activity (last 12 months) was evaluated by Baecke Questionnaire (exercise, leisure and transportation activities) in baseline, 12 months and 18 months after. Comparison between groups was done using the Kruskall-Wallis test. Mann-Whitney test was used as post hoc.

RESULT(S): There were no differences in baseline. After 12 months, SE presented greater Baecke score than comparison HE (p=0.002) and CN (p=<0.001). Nevertheless, from 12 to 18 months (follow-up), SE decreased Baecke score and HE increased score (p=<0.001).

CONCLUSION(S): SE and HE can to be effective strategies to promote physical activity in Brazilian primary care units in low socioeconomic areas in 12 months. Nevertheless, HE seems to maintain physical activity after the intervention period.
P383 Using Google Ads to recruit new mothers for an online exercise study: worthwhile lessons to learn
Albright C, Dunn AL, Martin R, Saiki K, Parra L

PURPOSE: Our multidisciplinary team developed an online exercise program for new mothers and their babies. Mothers can select and combine up to three 10-minute videos demonstrating yoga, cardio, or strengthening exercises personalized to fitness level and choice to actively exercise with their baby or alone. Exercises with a baby are tailored to infant’s weight and include activities that promote cognitive development and mother-infant bonding. The videos are viewed on a television connected to the internet. A randomized trial is comparing the effectiveness of tailored online exercise videos to standard Mom and baby exercise DVDs. Main outcome is minutes/week moderate-to-vigorous physical activity. Recruitment of healthy, sedentary, postpartum women uses primarily online paid advertisements.

METHOD: Google Ads appeared onscreen only when specific keywords were used in a Google search (i.e., “mom and baby workout”). The Ads began on December 26, 2012 and during the first 2 weeks we had 454 clicks (i.e., views) on our Google Ads and 67 visited the recruitment website, consented, and completed online baseline survey. Participants received a $5 online gift card after enrolling.

RESULT(S): Due to our need to Email and ship participants’ condition-specific information/equipment, we discovered 53 persons had provided incorrect or fraudulent emails/addresses/phone numbers or were men. Thus, we had to drop 79% of the initial participants and change recruitment protocols to include phone verifications.

CONCLUSION(S): Our use of automated methods of online enrollment and a very appealing $5 incentive may have contributed to fraudulent enrollment; however, verifying eligibility via phone led to successful enrollment of 170 new mothers.

P384 Determinants of participation in workplace physical activity schemes in the UK: a cross sectional survey
Morris M

PURPOSE: Public health interventions to reduce or prevent obesity often include initiatives to increase physical activity. The workplace has been shown to be an effective site for such interventions. There is very little evidence which describes the participants of such schemes and analyses whether participation can be predicted by individual characteristics.

METHOD: A cross sectional survey of the Leeds Teaching Hospitals Trust employee population (n=15393) compared to a subset of employees who participate in the Trust workplace physical activity schemes, specifically gym membership (n=400) and the cycle to work scheme (n=242) in August 2010. Difference testing between participant and non-participant groups was carried out. Bivariate generalised linear models for binary outcomes were used to investigate whether characteristics of participants can predict participation.
RESULT(S): Gym members are less likely (p<0.001) to be female than male, odds ratio (OR) 0.21 (confidence Interval (CI) 0.11 to 0.41), and more likely (p<0.001) to be younger OR 0.95 (CI 0.94 to 0.97). There is no effect of socioeconomic status, through index of multiple deprivation or salary band on gym membership. There is no significant effect of age on participating in the cycle to work scheme. Females are less likely to participate (p=0.05) in the cycle to work scheme, OR 0.36 (CI 0.13 to 1.01). Increasing Salary band increases likelihood (p<0.001) of participation in the cycle to work scheme, OR 1.27 (CI 1.13 to 1.43).

CONCLUSION(S): Staff demographics can be useful to predict participation in specific types of workplace physical activity scheme.

P385 Changing minds, Changing lives from the top-down: a case study of the adoption of a nationwide, theory-based intervention to increase health care professionals’ leisure-time physical activity prescription behavior among Canadians with a physical disability
Tomasone JR, Martin Ginis KA, Estabrooks PA, The Canadian Paralympic Committee

PURPOSE: Health care professionals (HCPs) are vital conduits of leisure-time physical activity (LTPA) information for patients with disabilities (Faulkner et al., 2010); however, very few prescribe LTPA. Changing Minds, Changing Lives (CMCL) is a Canada-wide, presentation-based intervention aimed at increasing LTPA-prescription behavior among HCPs by enhancing their knowledge and confidence, and providing prescription tools. This study describes the development and dissemination of a new theory- and evidence-based CMCL curriculum, and interventionists’ social cognitions for, and adoption of, the new curriculum.

METHOD: Following a collaborative curriculum development process, interventionists (n=22) were trained to deliver the curriculum and completed measures assessing Theory of Planned Behavior (TPB) cognitions regarding curriculum use before, after, and six months following training. Interventionists also rated the curriculum on Diffusion of Innovation characteristics that facilitate adoption.

RESULT(S): Interventionists reported strong TPB cognitions for using the curriculum before training. Significant increases emerged for interventionists’ attitudes and perceived behavioral control (PBC; ps≤.025) for delivering the curriculum from pre- to post-training. Interventionists rated the curriculum as minimally complex, compatible with their needs, easy to adapt and use on a trial basis, and having a relative advantage over the old curriculum. Between post-training and 6-month follow-up, interventionists delivered 36 CMCL presentations to 787 HCPs across Canada. During this time, significant decreases were seen in interventionists’ attitudes, PBC, and intentions to use the curriculum in its entirety (ps≤.024).

CONCLUSION(S): The theory-driven, participatory development process facilitated curriculum adoption, reinvention, and implementation by interventionists. Future research is planned to examine the effectiveness of CMCL delivery on HCPs’ LTPA-prescription behavior.
P386  Misunderstandings about economic evaluations in lifestyle interventions
Hendriks MRC, Berendsen BAJ, Kremers SPJ, Savelberg HHCM

PURPOSE: There is growing evidence for the effectiveness of lifestyle interventions to increase physical activity and subsequently reduce health complaints. Due to scarcity of resources and demographic changes, there is a need for evidence about cost-effectiveness of these programmes as well. Therefore, we aim to address common misunderstandings about economic evaluations.

METHOD: Misunderstandings of economic evaluations are explained by means of an example: the economic evaluation of the ‘BeweegKuur’, a combined lifestyle intervention aimed at promoting physical activity and healthy diet. Within a clustered randomized controlled trial we evaluate whether the more intensively guided ‘supervised exercise programme’ of the ‘BeweegKuur’ is more cost-effective than the less intensive ‘start-up exercise programme’ in promoting physical activity. Design is a combined cost-effectiveness and cost-utility analyses from a societal perspective, with a time horizon of two years. Quality Adjusted Life Years are assessed by means of EuroQol 5-D. After the trial, data will be used in a model to evaluate long term costs and effects.

RESULT(S): It is a misunderstanding that cost-effectiveness analysis is a cost-benefit analysis, and it is not always necessary to do an empirical trial. Moreover, cost-effective is no synonym for cheap. To interpret results we use incremental cost-effectiveness ratios and related willingness to pay thresholds. Moreover, perspective and time horizon have an impact on the outcomes of cost-effectiveness.

CONCLUSION(S): Policymakers and healthcare providers have to deal with scarcity of resources. Therefore, good understanding of economic evaluations and its principles may help them to make good decisions in health care.

P387  A novel gamified physical activation of young men – A multidisciplinary population-based randomized controlled trial (MOPO study)

PURPOSE: Inactive and unhealthy lifestyles are common among adolescent men. This intervention examines the effectiveness of a gamified activation method, based on tailored health information, peer networks and participation, on physical activity, health and wellbeing in young men. We hypothesize an improved physical activity and health among the activation group as a result of the intervention.

METHOD: Conscription-aged men (18 yrs) attending compulsory annual call-ups for military service in the city of Oulu in Finland (n=1500) will be randomized to a 6-months intervention...
or a control group (no activation) during the fall 2013. A questionnaire on health, health behaviour, diet and wellbeing is administered in the beginning and end of the intervention. Anthropometric measures, body composition, grip strength, heart rate variability and aerobic fitness are measured. The activation group utilises an online gamified activation method combining communal youth services, physical activity measurements, social networking, tailored health information and exercise programs based on individual baseline activity. Daily physical activity of the participants is monitored. The activation service rewards improvements in physical activity or reductions in sedentary behaviour.

RESULT(S): New evidence on the effectiveness of a gamified activation service for improving the activity levels and reducing inactivity in young men will be gained. The study also provides novel information on the health status, physical fitness, motivational factors and profiles of physically active and inactive young men.

CONCLUSION(S): This unique intervention to activate young men can provide a translational model for community use and be utilized in developing tailored health-related gamified services.

P388 Applying RE-AIM to a national physical activity-enhancing partnership initiative: a preliminary evaluation of SCI Action Canada
Sweet SN, Estabrooks PA, Latimer-Cheung AE, Martin Ginis KA

PURPOSE: SCI Action Canada is a national community-university partnership aimed at promoting physical activity in Canadians with spinal cord injury (SCI) through knowledge translation. The purpose of this study was to determine the public health impact of SCI Action Canada.

METHOD: The RE-AIM framework was used to determine the reach of the initiative into the target population and its effectiveness in increasing minutes of physical activity. The proportion of community partners engaged in SCI Action Canada (adoption) and who maintained engagement for 5 years as well as the degree to which the strategic plan has been implemented were also assessed.

RESULT(S): Just over 5% of the 85 000 Canadians with SCI have participated in at least one SCI Action Canada initiative. The initiative is moderately effective as indicated by increases from pre-program physical activity (M= 10.69, SD= 18.89) to post-program (M= 19.68, SD= 29.27, Cohen’s d= 0.36). For adoption, 44% of potential Canadian community partners have joined SCI Action Canada and 40% of these partners have adopted an SCI Action Canada tool or service. SCI Action Canada has implemented 92% of its strategic plan. Organizational maintenance was 100% for the original community partners after 5 years.

CONCLUSION(S): SCI Action Canada is making an impact at both the individual and organizational level, with regards to promoting physical activity to Canadians with SCI. This evaluation also demonstrated that RE-AIM is an effective framework to evaluate a national
partnership initiative and can be used to successfully evaluate a large knowledge translation initiative.

**P389**  
*Which factors help men maintain weight loss following a group-based programme delivered through top professional football clubs? Findings from qualitative research*
Gray CM, Hunt K, Mutrie N, Anderson AS, Wyke S

**PURPOSE:** Purpose: The ‘draw’ of professional football clubs has succeeded in attracting middle-aged overweight men to engage in weight loss through the Football Fans in Training (FFIT) programme. FFIT uses education and behaviour change techniques based on control theory to increase physical activity (PA) and improve diet. Many men succeed in losing weight during the initial, 12, weekly sessions. Self-determination theory suggests that autonomy (intrinsic motivation), competence and relatedness are associated with long-term weight loss maintenance.

**METHOD:** Methods: Thirteen focus groups with men (n=4-6) 12 months after participation in FFIT. Purposive sampling ensured a range of experiences of maintenance. An analysis framework guided by self-determination theory described men’s accounts of maintaining weight, PA and dietary change.

**RESULT(S):** Results: Most participants had succeeded in maintaining weight loss and described how improved wellbeing helped them keep up changes they had made, “The more exercise you’re doing, the healthier lifestyle, the more you actually enjoy your life”. Many spoke confidently about achieving the balance between energy intake (through diet) and expenditure (through PA). Injury and negative life events were major obstacles for men who were less successful, but ongoing peer support had helped some overcome relapse. “I just fell back straight into the bad ways, but I was still going walking wi’ the boys. So I just gave myself a kick up the backside and said, “Right, just get yourself back into it”.

**CONCLUSION(S):** Conclusions: FFIT succeeded in promoting the autonomy, competence and relatedness that, according to self-determination theory, are likely to support long-term behaviour change.

**P390**  
*From a cohort study to a randomized clinical trial: increasing step counts in adults with type 2 diabetes*
Dasgupta K, Rosenberg E, Daskalopoulou S

**PURPOSE:** To develop/test strategies to increase physical activity and reduce vascular disease risk.

**METHOD:** Study 1: Cohort study wherein 201 adults with type 2 diabetes were evaluated in
terms of daily step counts (2 weeks of pedometer-based assessment with concealed viewing windows), anthropometric measurements, hemoglobin A1C, and blood pressure. Study 2: Ongoing clinical trial examining the effects of ‘step count prescription’ by physicians.

RESULT(S): A roughly 2,500 steps/day increment is associated with lower BMI (-1.6 kg/m2, 95% CI -2.4 to -0.8), waist (-4.6 cm, 95% CI -6.4 to -2.8; Manjoo, Joseph, and Dasgupta, Nutrition and Diabetes, 2012) and blood pressure (Manjoo, Joseph, Pilote, and Dasgupta, PLoS ONE, 2010; women: systolic -6.5 mm Hg, 95% CI -10.2 to -2.8; diastolic -3.5 mm Hg, -5.5 to -1.5; men: systolic -1.8 mm Hg, 95% CI, -5.3 to 1.8; diastolic -1.5 mm Hg, 95% CI -3.5 to 0.8). In our current trial, the active intervention aims to increase step counts by ≥ 3,000 steps/day through step count monitoring, target-setting and prescription by the physician and patient (three month intervals over one year). The control arm has the same contact time but no pedometer/prescription. We will evaluate the differences between these arms for changes in carotid femoral pulse wave velocity (i.e., arterial stiffness, composite indicator of arterial health) over one year.

CONCLUSION(S): Our prior study establishes the physiological impact of a 2,500 step/count increment. Our ongoing trial will determine whether a pedometer-based strategy integrated into follow-up medical visits has a measurable effect on arterial health.

**P391 Comparing health educators’ perceptions of community-based physical activity programs: a qualitative analysis of adopters and non-adopters**
Harden SM, Johnson SB, Estabrooks PA

PURPOSE: Translating evidence-based physical activity (PA) interventions into community practice has been problematic. However, interventions developed using a participatory approach with practice professionals may be more likely to translate into sustained practice. The purpose of this study was to explore the perceptions of health educators (HE) who were trained on one of two community PA programs—one of which was developed using a research-practice partnership (Fit Extension).

METHOD: Semi-structured interviews were conducted with 12 HE who were trained on either Fit Extension (n=6) or Active Living Every Day (n=6; ALED), an evidence-based PA intervention, and had either delivered (n=7) or did not deliver (n=5) the intervention within 6 months of training. Interviews were designed to elicit HE perceptions of the PA program they were trained on and potential barriers or facilitators to delivering the program in their respective communities.

RESULT(S): HE perceptions differed between PA programs based on perception of value, ease of implementation, flexibility, along with frequency and duration of sessions. Emergent themes for non-adopters were: 1) program characteristics (e.g., costs), 2) fit within delivery system (e.g., PA focus), and 3) HE characteristics (e.g., self-efficacy, expertise). Common themes for adopters were: 1) program perception; 2) program processes; 3) fit within system; 4) collaborators/existing partnerships; 5) program materials; 6) program
continuance; 7) challenges; and 8) suggested program adaptations.

CONCLUSION(S): Based upon the qualitative findings, a participatory approach seemed to result in a program that HE would perceive as a better fit for the mission, values, and resources of their organizations.

P392  What are the barriers encountered by the physiotherapists in their role of physical activity promoters?
Cloes M, Fabre F

PURPOSE: The fight against sedentariness needs multisectorial actions. Being experts in movement and exercise, physiotherapists (PT) consider themselves as ideally placed to promote, guide and prescribe physical activity (PA). The purpose of this study was to identify the barriers that limit their PA promoting mission as well as proposals of solutions.

METHOD: Fifteen PT attended to a 3 hours meeting during which researchers applied the nominal group technique. After a short introduction summarizing basic notions about PA, subjects were invited to describe the problems that PTs encountered when they want to promote PA. In a second step, they selected 8 categories of barriers to be discussed. During the last part of the meeting, subgroups had to imagine solutions to deal with selected problems. Oral reports were shared. After the meeting, a written report was prepared by the researchers and validated by the subjects.

RESULT(S): Out of the 13 identified categories, subject selected the following: Patients’ lack of awareness of PA’s interest for healthy living; Patients’ poor self perceptions and misrepresentations about PA; Patients’ difficulties to change their behaviour; PTs’ lack of knowledge about PA; PTs’ lack of informational resources; Patients’ lack of social support; Patients’ lack of facilities; PTs’ lack of interaction with other actors. The synthesis of the solutions was combined with written resources in a 19 pages brochure.

CONCLUSION(S): This study pointed out that PTs are able to propose a plurality of ideas and approaches through a constructive group work. Such approach will be proposed in inservice education.

P393  An evaluation of a peer mentoring programme on adherence levels to a community-based cardiac rehabilitation programme
Woods CB, Martin A

PURPOSE: This study examined the impact of a Peer Mentor (PMS) intervention on adherence of newcomers to an established phase IV Community- Based Cardiac Rehabilitation Programme (CBCRP: named HeartSmart).

METHOD: Long-term HeartSmart adherers (N=8, 100% male, 64-77yrs, > 12mths attendance)
were trained as PMs, in order to provide support during 2 weekly structured exercise classes to newcomers. Training (8 hours) covered benefits, barriers, self-efficacy and goal setting for PA. Mentees (N=13, 82% male, 50-77yrs), who had recently experienced a cardiac event were recruited and paired with a PM. Outcome measures included attendance rates, assessment of PA level (accelerometry) and interviews (focus group with PMs, 1-1 in-depth interviews with mentees).

RESULT(S): Content analysis revealed that PMs found training helpful, had a positive experience and identified challenges as assisting exercise mastery, conflicting input from the HeartSmart staff, and increased responsibility. Recommendations included flexible match period and formalised initial contact. Mentees: Eight (7male) mentees were attending HeartSmart at 6-weeks (mean 67% adherence). Reasons for dropout included injury (N=2), illness (1), pace too challenging (N=1) and feeling too young for class (N=1). Mentees demonstrated a significant increase in PA levels, and reported that their adherence was positively influenced through enhanced social support and facility familiarity ‘He (PM) made sure I didn’t get lost’ and enhanced exercise mastery ‘I had trouble getting into some of the machines… and he (PM) helped’.

CONCLUSION(S): PMs assisted newcomers fit into an established phase IV CBCRP, however, as structured, it was insufficient to address adherence issue for all participants.

P394 Peer-delivered physical activity interventions: an overlooked opportunity for physical activity promotion
Martin Ginis KA, Nigg CR, Smith AL

PURPOSE: Purpose: People who are initiating an exercise program consider peer mentors to be valuable, credible physical activity (PA) intervention delivery agents (Letts et al., 2010). Yet, surprisingly, the role of peer mentors has been generally overlooked in the PA intervention literature. The purpose of this systematic review was to catalogue and synthesize published studies that have examined the effects of peer-delivered PA interventions on PA behaviour.

METHOD: Methods: A systematic search was conducted in 6 databases. Ten published studies met our inclusion criteria of reporting behavioural PA data, from a PA intervention (informational, behavioural, or social) that was delivered by a peer. The following information was extracted from each study: study design and duration; characteristics of the sample, peers and interventions; and PA behavioural and social cognitive outcomes.

RESULT(S): Results: In all articles reporting within-groups analyses, peer-delivered interventions led to increases in PA behaviour. When compared to alternatives, peer-delivered interventions were just as effective as professionally-delivered interventions and more effective than control conditions for increasing PA. Only three studies included measures of social cognitive variables. These studies yielded some evidence that peers may be effective for enhancing self-efficacy and self-determined forms of motivation.
CONCLUSION(S): Conclusions: Our findings suggest that interventionists should consider peers to be viable, effective PA intervention delivery agents and should consider including peer mentors in their intervention delivery models. Investigators are encouraged to pursue a more comprehensive understanding of mediating and moderating factors that can explain and maximize the impact of peer-delivered PA interventions.

P395 The role of guidelines in multisectoral strategies for promoting physical activity: a review
Leone L, Pesce C

PURPOSE: The interest for factors influencing the diffusion of Health Enhancing Physical Activity guidelines (HEPA-G) is recently growing. Our main purpose was to identify mechanisms of evidence emersion and knowledge translation through which guidelines are generated and transitioned into practice in different policy sectors (health, transport, education, urban planning, sport).

METHOD: The Realist synthesis (RS) is a recent theory-driven approach to reviewing research evidence (Pawson 2006), providing an explanatory analysis of how and why complex social interventions work in specific contexts. We applied it to primary evidence sources to ‘test’ main assumptions about evidence building and dissemination, in order to interrogate and refine the initial ‘programme theory’ about the expected impacts of HEPA-G.

RESULT(S): Physical Activity (PA) has been identified as a ‘weak policy’ lacking for institutional mandate due to intrinsic characteristics of physical inactivity that renders it atypical as compared to other main risk factors for Non-Communicable-Diseases as alcohol, tobacco, and obesity. Threats of existent guidelines are due to: data gathering limited to health databases; conflicting advice in some HEPA-G; lack of consultation; underestimation of the role of health practitioners’ lifestyle and believes; urban planners’ perceived feasibility of policy measures.

CONCLUSION(S): To increase the impact of HEPA-G it is necessary to develop a broader, coherent and transferable framework which should extend from the analysis of agenda setting and advocacy processes for PA policies, to issues related to cooperative practices of evidence building. Dissemination processes should be reframed in terms of knowledge translation mechanisms within several policy sectors.

P396 Physical activity intervention preferences: Who prefers what?
Short CE, Vandenalotte C, Duncan MJ

PURPOSE: People have different preferences on how health behavior change interventions are delivered to them; recruitment, intervention retention and effectiveness may be improved if preferences can be matched. This study aims to explore factors related to preference of intervention delivery mode.
METHOD: A question relating to physical activity intervention preference was included in the 2010 Queensland Social Survey using Telephone Interviews. Multivariate logistical regression was used to explore socio-demographic (e.g., age, marital status, location) and behavioral factors (e.g., internet use, PA, Diet, social networking) related to intervention preferences.

RESULT(S): 35.2% of those approached took part in the telephone interviews (n = 1,261). Preference for distance-based interventions over face-to-face interventions was significantly lower among females (compared to males; RRR = 0.44, CI = 0.21-0.91; P = 0.02), individuals with children (compared to no children; RRR = 0.47, CI = 0.23-0.96, P = 0.04), individuals without a chronic disease (compared to those with a chronic disease (RRR = 0.43, CI = 0.23-0.81, P = 0.009) and higher among those working part-time (compared to full-time; RRR =2.50, CI = 1.17-5.36; P = 0.01). Factors relating to preferences for different types of face-to-face interventions (i.e., group vs. one-on-one) and distance-based interventions (i.e. print vs internet) are also explored.

CONCLUSION(S): Exploring the relationship between individual characteristics and intervention preferences may help us to deliver more appealing interventions with more targeted recruitment strategies.

P397 The development of a smartphone physical activity application by an interdisciplinary research team
Fairbairn S, Bazelli B, Ferguson-Roberts J, Mullen B, Stroulia E, Lederer R, Mummery K

PURPOSE: The purpose of this research is to examine the design process of a physical activity application by an interdisciplinary work team. The majority of health promotion applications are designed within a single discipline. By including computing science, industrial design, and physical activity experts the application offers the promise of a technically and theoretically behavioural change application in the area of physical activity.

METHOD: This is a qualitative reflection on the process of working in an interdisciplinary group to bring a wide breadth of experience to a narrow focus and design a successful smartphone application aimed at behaviour change. Reflective statements were collected from all team members and analyzed for common themes.

RESULT(S): Four common themes were drawn out of the reflections: outcome expectancies, time, communication, and expertise. Once identified the themes were discussed further to determine what effect they had on the collaboration process and it was determined how they should be addressed when engaging in future collaborations.

CONCLUSION(S): The results of this reflective process represent a critical look at an area of health promotion that is crucial to the success of future interventions. Collaborations are necessary to developing the best possible interventions; by giving the themes identified through this study due consideration at the beginning of collaborations groups should be more effective and have a reduced chance of group breakdown.
P398  Mobile fitness apps: profiling RunKeeper users  
Stragier J, Mechant P

PURPOSE: The use of mobile fitness apps (e.g. Endomondo, RunKeeper) has seen a strong growth in recent years. This research focuses on the potential of these apps to promote physical activity. A quantitative survey was conducted on a sample of 254 users of RunKeeper in order to gain insight in the profile of RunKeeper users.

METHOD: A sample of RunKeeper users was created by following #RunKeeper on Twitter. Next, these users were invited, via an @mention on Twitter, to participate in an online survey. A shortened version of the Motivation of Marathoners Scale was used to assess running motivation, measuring nine dimensions (general health orientation, weight concern, affiliation, recognition, competition, personal goal achievement, psychological coping, self-esteem and life meaning). Additionally the dimension “enjoyment” was measured.

RESULT(S): The majority of the sample consists of male runners (82%). Respondents run a weekly average of 24 km over 3 runs per week on average. Results indicate that RunKeeper users are mainly recreational runners with general health orientation, enjoyment, personal goal achievement and weight concern as their most important motivations. Competition is not a motivation at all. Our sample consists of highly motivated runners.

CONCLUSION(S): Our results provide insights into the profile of RunKeeper users and indicate that the motivation of these runners is mainly recreational with, for many, a strong emphasis on health and weight improvement. Our findings suggest that mobile fitness apps have a good potential for promoting physical activity, especially to those looking for extra motivation to start and keep running.

P399  Social support for physical activity – Role of Facebook with and without structured intervention  
Cavallo DN, Tate DF, Ward DS, DeVellis RF, Thayer LM, Ammerman AS

PURPOSE: To describe social support for physical activity (PA) between college women in a PA-themed Facebook group and in their personal use of Facebook.

METHOD: Design: Analysis of a survey, structured interviews, and Facebook communications of participants in the Internet Support for Healthy Associations Promoting Exercise (INSHAPE) randomized controlled trial. Participants: Female undergraduate students at a large southeastern US public university, (n=149). Measures: Structured interviews (n =24), a survey (n = 120), and PA-related Facebook communications documented among 130 Facebook users (n = 774 interactions). Analysis: Major themes from structured interviews and Facebook communications were double-coded and analyzed using Atlas ti using a grounded theory approach. Descriptive statistics and chi-squared comparisons were calculated for survey and qualitative data.

RESULT(S): A total of 186 PA social support communications were recorded over 12 weeks.
More companionship support communications (16.1%) than informational support communications (9.3%) were documented in personal Facebook use in contrast to support found within the PA-themed Facebook group (3.9% companionship vs. 12.0% informational). Participants reported that personal familiarity and privacy considerations were important factors influencing the exchange of support.

CONCLUSION(S): This study demonstrates that important types of social support for physical activity are exchanged in regular online social network use and can be fostered among young women enrolled in an online social network group designed to increase physical activity.
Determinants of health behaviors and health in adults

P400  Weight and weddings: a content analysis of diet and physical activity-related messages within bridal magazines
Klos LA, Kessler MM, Wheeler LA

PURPOSE: Studies on wedding-specific appearance management reveal that many women attempt weight loss in preparation for their wedding. Although the diet, fitness, and weight control industries are pervasive in their reach to American women, it is unclear how these industries are represented within magazines targeting women preparing for weddings.

METHOD: A content analysis was conducted on all issues of Brides magazine published between 2009-2011 (N=30) to determine the presence and frequency of diet and physical activity (PA)-related content pertaining to body management. Articles, advertisements, and other minor items (e.g., tips) were analyzed for major study themes by two independent coders. Discrepancies were discussed until consensus was reached.

RESULT(S): Each issue of Brides included 338.8 (±101.1) pages with 39.2 (±9.5) articles, 38.1 (±19.5) minor items, and 291.0 (±103.0) advertisements. Among single thematic articles, none were diet-related, and 3% were PA-related. An additional 3% of articles focused solely on the combination of diet and PA. Approximately 44% of articles were multi-thematic; of those, 32% included some minor mention of diet (along with other topics), and 6% incorporated some diet and PA information. Similar findings were observed for minor items and advertisements.

CONCLUSION(S): Explicit text and advertisements about diet and PA was fairly uncommon within bridal magazines. However, the dominant female body shape portrayed in the images within this publication was quite slender. Such images may cultivate norms of the ideal bride’s body perhaps leading some women to seek alternative resources for information about diet and PA in order to achieve their desired wedding physique.

P401  Is weighing a “woman’s thing?” Associations among gender, gender role orientation, and self-weighing behavior
Klos LA

PURPOSE: Self-weighing behavior has received increased attention for its potential to aid weight management efforts within certain populations. However, little is known about the factors influencing an individual’s choice to self-weigh, such as gender and gender role identification. Given strong associations between body surveillance and the female experience, it was hypothesized that women, and individuals identifying more strongly with feminine traits, would self-weigh more frequently.

METHOD: Undergraduate students (n=266; 71% female; 89% White) at a U.S. university
completed the Short Bem Sex-Role Inventory, questionnaires about their self-weighing behavior and weight management approach, and self-reported height and weight. Multinomial and logistic regression was used to examine associations between gender, gender role orientation (mean Femininity and Masculinity scale scores), and self-weighing frequency.

RESULT(S): About 18% of participants self-weighed several times a week or more, 15% self-weighed about once a week, 20% self-weighed less than once a week, 25% self-weighed less than once a month, and 21% never self-weighed. Neither gender, gender role orientation, nor the interaction between the two was significantly related to self-weighing frequency. However, frequent weighing (≥1 time/week) was more common among participants actively trying to change (p=.003) or maintain (p=.02) their weight, and with regular scale access (p<.001).

CONCLUSION(S): Self-weighing does not appear to be a gendered behavior both in terms of biological sex and gender role orientation. Given the findings of this study, it is unlikely that interventions and campaigns that aim to encourage self-weighing for purposes of weight regulation among young adults would experience barriers related to gender and gender-related stereotypes.

P402 The “exercise and eat” paradox: a qualitative inquiry and future research agenda
Dohle S, Wansink B

PURPOSE: Exercise is part of a healthy lifestyle, and especially important for people who need to lose weight and maintain a healthy body weight. Little is known, however, about how exercise actually influences recreational athletes’ dietary patterns, particularly the “exercise and eat” paradox. The goal of this study is 1) to identify common beliefs and behaviors related to exercise and diet, and 2) advance a research program (new directions and hypotheses) to better understand how exercise influences diet and who it influences most.

METHOD: We conducted a qualitative study (focus groups) with recreational athletes who were physically active between one and five hours per week. Questions explored exercise objectives, beliefs and behaviors in regard to food intake before, during, and after exercise, consumption of sport supplements, and dietary patterns on sedentary days. All focus groups were audio-taped and transcribed verbatim. Transcripts were analyzed using a grounded theory approach.

RESULT(S): It is widely known that some recreational athletes often claimed to reward themselves for being active by consuming food. What was uniquely found in this research was that other recreational athletes had specific beliefs about dietary needs and how to compensate for exercise-induced losses along with exercise-related likes and dislikes about food. Their food intake also depended on their personal objectives of exercising, such as the goal to perform well in competitions.
CONCLUSION(S): Results of this study show that exercising and dietary patterns are closely intertwined. In addition, we articulate new hypotheses and outline a research agenda that can help improve how recreational athletes eat.

P403  **Associations of diabetes patients’ perceived autonomy support, competence and treatment regulation with their diet and physical activity**  
Raaijmakers L, Martens MK, Bagchus C, De Vries NK, Kremers SPJ

PURPOSE: The aim of this study was to assess the influence of diabetes patients’ perceived autonomy support, competence and treatment regulation on their diabetes self care activities (healthful diet, physical activity, monitoring blood sugar and medication intake) and perceived diabetes control.

METHOD: A cross-sectional questionnaire study was conducted among 571 patients with (a high risk of) diabetes. The measures to assess perceived autonomy support, competence and treatment regulation were preselected subsets of validated questionnaires based on Self Determination Theory. Reliability analyses were conducted for all subscales and a stepwise approach was used in the linear regression analyses with diabetes self care activities and perceived diabetes control as dependent variables.

RESULT(S): Overall, participants had high scores on perceived autonomy support, perceived competence and autonomous self regulation for various diabetes self care activities. Perceived competence was positively associated with following a healthful diet. When patients perceived more autonomous self regulation for their medication intake and/or blood glucose monitoring, they performed these behaviors more often. Perceived autonomy support and competence were positively associated with patients’ perceived diabetes control.

CONCLUSION(S): The results of this study emphasize the importance of perceived competence in diabetes patients and the need for autonomy support. Professionals can be trained to be autonomy supportive, for example with motivational interviewing techniques. Furthermore, our study showed that diabetes self care activities related to diet and exercise seem more important in relation to patients’ perceived diabetes control than self care activities related to glucose monitoring and medication intake.

P404  **A qualitative study on psychological and cultural factors of dietary and physical activity behaviors among Dutch, Turkish and Moroccan low SES groups in the Netherlands**  
Romeike K, Oenema A, Abidi L, de Vries H, Lechner L

PURPOSE: To investigate cognitive and cultural beliefs, barriers and facilitators for healthy
dietary and physical activity (PA) behaviors among Dutch, Turkish and Moroccan adults with a low socioeconomic status (LSES).

METHOD: Focus-group interviews were conducted among 90 Dutch, Turkish and Moroccan LSES adults between March and August 2012. Five Dutch, four Turkish and four Moroccan groups were conducted, separated by sex and ethnicity and using a structured question-route. Interviews were recorded, transcribed and analyzed applying framework-approach.

RESULT(S): The most important attitude beliefs were taste (healthy food tastes good) and pleasure (exercise is fun). Social influence was perceived as an encouraging factor to exercise (exercising together). Perceived barriers to exercise/cook healthy were lack of time and tiredness. Costs were no barrier for most participants (exercise/healthy food does not have to be expensive). Some participants mentioned planning exercising/healthy eating as a possibility to overcome barriers. Dutch participants said that they ‘just do it’ (just exercise/eat vegetables) and had healthy behavior as a habit. Turkish and Moroccan participants mentioned cultural-specific factors, like hospitality (being offered lots of food) and religion (according to Islam, you shouldn’t eat too much).

CONCLUSION(S): Attitude beliefs, barriers and social influence were the most apparent factors that emerged. High costs were not perceived as important barrier. The clearest difference between Dutch and other ethnic groups was the importance of religion for Turks and Moroccans. This study provides insight into determinants of dietary and PA behavior among the target groups. Quantitative research is needed to confirm the association of these factors with behavior.

P405 Association between physical activity level and possible disordered eating attitudes amongst an English university sample
Varela-Mato V, Clemes SA, Wallis D

PURPOSE: High levels of physical activity (PA) have been closely linked with disordered eating attitudes (DEA). University attendance often leads to changes in both PA and eating behaviours. The aim of this study therefore was to assess levels of PA and screen for possible DEA amongst university students.

METHOD: Data were collected via an online questionnaire from 306 university students, in England. PA was assessed using the IPAQ short and dietary behaviour was assessed using the EAT-26. Comparisons of PA levels and DEA were conducted between males (n = 99; mean age 22 years, [SD 4.9]) and females (n = 207; mean age 21 years, [SD 3.2]) and between students studying health-related (n = 138) and non-health-related (n = 164) degrees using chi-square and t-tests

RESULT(S): 14.5% of females and 8% of males showed signs of DEA, however this difference in prevalence was not statistically significant (p>0.05). 66% of the sample reported high levels of PA (≥1500METs-min/week) and no significant differences in PA were observed
between genders (p>0.05). A significant association between PA level and the probability of suffering from DEA was observed (p<0.001), with those reporting higher levels of PA being 2.2 times more likely to suffer from DEA. Degree studied was not significantly related to PA level or DEA (p> 0.05).

CONCLUSION(S): In the sample studied, higher PA levels were associated with higher levels of reported DEA. Although, no significant differences were found between genders, the situation seems more conspicuous amongst female.

P406 Determining if a gradient exists in physical activity, fruit and vegetable consumption and BMI among rural and urban residents in the same health disparate region
Hill JL, You W, Zoellner JM

PURPOSE: Purpose: The burden of obesity is not borne equally and disparities in prevalence are well documented for low-income, minority and rural adults. Understanding the causes of these disparities is essential to the development and implementation of effective interventions to address obesity and its related conditions. The primary purpose of this study is to determine if differences exist in BMI, physical activity (PA) and fruit and vegetable (FV) intake between rural and urban residents living within the same health disparate region.

METHOD: Methods: Conducted as part of a larger ongoing CBPR initiative, data was gathered through a random digit dial telephone survey in this health disparate region. The telephone survey consisted of previously validated measures.

RESULT(S): Results: Respondents (n=930, aged 56±17 yrs, 76% female, 63% white, 44% reported household income <$20,000/yr) were primarily overweight (BMI=29±7kg/m2), with 30% being obese and 7% morbidly obese. Thirty seven percent reported meeting recommendations for PA and only 9% met recommendations for FV intake. There were significant differences between rural and urban residents for meeting PA recommendations and BMI. However, there were no differences between rural and urban residents on FV intake.

CONCLUSION(S): Conclusions: When controlling for income, education and race, urban residents of this health disparate region were more likely to be overweight or obese than rural counterparts. These results will be used by the community-academic partnership to guide the development of culturally relevant and sustainable interventions to increase physical activity, improve dietary outcomes and reduce obesity within this health disparate region.
P407  Socioeconomic differences in perceptions on healthy eating, physical activity and lifestyle advice: opportunities for lifestyle interventions tailored to individuals with low socioeconomic status
Bukman AJ, Teuscher D, Feskens E, van Baak MA, Meershoek A, Renes RJ

PURPOSE: Successful lifestyle interventions for individuals with low socioeconomic status (SES) are scarce and little is known about possibilities to tailor a lifestyle intervention to these individuals. The purpose of this study was to get insight into socioeconomic differences in perceptions on healthy eating, physical activity and lifestyle advice in order to provide leads for tailoring nutrition and physical activity interventions to individuals with low SES.

METHOD: Data were gathered with 9 semi-structured focus group interviews among low SES groups and high SES groups in two different regions in the Netherlands. Themes that were introduced during the interviews were the daily practice of eating, determinants of healthy eating, determinants of physical activity, and requirements for lifestyle advice.

RESULT(S): Low SES participants were cure oriented rather than prevention oriented, had a stronger focus on their own experiences associated with physical illness, and were more affected by price in their daily practice of eating compared to high SES participants. Low SES participants indicated they rather receive nutrition-related advice in groups than individually. For physical activity, low SES participants preferred to be physically active together with persons of the same age, gender or illness.

CONCLUSION(S): To increase participation of low SES individuals in nutrition and physical activity interventions, it is necessary to trigger individual’s sense of urgency for behaviour change by emphasizing their susceptibility to get a disease and their own potential to influence this susceptibility. Such interventions should use the supportive effect of (peer)groups and should take participant’s price concerns into account.

P408  Perceptions of low SES groups from different ethnic origins towards a healthy lifestyle
Teuscher D, Bukman AJ, van Baak MA, Feskens E, Renes RJ, Meershoek A

PURPOSE: This study aimed to explore perceptions of low SES adults from different ethnic origins towards a healthy lifestyle in order to tailor lifestyle interventions to their needs.

METHOD: In this study, 14 focus group interviews were held with groups of Moroccan, Turkish and Dutch ethnicity with a low SES. The recruitment took place in disadvantaged neighbourhoods. Participants were encouraged to share their perceptions towards healthy eating and physical activity. According to the grounded-theory-approach mainly inductive coding strategies were used to define key themes.
RESULT(S): In all groups uncertainty about the definition of a healthy diet and sufficient physical activity was reported. Furthermore, participants described a lack of energy at certain moments to maintain demanding health behaviours. Moreover, the lack of a supportive environment was mentioned as making lifestyle change difficult. On the other hand, social support was frequently named as important enabler to initiate or maintain health behaviours. However, participants seemed to struggle to combine a healthy lifestyle with other priorities in daily life. They indicated that the absence of stress and moments of pleasure are also relevant factors that contribute to their health.

CONCLUSION(S): Our results indicate that health behaviour is deeply embedded in an individual’s social context, which can make behaviour change difficult regardless of a person’s ethnic origin. They emphasise that advice needs to be tailored to the individual’s personal challenges and social context. Increasing social support and creating enjoyable moments in lifestyle interventions are identified as potential enablers for participants in order to initiate and maintain demanding health behaviours.

P409 Do residents’ perceptions of being “well-placed” and objective presence of local amenities match? A case study in West Central Scotland, UK
Macdonald L, Kearns A, Ellaway A

PURPOSE: There has been growing interest in how neighbourhood features, e.g. access to local amenities, influence residents’ health behaviours. Prior research measured amenity access through subjective or objective measures. We believe both should be explored and use West Central Scotland data to investigate correspondence between residents’ subjective assessments of how “well-placed” they are for food stores, schools, libraries, pharmacies, and public recreation facilities, and objective GIS-mapped measures of these; and examine correspondence by sub-groups.

METHOD: ArcMap was used to map respondents (n=1760) and amenities; and amenity presence/absence within straight-line and road-network buffers around respondents’ homes was recorded. Kappa statistics were used to investigate whether objective amenity presence within a specified buffer was perceived by a respondent as being “well-placed” for that amenity. Agreement was tested for all respondents, by sex, age, class, area deprivation, car ownership, dog ownership, local walking etc.

RESULT(S): For all respondents together, there was poor agreement (Kappa <0.20) between perceived and objective presence, within 800m and 1000m straight-line and network buffers (except pharmacies at 1000m straight-line). Results varied between sub-groups; amongst sub-groups at 800m (straight-line) the highest agreement was for pharmacies and primary schools, and at 1000m, for pharmacies, primary schools and libraries. For network buffers <1000m, agreement was poor.

CONCLUSION(S): Respondents did not necessarily regard themselves as “well-placed” for specific amenities when amenities were present near their homes; however results did vary
between amenities, buffers, and sub-groups. These findings, although not clear-cut, make an important contribution to considerations of determinants of health behaviours, such as diet and physical activity.

P410  Do greener neighborhoods mean slimmer people? Evidence from The 45 and Up Study
Kolt GS, Astell-Burt T, Feng X

PURPOSE: With growing consensus that greener neighborhoods can assist in the promotion of healthy lifestyles, policymakers are looking towards enhancing proximity to green space to tackle obesity. The purpose of this study was to quantify the relationship and pathways linking proximity to green space and weight status among a sample of Australians aged 45 years and older.

METHOD: Participants were 246,920 adults aged 45 years and older drawn from the baseline dataset of The 45 and Up Study, a large cohort study of health and social issues in New South Wales, Australia. Multilevel linear and multinomial logit regression models were fitted to investigate association between Body Mass Index (BMI) and an objective measure of green space. Proximity to green space was constructed using catchment areas of 1 kilometer radius around each participant, BMI was derived from self-report height and weight, and physical activity was assessed with the Active Australia Survey.

RESULT(S): Women with over 80% proximity to green space had relative risk ratios of 0.90 (95% confidence interval: 0.83, 0.97) for overweight and 0.83 (0.74, 0.94) for obesity. No similar protective association was found for men. These results were consistent after controlling for moderate to vigorous physical activity (MVPA) and sitting time, each of which were favorably associated with proximity to green space in men and women.

CONCLUSION(S): Use of green space for tackling obesity may have a more substantive impact among women than men. Large-scale investments to enhance neighborhood green space may promote MVPA and reduce sedentary behavior in middle-to-older aged adults.

P411  JPI “a Healthy Diet for a Healthy Life”
Kuling V

PURPOSE: A Joint Programming Initiative (JPI) is an approach introduced by the European Commission (EC) to involve countries to work together on research. The JPI “a Healthy Diet for a Healthy Life” (HDHL) will provide coordination of research on the impact of diet and lifestyles on health. A first Joint Action will be presented.

METHOD: In the SRA of this JPI there are three interacting key areas described, including the knowledge gaps and opportunities for countries to work together: 1. DETERMINANTS OF DIET AND PHYSICAL ACTIVITY  2. DIET AND FOOD PRODUCTION  3. DIET AND CHRONIC
DISEASES We will focus on DEDIPAC, joint action on DEterminants of DIet and Physical ACTivity. There will be a Knowledge Hub meeting in the beginning of March, where 88 scientist out of 13 countries will define and prioritize research questions and start making a proposal on how to tackle this questions together.

RESULT(S): A network of selected research groups and scientists will carry out a programme of joint trans- and multidisciplinary activities for a better understanding on how individual, social and environmental determinants influence food and physical activity.

CONCLUSION(S): There are questions European Countries cannot answer on their own, but can be answered if European countries work together. That is why we need to join forces to reach our vision: In 2030, all Europeans will have the motivation and opportunity to consume a healthy diet from a variety of foods, have healthy levels of physical activity and the incidence of diet-related diseases will have decreased significantly.

P412 More is sometimes less: the role of quantitative and qualitative motivation for physical activity, eating behavior, and well-being
Silva MN, Carraça E, Santos I, Palmeira AL, Sardinha LB, Teixeira PJ

PURPOSE: Self-determination theory (SDT) posits that controlled types of motivation, rather than adding, may be detrimental to motivational regulation and well-being. This study explores correlates of quantitative and qualitative elements of exercise motivation in overweight women.

METHOD: Four motivational profiles were created based on autonomous and controlled regulations for exercise in 221 women (37.6±7 yr; 31.6±4.1kg/m2) finishing a 12-month weight management intervention: high quality (HQL, high autonomous, low controlled motivation, n=49); low quality (LQL, low autonomous, high controlled, n=42); low quantity (LQT, low autonomous, low controlled, n=46); high quantity (HQT, high autonomous, high controlled, n=56). Group differences in physical activity (PA), psychological well-being (PWB), goals and needs (GN), and eating behaviors (EB) were assessed using linear regression with orthogonal contrasts, adjusting for intervention group.

RESULT(S): Compared to the LQL, the HQL group displayed more MVPA (315±197 vs. 150±137 min/wk; ES=0.97, p=0.004), higher PWB (ES=0.64-0.82, ps<0.01), flexible restraint (ES=0.74, p=0.038), and more intrinsic exercise motives (ES=0.69-1.88, ps<0.05). The HQL group also showed more vitality, perceived autonomy and competence, and more internal and less external goals (ES=0.27-0.79, ps<0.05) compared to the HQT group. Comparison between LQL and LQT showed differences for vitality and mental health (ES=0.26-0.14, ps<0.05) favoring LQL, and for GN (ES=0.56-0.09, ps<0.05) favoring LQT.

CONCLUSION(S): In line with SDT premises, good quality motivation predicted the most optimal behavioral and psychological profiles. Differences in vitality and in goals and needs also emerged between the good quality and high quantity motivation groups, with controlled motivation being detractive rather than positive.
P413 Prevalence of health-risk behaviours among Canadian post-secondary students: descriptive results from the National College Health Assessment
Kwan M, Faulkner GEJ, Cairney J, Arbour-Nicitopoulos K

PURPOSE: The purpose of the current study was to examine the prevalence of a broad range of health-risk behaviours among post-secondary students from across Canada, and to test for institutional variability that may exist in the prevalence of these behaviours.

METHOD: Data were collected from 8,182 undergraduate students enrolled in one of eight Canadian post-secondary institutions during the fall or spring of 2009, using the National College Health Assessment (NCHA). The NCHA consists of 60 questions, including assessments of student health status and engagement in various health behaviours.

RESULT(S): Findings show relatively low prevalence rates in smoking (13.1%) marijuana (17.5%) or other illicit drugs (3.5%) use, and risky sexual behaviour (12%). Binge drinking, however, was much higher, with nearly 60% of students consuming more than 5 alcoholic drinks in a single occasion during the past 2 weeks. Similarly, prevalence rates for physical inactivity (72.2%), inadequate sleep (75.6%) and low fruit and vegetable intake (88%) were all high among the student population. Results also found that students in smaller institutions exhibited higher rates of inactivity, binge drinking, and marijuana and illicit drug use compared to institutions having a larger student body.

CONCLUSION(S): Overall, findings point to the need for more concentrated health promotion campaigns targeting health promoting behaviours, including obtaining more sleep, consuming more fruit and vegetables, and greater participation in physical activity. Given evidence of some institutional variability, future efforts are warranted in exploring how best to increase institutional commitment for collecting surveillance data on Canadian post-secondary students.

P414 Understanding patterns and consequences of multiple health-risk behaviours among university students
Kwan M, Faulkner GEJ, Arbour-Nicitopoulos K, Irving H

PURPOSE: Few studies have examined the patterns for a wide range of health-risk behaviours among the university student population. Using data collected with the National College Health Assessment (ACHA, 2006), the primary purpose of this study was to examine the clustering of multiple health-risk behaviours (e.g., physical inactivity, smoking, binge drinking, illicit drug use) among a large university sample (N = 1478; Median age = 22 years). The secondary purpose was to explore how class membership relates to academic and health outcomes.

METHOD: Latent class analysis was used to identify mutually exclusive patterns of eight salient health-risk behaviours.
RESULT(S): Using a combination of traditional fit indices and recommendations by Muthen & Muthen (2010), four classes emerged: (1) high risk group, 12.0%; (2) moderately at-risk group, 14.7%; (3) typical student group, 47.5%; and (4) moderately healthy group, 25.8%. Results of the latent class regression found class membership being significantly associated with GPA ($\chi^2 = 22.41, p < .01$), fatigue ($\chi^2 = 9.13, p < .05$), depressive symptoms ($\chi^2 = 7.88, p < .05$), and approaching significance for stress ($\chi^2 = 6.53, p = .09$).

CONCLUSION(S): Individuals in the high risk class scored highest in poor academic performance, stress, fatigue, diagnosed anxiety, diagnosed depression, and depressive symptoms. Interestingly, the moderate risk group scored the second highest on stress, fatigue, diagnosed anxiety, diagnosed depression, and depressive symptoms, while the moderately healthy class scored generally the lowest across all measures. Overall, the results suggest that there are negative consequences associated with increased patterns of health-risk behaviours; and targeted interventions aimed at these unique groups appear warranted.

P415 Evaluation of the healthfulness of university campus environments
Horacek T, Deleso K, Kattelmann K, Walsh J, White A, Gurka M, Olfert M

PURPOSE: The objective of this study was to evaluate the healthfulness of the policy, recreation, built, and vending environment on post-secondary institution campuses.

METHOD: The Healthy Campus Environmental Audit was developed, pilot-tested and implemented by 13 US post-secondary institutions. Five 10-point categorical surveys were used to evaluate policies; recreation programs and facilities; and buildings and vending via 8-10 buildings per campus. Analyses included ANOVA with post-hoc Tukey’s-B for score differences by institution and building type and Chi-square.

RESULT(S): The mean policy scores were significantly lower than the desired score “≥7” ($P = 0.002$), with only one campus scoring “10”. Overall, recreation programs (7.1±0.7) and facilities (7.1±1.2) scored well; however fewer programs (77%, $P< 0.05$) were offered on weekends than weekdays, and only 30% of programs targeted high-risk populations ($P=0.01$). Amenities scores were lower for satellite (2.8±1.6) versus main (4.1±1.8) recreation facilities ($P=0.04$). Significant differences were determined between institutions for the healthfulness of their building and vending audit scores ($P < 0.001$). Only 11% of vending machines had at least 25% healthful options, however recreation buildings had significantly more healthful vending options ($P=0.026$). Although stairwells were clean and well lit; there was a lack of signage to encourage stair use ($P<0.001$).

CONCLUSION(S): On these 13 post-secondary institutions, recreation programs and facilities but not the built and vending environments were supportive of healthful lifestyles for obesity prevention. These findings and the limited policies provide evidence to support initiatives to improve campus environments for physical activity and healthful eating.
P416  Spatial analysis of overweight and obese in the UK Women’s Cohort Study (UKWCS)
Morris M, Hulme C, Clarke G, Edwards K, Cade JE

PURPOSE: Strong evidence exists to suggest that there are layers of both personal and environmental factors influencing behaviour patterns, summarised by the ecological model. Incidence of overweight/obesity is no exception. Using a geodemographic classification could go some way to controlling for these factors in analysis. Such classifications combine demographic characteristics of individuals with small area geography to profile a type of area.

METHOD: Using the UK Women’s Cohort Study (n~35000) logistic regression can be used to investigate whether the type of area in which the women live - determined by the geodemographic Output Area Classification - affects likelihood of being overweight or obese.

RESULT(S): An increased likelihood of being overweight/obese is observed for those living in Blue Collar Communities, or an area Constrained by Circumstance (for example public or residential housing) compared with women living in an area of Typical traits, so named as it exhibits no distinguishing demographic characteristics (relative risk ratios 1.44 (confidence interval 1.30 to 1.59) and 1.56 (1.39 to 1.76) respectively (p<0.05)). City Living or Countryside living are associated with significantly (p<0.05) reduced risk of overweight/obese (relative risk ratios 0.77 (confidence interval 0.69 to 0.85) and 0.89 (0.83 to 0.96) respectively). When adjusting for energy intake, energy expenditure and cost of the diet these associations remain true.

CONCLUSION(S): Results suggest that living in a certain type of area affects likelihood of being overweight or obese. They also show that geodemographic classifications may be a useful tool to inform public health nutrition policy.

P417  Kitchen counter correlates of obesity
Wansink B, Hanks AS, Kaipainen K

PURPOSE: Home food environment, such as visibility and convenience of food, can have a large influence on food intake. The two studies presented here aim to determine whether the presence of different foods on a person’s kitchen counter is associated with their body mass index (BMI).

METHOD: In study 1, a nationwide sample of 500 households in the United States was asked to inventory their kitchen and provide their height and weight. In study 2, home visits to 210 households were conducted where heights and weights were taken and kitchens were photographed and catalogued. Main outcome measure was the difference in BMI between households which had various foods visible on the counter compared to those who did not.

RESULT(S): The presence of fruit on the counter was associated with lower BMI in both studies, but the presence of foods such as candy, cereal, soft drinks, and dried fruit were
associated with weight differences that ranged from 9.4 to 14.4 kg. Associations with BMIs were more related to the presence of baked goods among men and the presence of fresh fruit and soft drinks among women.

CONCLUSION(S): Although correlational, the findings from these two studies suggest that when counseling people regarding their weight, health professionals also suggest they clear their kitchen counter of all foods except fresh fruit.

P418 Age-related changes in body composition in Czech women aged 18 to 89 years
Gába A, Pridalová M

PURPOSE: The Czech Republic lacks body composition data for women. Therefore, the purpose of the study was to determine body composition (body fat mass [BFM], fat-free mass [FFM], body fat percentage [%BFM] and visceral adipose tissue [VAT]) and to define the changes that occur with aging in women aged 18 to 89 years. We also develop age-specific percentile curves for these parameters.

METHOD: A cross-sectional study was conducted with a sample of 1,970 apparently healthy women. Body composition was measured using a direct segmental multi-frequency bioelectrical impedance analysis (InBody 720).

RESULT(S): The mean BFM was 19.7 ± 8.9 kg, and BFM reached its peak in women over 70, at 27.6 ± 8.8 kg. There was a strong correlation between BFM and age (r = 0.61; r² = 0.37). Fifty percent of the women in the study had a BFM between 13.0 kg and 25.0 kg. The %BFM (r = 0.69; r² = 0.47) and VAT (r = 0.88; r² = 0.77) were also significantly associated with age. The reference range for %BFM was 22.0–35.6% (25th–75th percentile). In addition, the prevalence of obesity was progressively greater among the older women. The mean FFM was 45.8 ± 5.5 kg, and FFM decreased with age (r = −0.27; r² = 0.07).

CONCLUSION(S): The results presented in this study indicate that age is the strong predictor of body composition in Czech women 18 to 89 years old.

P419 Exploring how social networks influence weight behavior’s in socially deprived communities
Clonan A, Powell K, Peacock M, Wilcox J, Bissell P, Holdsworth M

PURPOSE: Obesity levels amongst the UK population present a major challenge for policymakers and public health intervention planners. Research demonstrates that social networks have strong influences on health outcomes, and can influence weight behaviour. Although studies report significant associations between friends body weight, most are unable to establish the mechanisms by which social networks influence weight behaviours. Furthermore, existing empirical studies focus on data from adolescents, with limited
information on other ages. Therefore the aim of this study was to explore the mechanisms by which social networks influence weight behaviours in adult women living in socially deprived communities.

METHOD: Taking a qualitative approach, biographical narrative interviews were utilised over two stages to interview participants in their homes. 16 female participants (18-64 years) were recruited from the Clifton and St Ann’s areas of Nottingham City; these were identified as having high levels of social deprivation. Interviews were recorded, transcribed and analysed using a data analysis group, which offered different perspectives on the data to enable triangulation of emerging analyses.

RESULT(S): Findings indicate that social networks influence weight-related behaviours’, such as food choice, eating and physical activity. Pathways of the mechanism include intergenerational and familial relationships, cultural background and situational factors such as income and environment.

CONCLUSION(S): Findings provide useful information for designing obesity interventions which exploit social networks. Interventions targeting family units, close social networks, or specific cultural groups rather than individuals may provide stronger established pathways to enact long term behaviour change. Further research is required to test this hypothesis in an intervention setting.

P420 Do your friends make you fat? Social networks and the spread of obesity
Powell K, Clonan A, Wilcox J, Preston L, Bissell P, Holdsworth M

PURPOSE: There is increasing evidence to suggest that social networks influence general health and the risk of disease. Recent research indicates that overweight and obesity cluster in and spread through social networks, although the social processes through which this occurs are not well understood. The aim of this study was to better understand the social processes through which social networks might influence the development of overweight and obesity.

METHOD: A scoping literature review was undertaken to summarise the key concepts, methods and approaches through which the development of overweight/obesity via social networks has been explored. A number of systematic review methods were utilised to enhance the rigor of the review, including the use of two reviewers and the development of clear inclusion and exclusion criteria (applied post hoc once the scope of the literature was understood).

RESULT(S): Several explanations for the clustering of overweight/obesity emerged: shared exposure to ‘contextual’ influences (such as the availability of healthy foods among particular social groups), the tendency for people with similar body weight or dispositions to cluster together (homophily), and the spread of social norms through social networks. The findings suggest that body weight norms, eating habits and disposition towards physical
activity might be influenced through processes of social comparison, social support or sense of belonging.

CONCLUSION(S): This study has shed light on the processes through which social networks influence the development of overweight/obesity. The findings provide opportunities for developing interventions that exploit such networks to prevent the spread of obesity.

P421 Streamlining food and health policies: food, nutrition and physical activity in the sustainability perspective
Risku-Norja H, Kurppa S, Ovaskainen M-L, Helakorpi S

PURPOSE: The presentation looks into the articulation of sustainability in the context of food, health and physical activity in the Finnish policy discussion.

METHOD: The presentation captures the results and conclusions from a qualitative content analysis of 28 relevant documents from the past decennium; these deal either specifically with physical activity, nutrition and sustainable development or they are more comprehensive and address both the sustainability and health topics. The material represents different types of policy documents from government programs to strategies and recommendations.

RESULT(S): The documents stress the significance of the citizens’-“consumers”- personal choices regarding both own health and the environment. The role of the public actors is also seen as important, and it is stated that the choices supporting healthy and sustainable lifestyle should be attractive, accessible and affordable. How this is in practice achieved remains to be concretised.

CONCLUSION(S): In formulating the instruments and measures the sustainability concept provides means to streamline health and food policies. The goals of health promotion and sustainable development could be easily combined through food and nutrition by paying attention to the criteria of sustainable food provision. Physical activity and food are also intimately linked through health promotion. Sustainability and physical activity can and should also be linked within the frame of policy for physical activity. Like local and seasonal food, seasonal activity close to own housing and functional activity including the trip to work could be steps towards more sustainable forms of physical activity that are accessible to all regardless the income level.
P422  Food budget apportioning and body mass index in the National Diet and Nutrition Survey (NDNS): introducing a fresh approach to quantifying diet costs, using constituent food groups
Timmins K, Hulme C, Cade JE

PURPOSE: Evidence implicating food prices in global obesity trends remains elusive, and the best method to assess the relationship is yet to be established. This paper introduces a fresh approach, examining the costs of food groups.

METHOD: Adult NDNS diary data were used. Food prices from an in-house database were applied to the foods and non-alcoholic beverages consumed. Daily diet costs were calculated, alongside the proportion of cost contributed by each of seven constituent food groups. Analyses include nonparametric comparisons and adjusted multivariable regression with BMI as the outcome.

RESULT(S): The normal weight category had significantly lower costs attributable to meat, fish, eggs and beans (median 27%), and higher costs for starchy foods (11%) than did either the overweight (31% and 10% respectively) or obese (32% and 10%). Higher costs were found for high-fat and high-sugar foods amongst the normal weight (10%) compared to the obese (8%), but not overweight, category. No association was apparent between food group costs and BMI.

CONCLUSION(S): These findings suggest that normal weight, overweight and obese individuals apportion their food budget differently. In contrast, whole diet costs do not differ by BMI category. This implies that it is not the food budget per se that encourages positive energy balance, but rather how people apportion their budget. The differences observed for high-fat and high-sugar foods are challenging to interpret, possibly reflecting some under-reporting. The lack of association in the regression analyses makes it difficult to ascertain the role of food group costs in excess weight.

P423  Obesity resistant individuals are intuitive eaters
Brown RC, Cooke RT, Renall NR, Skidmore P, Taylor RW

PURPOSE: An alternative approach for determining the cause, treatment and prevention of obesity is to study those who have remained lean (obesity resistant individuals (ORI)) despite living in an obesogenic environment. This information may allow us to develop novel strategies to benefit those who continually struggle with weight maintenance (obesity susceptible individuals (OSI)). Our objective was to compare dietary restraint, emotional eating, external eating and intuitive eating in ORI versus OSI.

METHOD: Using a pre-tested screening tool, participants self-defined as ‘remaining lean with
relative ease while eating whatever they wish’ were classified as ORI versus participants self-defined as ‘struggling to maintain their weight despite eating small amounts of food’ were classified as OSI. The Dutch Eating Behaviour Questionnaire (DEBQ) and the Intuitive Eating Scale (IES) were administered to 63 ORI and 54 OSI. All results were adjusted for BMI.

RESULT(S): Internal consistency for the questionnaires were good with Cronbach’s alpha reliability coefficients ranging from 0.74 – 0.96. Dietary restraint was lower in the ORI individuals (p<0.001) and along with emotional eating, was higher in females versus males (p=0.003, p=0.002, respectively). Scores for total and the three subscales of intuitive eating were all higher in ORI (p<0.001, p<=0.001, p=0.042, p=0.001), while total score and eating for physical rather than emotional reasons were significantly higher in males versus females (p=0.048, p=0.029, respectively).

CONCLUSION(S): Obesity resistant individuals display less dietary restraint and more intuitive eating behaviours than OSI. Strategies to improve intuitive eating should be included in weight management programmes to assist OSI to achieve weight maintenance.

P424 Can involvement with sports make a difference on nutrition knowledge score?
Alexiou E

PURPOSE: The study was designed to evaluate the level of basic nutritional knowledge score (NKS). Personal information included and recorded by the sample revealed conflicting inferences.

METHOD: 124 adults aged 25-35 years old took part voluntarily; 78 of them were men and 46 women. Participants were also asked to respond to a series of questions which have a possible effect on their NKS. SPSS v.17 was used for the analysis of the data collected.

RESULT(S): Average score obtained was 34.5 ± 6.8 (max 50). Scores did not differ according to volunteers’ gender and involvement with sports in the past. However, there was a statistically significant difference (P<.01 n2=.15) in case participants have been informed or studied about nutrition on their own. In addition, despite the fact that fewer women have been members of a sports team in the past (73.4 % vs. 84.5 %), males seem to “care” less about nutrition than females (55 % vs. 71.7 %).

CONCLUSION(S): Obviously, there is a contradiction in the present findings. Nutrition behavior change depends on a number of environmental factors. More studies are required to show how engagement to physical activity interacts with the adoption of healthy eating habits and thus may improve NKS. Interest degree in nutrition among adults of different sex deserves also further research.
**P425** Fruits and vegetables intake and associated factors in older adults in South Africa

Peltzer K, Phaswana-Mafuya N

**PURPOSE:** Numerous studies support the protective effect of high fruit and vegetable consumption on chronic disease risk, mainly against cancer and cardiovascular diseases. Compared with younger adults, older people experience additional health, social, and environmental conditions that affect their dietary intake. To identify those additional dimensions and examine them in association with fruit and vegetable intake, data of 3840 participants in the Study of Global Ageing and Adults Health (SAGE) in South Africa were analyzed.

**METHOD:** We conducted a national population-based cross-sectional study with a sample of 3840 aged 50 years or older in South Africa in 2008. The questionnaire included socio-demographic characteristics, health variables, anthropometric and blood pressure measurements. Multivariable regression analysis was performed to assess the association socio-demographic factors, health variables and inadequate fruit and vegetable consumption.

**RESULT(S):** Overall prevalence rates of insufficient fruit and vegetables intake were 68.5%, 64.8% among men and 71.4% among women, with a mean intake of 4.0 servings fruits and vegetables, among older adults (50 years and older). In multivariable analysis coming from the Black African or Coloured population group, lower educational level and daily tobacco use were associated with inadequate FV intake.

**CONCLUSION(S):** The amounts of fruit and vegetables consumed by older South African participants were far below the level of current recommendations (daily intake of at least five servings; 400 g). Public education and campaigns on adequate consumption of fruits and vegetables should be promoted targeting more towards lower educated and Black African and Coloured population groups.

**P426** Psycho-social predictors of fruit and vegetable consumption of Moroccan urban women

Landais E, Holdsworth M, Bour A, McCullough F, Delpeuch F

**PURPOSE:** In the context of nutrition transition, characterised by increasing obesity and diet-related non-communicable diseases, focusing on fruit and vegetable (F&V) intake is key to preventing weight gain and chronic diseases. The study focussed on behavioural determinants of F&V consumption and their association with F&V intake.

**METHOD:** A cross-sectional survey of 855 randomly selected women (20-49y) was conducted in 2009-2010 in Rabat-Salé. F&V consumption was measured using a validated Food Frequency Questionnaire. Behavioural Beliefs (BB), Normative Beliefs (NB), Control Beliefs (CB) and intention were measured using questionnaires developed and validated for this study.
RESULT(S): Mean F&V intake was 212g/day and only 10% of women met WHO recommendations of ≥400g/day. For fruit: intention was significantly correlated with BB (r=0.07), NB (r=0.08) and CB (r=0.25); CB was the strongest predictor. Fruit consumption was significantly correlated with intention (r=0.31), BB (r=0.07) and CB (0.32); intention was the strongest predictor. For vegetables: intention was significantly correlated with NB (r=0.11) and CB (r=0.12); NB and CB predicted intention with the same strength. Vegetable consumption was significantly correlated with intention (r=0.17), BB (r=0.08) and CB (r=0.15); intention was the strongest predictor.

CONCLUSION(S): Intention to eat fruit or vegetables was a reliable predictor of intake. Interventions that focus on changing behavioural, normative and control beliefs towards F&V could be an effective means of improving intake. Perceived barriers, such as cost, could be an effective lever to promote F&V consumption. Moreover, in low literacy context, knowledge and education should also be investigated as potential determinants of F&V consumption.

P427 Factors associated with the stage of change for green eating in a sample of women
Degen H, Horacek T, Nash J, Greene G

PURPOSE: The objective of this study was to compare the Stages of Change for green eating in women to their eating behaviors and attitudes.

METHOD: Green eating is consuming foods that are locally produced, hormone and antibiotic-free, reduce the environmental impact, and are free of genetically modified ingredients. A convenience sample of Syracuse University students and staff completed this online survey assessing their Stage of Change, behaviors and attitudes for green eating; weight; cooking and eating habits. Analyses included ANOVA with post-hoc Tukey’s-B for differences by stage and Chi-square.

RESULT(S): This study included 193 women, ages [18,55], 24 ± 8.9; primarily Caucasian (80%), followed by Asian (7%) ethnicity. The Stages of Change were collapsed to form three stages: Action/Maintenance (42%), Contemplation/ Preparation (32%), and Pre-contemplation (26%). There were significant differences by Stage of Change in expected directions (Action/Maintenance > Contemplation/Preparation > Pre-contemplation) for green eating behavior, confidence, pros, and cons (reverse) scores (all P<0.001). Although there were no differences in BMI (23.6±5.1) by stage, women in Action/Maintenance ate significantly more fruit/vegetables (4.0 ±1.5) than those in Contemplation/Preparation (3.1±1.4) and Pre-contemplation (2.8±1.4) (P<0.001). Women in Action/Maintenance planned (3.5±1.3 versus 2.7±1.2) and cooked (3.2±1.4 versus 2.4±1.2) meals more regularly than other stages (P< 0.001) yet all had similar food shopping habits.

CONCLUSION(S): There is a relationship between health-enhancing habits and behaviors and one’s willingness to practice green eating. Understanding the relationship between Stages of Change and practice of green eating may be an avenue for improving health-enhancing behaviors in university populations.
P428  Investigating the impact of energy density on food-specific appetite and satiety in obese patients using food image-based computer tasks
Gibson EL, Buckley K, Kapetanakis K, Miras AD, le Roux CW, Brunstrom JM

PURPOSE: Two studies used a novel set of food image-based computer tasks to assess differences in the impact of energy density on expected satiation, maximum and ideal lunchtime portion sizes, and ‘food reward’, in obese pre- and post-bariatric surgery groups and lean participants.

METHOD: Participants (Study 1: 16 lean, 17 obese; Study 2: 18 Roux-en-Y gastric bypass [RYGB], 20 adjustable gastric banding [AGB], weight-loss matched) were tested at least 2 hours after breakfast. Computer tasks presented serving-adjustable images of four common meals varying in energy density. For expected satiety, a serving of spaghetti Bolognese was matched for expected fullness to iso-energetic portions of each meal. For portion size tasks, participants varied the serving of each food in 84 kJ steps. In the ‘food reward’ task, points were earned for their preferred food by pressing the left or right arrow keys to highlight images of the target food appearing briefly on the relevant side of the screen, opposite the other foods.

RESULT(S): For both studies, portion sizes (g, not kJ) equated for expected satiety, and ideal and maximum portions chosen, decreased with increasing energy density of meal foods, with no group differences. In Study 1, both groups pressed to earn more points for the low vs. high energy-dense foods. In Study 2, whereas the RYGB group pressed more for the low energy-dense foods, the AGB group pressed equally for both.

CONCLUSION(S): These tasks allowed rapid testing of food-specific hypotheses in clinical groups, and suggest healthier eating by RYGB than AGB patients.

P429  Appetite sensations and satiety quotient: predictors of energy intake in diabetes
Dubé M-C, Tremblay A, Lavoie C, Weisnagel SJ

PURPOSE: The aim of this study was to evaluate the validity and clinical effect of appetite sensations to predict energy intake in subjects with type 1 diabetes (T1DM) and type 2 diabetes (T2DM).

METHOD: Sixteen generally well-controlled subjects (HbA1c: 7.0 ± 0.6%, T1DM n=12 and T2DM n=4) participated in this study. Visual analogue scales were used to measure appetite sensations before and after a fixed test breakfast. Fasting appetite sensations, 1 h post-prandial area under the curve (AUC) and satiety quotient (SQ) were used as predictors of energy intake. Two measures of energy intake were used: a buffet style test lunch and a three-day self-report dietary record. Spearman correlations were calculated.
RESULT(S): One hour post-prandial AUC for all appetite sensations represented the strongest predictors of ad libitum test lunch energy intake (P≤0.001) with more consistent and pronounced correlations for T1DM than T2DM. Only SQ for hunger was associated with ad libitum test lunch energy intake in T1DM. Self-reported energy intake from three-day dietary record was negatively associated with SQ for desire to eat, hunger and fullness in T1DM (p varying from -0.36 to -0.50, P ≤0.05) and only with fullness in T2DM (p =0.58, P ≤0.05). HbA1c correlated with 1 h AUC.

CONCLUSION(S): These results suggest that appetite sensations and derived variables are relatively useful predictors of spontaneous energy intake and free-living total energy intake in relatively well-controlled subjects with diabetes.

P430 The association between the availability of local convenience stores and dietary habits
Toft U, Lyngbye P, Vejlbjerg P, Glümer C

PURPOSE: Background: High accessibility of unhealthy food stores may contribute to a poor dietary quality. Research on the link between the neighbourhood food environment and consumption is limited, especially in a European context. The objective of this study was to examine the relationship between convenience stores (CS) and dietary quality within the Capital Region of Denmark.

METHOD: Cross-sectional study of the geographic food environment in the Capital Region of Denmark based on 38 235 subjects (age 16+) with complete information on retail food environment and dietary quality. A categorization procedure to identify CS from a government list of inspected food stores (the Smiley register) was developed. Using network analyses in Geographic Information System software, density of CS within a 0.5 km network buffer from residency was calculated for each participant. Information on dietary intake and confounders are derived from a questionnaire survey. Multi-level analyses were performed, adjusting for age, sex and individual socio-economic factors and area socio-economic status.

RESULT(S): The odds of having an unhealthy diet increased significantly (P<0.0001) with increased density of CS. Compared to individuals who did not have a CS within 0.5 km from their home, the OR’s were 1.23 (95% CL: 1.12-1.36) and 1.29 (95% CL: 1.13-1.48) for individuals having 1 or ≥2 CS, respectively. In the fully adjusted model the overall association remained significant (P=0.01) and OR’s diminished to 1.16 (1.04-1.29) and 1.11 (0.97-1.28).

CONCLUSION(S): High accessibility of convenience stores in neighbourhoods may contribute to less healthy dietary habits among residents.
P431  Do the associations between eating behaviours and the local food environment differ by employment status?
Thornton LE, Lamb K, Sahlqvist S, Crawford DA, Ball K

PURPOSE: To test if associations between eating behaviours and the local neighbourhood food environments differed by employment status. We hypothesised that women who are not employed may spend more time in their neighbourhood environment and be more likely to engage with local food stores (and therefore have stronger associations) than those who are employed.

METHOD: Multilevel regression analysis was conducted on 1519 women living within 45 Melbourne neighbourhoods. We tested the associations between fruit and vegetable intake and access (number of stores within 0.8km and 2km network buffers) to supermarkets and greengrocers and also fast food intake and access to fast food outlets. Where positive associations were observed, additional analysis was stratified by employment status (working full-time (n=576); working part-time (n=366); not employed (n=577)).

RESULT(S): Amongst the whole sample, vegetable intake was positively associated with the number of greengrocers within 0.8km and the number of supermarkets within 0.8km and 2km. No associations were found for fruit and fast food intake. When stratified by employment status, similar associations were observed between vegetable intake and the food environment amongst those working full-time and those not employed. No significant associations were found amongst those employed part-time although this may have been underpowered.

CONCLUSION(S): Associations between eating behaviours and the neighbourhood food environment did not differ according to employment status. Future analysis will examine access to food stores around the work address of the employed women and assess the relative strength of associations between the food environments around the home and work.

P432  Food catering industry compliance to current labelling laws and government guidelines about menu board labelling
Hyldig C, Tøttenborg S, Hansen GL, Svastisalee CM

PURPOSE: To investigate how menu board labelling (MBL) was monitored by UK governmental authorities.

METHOD: Interview subjects were identified by snowball sampling. Information about displaying kcal and kJ and reference values, compliance to laws and guidelines and information about government knowledge of lack of compliance collected from three confidential and thematically-structured telephone interviews with food industry stakeholders from the United Kingdom. All interviews were transcribed and thematically structured for analysis.
RESULT(S): Analysis showed an unwillingness of compliance to parts of the EU labelling law. Neither of the expert interviewees displayed kilojoules as required by law, and only one of three stakeholders displayed reference values appropriately and as recommended by national guidelines and recommendations. Government authorities however, were not found to be opposed to this lack of compliance.

CONCLUSION(S): It is apparent that menu board labelling (MBL) compliance in the United Kingdom is limited by the lack of governmental monitoring and enforcement of guidelines and regulations. This inconsistency is believed to cause complications when measuring the effect of MBL.

P433 Identifying salient beliefs of adults to understand consumer behavior and target messages for promoting milk and cheese consumption
Lacroix M-J, Desroches S, Turcotte M, Paquin P, Couture F, Provencher V

PURPOSE: To explore salient beliefs underlying the consumption (or not) of specific milk products (fluid milk and cheese) among healthy adults using the Theory of Planned Behavior (TPB).

METHOD: Healthy men and women (19 to 50 years-old) were recruited to participate in focus groups (n=161 participants; n=20 focus groups). All groups were led by a trained moderator using a standardized semi-structured interview guide that aim to elicit participants’ salient beliefs regarding attitudes (behavioral beliefs), subjective norms (normative beliefs), and perceived behavioral control (control beliefs). A thematic content analysis of transcribed discussions was performed.

RESULT(S): Most groups were aware of health outcomes, nutritional value and taste for both fluid milk and cheese (behavioral beliefs). Circle of acquaintances, health professionals or consultants, and the world of communication were viewed as major referents having an impact on fluid milk and cheese consumption. Potential improvements related to milk processing, desirable food associations and actual diversity available were among the most cited facilitating factors with regard to fluid milk consumption. Reduced price, actual diversity and culinary aids were cited as facilitating consumption with regards to cheese. Major reported barriers to consumption of fluid milk and cheese were a cost too high, an attenuated trust in the product and the presence of health problems.

CONCLUSION(S): These findings underline important key beliefs to explain social and behavioral factors associated to the consumption of fluid milk and cheese, which will be helpful for the development of targeted messages for promoting an optimal consumption of these foods.
P434  Characterizing the obesogenic environment via GPS: food availability and accessibility  
Shearer CL, Kirk SFL, Rainham D, Blanchard C, Dummer TJB, Lyons R

PURPOSE: The measurement of food availability has increasingly employed geographical information systems (GIS) to assess the density and proximity of food locations in a defined “buffer” around individuals’ homes. Yet, individuals routinely travel outside of their neighbourhoods for daily activities. Global positioning systems (GPS) measure individuals’ location and can be used to describe the food locations they are exposed to in daily life. The current study used GPS devices to measure food availability in a sample of Canadian youth. The goal of this research was to compare the availability of food locations based on GPS patterning to that based on a predetermined buffer around the home location.

METHOD: Youth (N=380) in grades 7-9 wore GPS devices for up to 7 days. The availability of food locations (fast-food outlets, restaurants, supermarkets, and convenience stores) was calculated based on their GPS data and within a 1km buffer of their home.

RESULT(S): Availability of food locations was greater when measurement was based on GPS patterning than on a predetermined buffer around the home. For instance, the proportion of our sample with at least one fast-food outlet, restaurant, supermarket, or convenience store available within a 1km buffer of their home ranged from 29-39%, whereas the proportion with at least one of these locations available to them based on their GPS patterning ranged from 70-87%.

CONCLUSION(S): Using a predetermined buffer around a youth’s home may misclassify food availability. Future research should characterize the food environment based upon human behavior and daily life patterns, rather than simply place of residence.

P435  Healthy eating despite restricted financial conditions? Findings from case studies from Giessen, Germany  
Yildiz J, Leonhaeuser I-U

PURPOSE: Nutrition behaviour including food purchasing is determined by household income. Low income diets are higher in energy (fat, sugar) and include less healthy items (fruits, vegetables). Economic and financial changes in welfare states (increasing number of unemployed) lead to declined individual financial conditions. Impacts of recent financial restrictions on individual level need to be researched.

METHOD: Mixed-methods were used starting with a secondary analyses of quantitative data (second German National Nutrition Survey, n=7490). Based on the results the qualitative part has been conducted using guideline-based face-to-face interviews for surveying people who actually faced a restriction of their household budget (n=14). Interviews have been transcribed, coded and analysed according to reconstructive content analyses.

RESULT(S): Participants (n=14) state that healthy eating is impossible due to their financial
conditions. Those who express that it is hypothetically possible point out that severe discipline is needed. Due to high prices some food items are no longer consumed (fresh fruits, vegetables, fish and meat). They feel restricted in their choices regarding the quality of food (freshness, brands) and the point of purchase. Besides material dimensions of nutrition deprivation, psychological and socio-cultural aspects are mentioned. Surprisingly, for some participants financial restriction is associated with positive changes: more consciously handling with food (e.g. less food is wasted, more attention is paid on labels/information on food packages, prices and package sizes, reduced impulsive buying).

CONCLUSION(S): Coping strategies for a healthy nutrition under restricted budgets must be developed and included into prevention programmes consider the positive points like increased awareness of food purchasing.

P436  Diet patterns among low income women in Mumbai
Kehoe SH, Shivashankaran D, Chopra H, Sahariah SA, Gandhi M, Barrie MM, Potdar R, Fall CHD

PURPOSE: There is evidence of low intakes of micronutrient-rich foods among women of reproductive age in Mumbai slums, yet little is known about dietary patterns in this population. We aimed to identify diet patterns adhered to in this population and to study associations with socio-demographic factors and BMI.

METHOD: Participants (n=6513) in this cross-sectional study were aged 25±4 years. We collected demographic and anthropometric data, and a 212-item food frequency questionnaire (FFQ) with a reference period of the past week was administered by interview. The FFQ food items were condensed to 40 food groups and principal component analysis was conducted. We used linear regression models to study associations between pattern scores, BMI and demographic variables.

RESULT(S): Median (IQR) BMI was 20.0 (17.9, 22.9) kg/m2. The diet pattern that accounted for most variance (8.7%) was characterised by frequent intakes of fried snacks, fruit and desserts (‘snack and fruit’ pattern). The second pattern explained 5.3% of the variance and was characterised by frequent intakes of meat dishes (‘non-vegetarian’). Adherence to the ‘snack and fruit’ pattern was positively associated with standard of living (p=0.003). Adherence to the non-vegetarian pattern was associated with younger age, being Muslim, lower education status and lower standard of living. BMI was positively associated with both pattern scores (p<0.001).

CONCLUSION(S): Among low income Indian women diet patterns are related to demographic variables and nutritional status. This information can be used to target dietary interventions towards at-risk-groups more effectively and may be useful in developing food-based dietary guidelines for this population.
P437  Whole grain intake correlates in young adults
Kamar M, Evans CEL

PURPOSE: Whole grain (WG) consumption is associated with reduced risks of chronic disease. Almost a third of UK adults and children do not consume any WG. Little has been done to explore WG consumption correlates in the UK. This study aims to explore the awareness, consumption patterns, barriers and possible facilitators of WG consumption in UK young adults.

METHOD: Participants were students (n=20) aged 20-35 years of various ethnicities. Dietary patterns and WG awareness were measured using picture-assisted 24-hour recalls followed by questionnaires. Focus groups were conducted on awareness, barriers and facilitators of WG consumption. Participants were given educational material and sample products to try. After two weeks the participants were followed-up using picture-assisted 24-hour recalls and questionnaires.

RESULT(S): Consumption, awareness of health benefits, identification, and acceptance of whole grain foods improved among participants at follow up by 0.25 servings/week, 41%, 50%, and 8.5% respectively. The majority of participants reported bread and cereal products to be their favourite varieties. The top barriers to WG consumption were sensory properties, price, availability, and lack of awareness of health benefits. Suggested facilitators of consumption were educational campaigns, a standardised WG stamp, price reduction, and increased availability and varieties. Asian ethnicity, female gender, home eating, and healthier lifestyles were observed to be positively associated with some WG intake correlates, but with no statistical significance.

CONCLUSION(S): This study identified barriers and facilitators to WG consumption in UK young adults. More research should address WG intake correlates and interventions using psychological models, to improve WG awareness, availability, and consumption.

P438  Is the availability of healthy foods related to fruit and vegetable consumption in a rural, health disparate region?
Chau C, Zoellner JM, Estabrooks PA, Hill JL

PURPOSE: Meeting daily dietary guidelines for fresh fruit and vegetables (FV) reduces the risk of numerous chronic diseases. Unfortunately, only 1/4 of Americans meet these recommendations and even fewer in rural regions. Poor food environments may be related to poor diet. This study examines the relationship between the availability of healthy options in the food environment and individual FV consumption in the Dan River Region.

METHOD: A random-digit dial telephone survey collected individual health behavior, including FV intake. Respondents’ home addresses were geocoded and mapped in ArcGIS. All publicly available stores and restaurants were audited with the Nutrition Environment Measures Survey (NEMS) to assess their healthy options availability (0=low, 30=high availability). One-way ANOVA tested for mean differences in cups of FV consumed by
healthy availability in the food environment. Linear regression tested if healthy availability predicted FV intake.

RESULT(S): The final sample contained 813 residents and 483 food outlets (295 restaurants, 188 stores). Mean daily FV is 2.8 cups (SD=2.5) with less than 10% of the sample meeting FV recommendations. Mean healthy availability of all food outlets was 6.2 (SD=6.0); grocery stores had the highest availability (M=19.6;SD=8.6) among all stores and fast-causal restaurants (M=8.7;SD=7.2) for all restaurants. One-way ANOVAs and linear regression were not statistically significant.

CONCLUSION(S): Regional FV consumption is low; coupled with the low availability in the food environment, residents have few options for healthy consumption. Local efforts are focused on addressing both environmental- and individual-level factors aimed at providing better access and improving intake of FV.

P439 Correlates of mismatch between student-perceived and objective measures of local fast food outlets
Svastisalee CM, Pedersen TP, Suldrup JT, Rasmussen M, Krølner R

PURPOSE: To examine correspondence between objective and perceived measures of access to fast food outlets and sociodemographic, behavioral and school environmental correlates of mismatch.

METHOD: Danish data from the Health Behaviour in School-aged Children Study (HBSC) were supplemented with geocoded addresses of fast food outlets within school neighborhoods (N = 73) and school principal reports (n=69) of the food environment. Adolescents aged 11-15 years (N=4,368) reported fast food outlet exposure within 5-minute walking distance to school. Correlates of student over-and under-reporting of access to fast food outlets were identified using univariate multilevel logistic regression analyses.

RESULT(S): Mismatch was most frequent due to over-reporting by students. Over-reporting of fast food outlets was least likely among the youngest students (OR=0.57; 95% CI: 0.37-0.88). Probability for under-reporting decreased by increasing age, and was less likely among students who did not bring packed lunch frequently (OR=0.62; 95% CI : 0.45-0.86). Younger students (OR = 4.77; 95%CI: 3.07, 7.41) and those speaking a language other than Danish (OR = 1.65; CI: 1.02, 2.66) were unaware of local fast food outlets.

CONCLUSION(S): Adolescents tended to over-report access to fast food outlets. The two types of measures may describe different aspects of local access, highlighting the need to include self-report and objective audits of the food environment. Inclusion of descriptive information that explores to what extent children of various age groups and cultural backgrounds interpret their local surroundings, as well as in which context they use fast food outlets, may provide valuable information when constructing school-based nutrition policies.
P440  
**Food access using the emergency food supply**  
Byker CJ

**PURPOSE:** The purpose of this segment of the symposium will be to describe the nutritional impacts of accessing food through the emergency food supply for limited resource individuals in Montana. The literature will be summarized and two studies from the Montana emergency food supply presented while describing an agenda for further research.

**METHOD:** In a community university partnership, two Montana emergency food supply programs were evaluated for their capacity to improve access to healthy foods for low-income audiences. Programs were evaluated through mixed methods approaches, including the Healthy Eating Index and self-report survey.

**RESULT(S):** Individuals access the emergency food supply through food banks and food pantries. In general, little is known about the nutrient quality of emergency food supply foods. For children with very low food security, 72 BackPack programs and similar programs are offered through food banks and pantries in Montana to provide emergency foods over the weekend. The Healthy Eating Index 2005 was utilized to analyze the nutrient quality of the foods supplied and it was found to vary depending on degree of saturated fat, sodium, and added sugars. For seniors, a novel approach to improving food access was offered through a mobile pantry. Fruit and vegetable access for seniors was improved in Southwest Montana through mobile pantry efforts.

**CONCLUSION(S):** Similarities and differences in programs and populations will be discussed. These findings will be examined within the context a research agenda to design and evaluate effective programs in the emergency food supply that increase access to nutritious foods for limited resource individuals.

P441  
**Low-income families’ exposure to high fiber and high saturated fat foods measured using disaggregated receipt data**  
Calloway E, McAllaster M, McInnis K, Romo-Palafox MJ, Sweitzer SJ, Briley ME

**PURPOSE:** This study investigates low-income families’ exposure to high fiber (HFbr) and high saturated fat (HSF) foods using disaggregated receipt data. It is hypothesized: 1) more food components will be HSF than HFbr; 2) compared to restaurant food (fast-food and full service), grocery store food is less likely to be HSF and more likely to be HFbr.

**METHOD:** Seventeen low-income parents with young children collected all food purchasing receipts from 6/05/2011 - 6/20/2011. Composite food items were disaggregated using USDA’s Food-A-Pedia tool to determine proportions of food-group components. All food components and single constituent foods were assigned to a food category. Frequencies were calculated. Proportional differences were assessed using z-tests.

**RESULT(S):** Total food components purchased (n=1185) were significantly more likely to be HSF (30.6%, n=362) than HFbr (25%, n=296), (p<0.0001, z-score=4.43). Most (79.7%, n=945) food components were purchased at a grocery store, with the remainder (20.3%, n=240) at a
restaurant. Grocery store food was equally HFbr (27.7%, n=262 food) as HSF (28.5%, n=269), (p=0.58, z-score=0.55). Restaurant foods were more likely to be HSF (38.8%, n=93) than HFbr (14.2%, n=34), (p<0.0001, z-score=10.92). All foods are more likely (p<0.0001, z-score=5.02) to be HFbr if from a grocery store, and HSF if from a restaurant.

CONCLUSION(S): Grocery store food is equally as likely to be HSF as HFbr, but more likely to be HFbr and less likely to be HSF compared to restaurant food. Though most food exposure comes from the grocery store, interventions should minimize participants’ restaurant food purchasing.

P442  Characterizing the food skills and dietary habits among emerging adults on a university campus
Brüner B, Holmes M, Phillips C

PURPOSE: Over the past few decades, ‘normal’ eating patterns have come to consist of pre-prepared, fast food, contributing to poor health and decay of ‘from scratch’ food skills. University students are vulnerable to falling prey to convenience and fast foods, and while campus initiatives promote healthy eating, there is an underlying assumption of adequate food skills. Therefore, the aim of this study was to characterize the food skills and dietary habits of emerging adults living in campus residence.

METHOD: A total of 199 university students (18% M and 82% F; mean age 19.4 ± 1.65 years; 57% freshman) living in campus housing completed an on-line survey assessing food skills and fast food intake. Descriptive statistics were used to analyze the results.

RESULT(S): Over half (58%) the sample reported high skill level to prepare pre-packaged foods (e.g. macaroni and cheese), but only 24% reported the same level of skill to prepare similar foods from scratch. Students reported adequate time and skills to prepare food, however only 11% prepared the majority of their meals at least partly from scratch. Over half (54%) the sample ate fast food weekly, 50% did not eat breakfast daily and only one third were confident in eating the recommended daily servings of fruit and vegetables.

CONCLUSION(S): The results suggest a lack of skill to cook ‘from scratch’ and a reliance on convenience foods. Given the current food environment is filled with relatively inexpensive fast foods, there is a need for innovative initiatives to improve the food skills of this population.

P443  Understanding healthy eating behavior within the context of the modern food environment
Penney T, Vallis MT, Kuhle S, Rainham D, Dummer TJB, Kirk SFL

PURPOSE: The prevention of chronic disease requires understanding and intervention related to both individual, and environmental level determinants. However, traditional
approaches to chronic disease prevention and management have been primarily focused at the individual level, less so at the environmental level, and limited effort toward combining these influences. This lack of comprehensiveness is partially due to a paucity of complex theoretical frameworks for clarifying the influences of personal cognitive, and broader environmental variables on health behaviour. Therefore, the purpose of this research is to expand and test a popular health behaviour theory, Social Cognitive Theory (SCT), to include influences of the perceived food environment on healthy eating behaviour.

METHOD: This study will include two phases. Phase 1 will expand SCT to include a perceived food environment construct through systematic review of the literature. Phase 2 will conduct a cross-sectional study of 200 adults (age 35 to 69 years) using an online survey to test the expanded SCT informed by phase 1. Data analysis will include descriptive statistics and structural equation modeling to compare the traditional and expanded SCTs.

RESULT(S): Through the expansion of SCT to include broader environmental variables, we will simultaneously reveal the social-cognitive and perceived environment aspects of healthy eating behaviour.

CONCLUSION(S): It is expected that this knowledge could inform targeted chronic disease self-management programs and improve efforts in the development of effective population health interventions for supporting health behaviour change through the creation of supportive environments.

P444 Development and testing of an evidence-based mHealth weight management programme


PURPOSE: Over one billion individuals worldwide are overweight or obese. However the menu of evidence-based weight management treatments is limited. Our aim was to develop and test an evidence-based mHealth (mobile phone and internet-delivered) weight management programme for overweight and obese adults.

METHOD: An iterative development process with mixed methods was used to develop the programme. Content development was overseen by an expert group and based on evidence of effective programmes with additional input from overweight adults via focus groups and an online survey. A participant website, library of 130 text messages, and a hard copy toolkit were developed and piloted amongst overweight/obese New Zealand (NZ) adults.

RESULT(S): 145 overweight adults participated in the content development phase. There was a high demand for personalisation of the programme and messages; practical tips; and opportunities to self-monitor behaviour. Findings from focus groups suggested the need to focus on lifestyle behaviour goals rather than weight loss, and to prioritise support and motivation for behaviour change over education/information delivery. 53 volunteers (mean age 42, 81% female) were recruited from the community to pilot test the programme. At
baseline, mean weight was 101 kg (BMI 35.7 kg/m2), 26% were Maori (indigenous), and 32% were of Pacific ethnicity. 12-week follow-up will be complete by December 2012 (retention rate to date is 96%).

CONCLUSION(S): An evidence-based mHealth weight management programme is technically feasible, and the content we developed is appropriate for our target population. The acceptability and potential efficacy of the programme is being tested in a 12-week pilot study.


PURPOSE: Increasingly, consumers are opting for the use of pre-prepared meals or sauces which are associated with higher intakes of salt. Past studies have often used social cognitive theories to predict such dietary behaviours. More recently, however, it has been proposed that behaviour results from interaction between both reflective and impulsive processes (Strack and Deutsch 2004). The current study attempts to use both, reflective and impulsive factors to predict meal preparation behaviours, more specifically healthier meal preparation (HMP) and convenience-oriented meal preparation (COMP) behaviours in the same model.

METHOD: Structural equation modelling was used to test a theoretical model for meal preparation behaviours using three sets of predictors 1) socio-demographic factors, 2) reflective factors such as food involvement, food shopping, meal planning and salt knowledge, and 3) impulsive factors which consisted of general impulse buying tendency and sensitivity to situational cues.

RESULT(S): HMP practices were significantly predicted by being older, female, and having higher levels of food involvement, meal planning, salt knowledge and negative attitudes towards food shopping. COMP was negatively associated with age and food involvement, and positively associated with impulse buying tendency and sensitivity to situational cues.

Dietary patterns in a multi-ethnic population: preliminary findings from HELIUS-Dietary Patterns study
Dekker L, Snijder M, Beukers M, De Vries J, Brants H, de Boer E, Nicolaou M, Stronks K

PURPOSE: The role of diet in health is difficult to elucidate due to the complex interplay between foods and nutrients. Thus, research into dietary patterns rather than individual foods or nutrients is increasingly being used in nutritional epidemiology. In the Netherlands, immigrants and ethnic minorities form an increasing and large part of the population. These groups have a high risk of obesity and cardiovascular disease, making them an important target for public health interventions. Dietary patterns reflect different ethnic eating traditions. Given the increasing importance of these groups, nutrition education strategies need to be tailored to reflect these differences. We aimed to explore ethnic differences in dietary patterns in order to provide a basis for public health nutrition strategies.

METHOD: The HELIUS-dietary patterns study includes a random population sample of Amsterdam residents of Turkish, Moroccan, Surinamese and ethnic Dutch origin, aged 18-70 years. Our analysis will include data from Surinamese (African origin and South Asian origin) and Dutch participants. Food intake data is being collected using ethnic-specific FFQs specially developed for this study. Dietary patterns will be derived using principal component analysis.

RESULT(S): Data gathering is on going. We will start analyses in March 2013 and expect to provide preliminary results (insight into the predominant dietary patterns identified) during the ISBNPA conference.

CONCLUSION(S): This study will contribute to our understanding of the role of diet in ethnic health inequalities. Insight into dietary patterns will aid the development of relevant and appropriate public health interventions to improve diet.
P447  Academic performance among a nationally representative sample of Canadian youth: does physical activity, sedentary behaviours, and/or fruit and vegetable intake matter?
Woodruff S, Ahmed R, Manske S

PURPOSE: To investigate the associations among academic performance (AP), demographics, fruit and vegetable intake (FV), physical activity (PA), and sedentary behaviour (SED) by geographic location in Canada.

METHOD: This study utilized self-reported data that were collected as part of the national Youth Smoking Survey 2010/2011. Approximately 50,949 students in grades 6-12 filled out the paper-based survey during class time. Survey weights were used in all analyses to account for non-response and be representative of the Canadian population. Descriptive analyses of the sample demographics (gender, grade), FV (servings/day), PA (>3 times/week of hard physical activity for at least 60 minutes), and SED (<2 hours/day of phone/email/video games/computer/TV/movies) were examined by academic performance (mostly A’s, A’s and B’s, B’s and C’s, C’s, below) and geographic location (Atlantic, Quebec, Ontario, Prairies, and British Columbia). Regression models were used to examine the lifestyle factors associated with academic performance by each region.

RESULT(S): The majority of students (49.5%) reported getting mostly A’s and B’s, consumed 3-5 servings of FV/day (53%), were physically active >3 times/week (73%), and were sedentary for more than 2 hours/day (85%). Regression analyses conducted for each region separately, suggested that FV was positively associated with academic performance (all p<0.001) across all regions. PA (Atlantic and Prairies) and SED (Atlantic, Prairie, BC, and Ontario) were also positively associated with AP, yet not consistent across regions.

CONCLUSION(S): While AP was consistently associated with FV across all regions, SED/PA associations were not. Regional strategies may be necessary to promote energy balance for enhancing cognitive health for AP.

P448  Breakfast frequency and perceived inability to concentrate in school among 13-year-olds: findings from the Boost study
Krølner R, Aarestrup AK, Jørgensen SE, Jørgensen TS, Pedersen TP, Rasmussen M, Holstein BE, Due P

PURPOSE: Many teenagers go to school without eating breakfast. Few studies have investigated the relationship between breakfast frequency and teenagers’ ability to concentrate in school. This study examined the association between breakfast frequency and perceived inability to concentrate in school among Danish 13-year-olds.
METHOD: We used baseline data from the school-randomized Boost intervention trial targeting fruit and vegetable intake among year 7 pupils (~13 year-olds). 2,156 pupils (participation rate: 95%) from a random sample of 40 schools completed a questionnaire in class. Outcome: Perceived inability to concentrate in school in the morning from 8-12 am. Response categories were dichotomised into always/often versus sometimes/seldom/never. Determinant: Breakfast frequency on school days. Response categories were trichotomised into low: 0-1 day, medium: 2-3 days, and high: 4-5 days (reference category). We used multilevel logistic regression analysis and included gender and parental occupational social class as potential confounders.

RESULT(S): Among pupils, 16.1% always/often perceived to be unable to concentrate in school in the morning. Low breakfast frequency was reported by 9.2% of the pupils (medium: 7.5% and high: 83.3%). The odds ratio for perceived inability to concentrate was 1.96 (1.27-3.05) among pupils with medium breakfast frequency and 2.51 (1.72-3.67) among pupils with low breakfast frequency. Boys and pupils from low social class had higher odds for always/often being unable to concentrate in school.

CONCLUSION(S): This study indicates that breakfast habits are important for teenagers’ school achievement. More detailed analyses are needed to study if the observed association differs by teenagers’ physical activity levels and sleeping habits.

P449 Objectively versus subjectively measured physical activity: associations with cognition and academic achievement in adolescents
van Dijk M, de Groot R, Van Acker F, Savelberg HHCM, Kirschner PA

PURPOSE: Physical activity has a positive effect on cognitive performance in adults. Therefore, physical activity may stimulate cognitive performance and thereby academic achievement in adolescents as well. However, the association between physical activity and cognitive performance in adolescents is still unclear, because only a few studies investigated this association and reported mixed results. One shortcoming of these studies is the lack of an objective instrument to measure physical activity. Physical activity was generally based on self-report, a method that is sensitive for social desirability and recall bias. Therefore, we investigated associations in adolescents between objectively and subjectively measured physical activity on the one hand and cognition and academic achievement on the other hand, controlling for covariates.

METHOD: Cross-sectional study in 441 students (grade 7 and 9). Physical activity measured objectively by accelerometry. Participants wore an accelerometer (ActivPAL3™) one week (24 hrs/day). Physical activity measured subjectively by questionnaire (IPAQ-A). Cognitive performance measured by two neuropsychological tests (D2 test of attention, Symbol Digit Modalities Test). Academic achievement (Dutch, mathematics, English) provided by the school. Aerobic fitness, BMI measured objectively. Socioeconomic status, pubertal phase measured by self-report. Regression analysis was used to analyse associations between physical activity and cognition and academic achievement.
RESULT(S): Objectively measured physical activity showed a negative association with academic achievement in adolescents ($\beta = -.110$, $P = .030$). Subjectively measured physical activity showed a positive trend with cognition, however not significant.

CONCLUSION(S): Objective results in contrast, while subjective results are in line with most studies measuring physical activity subjectively.

P450  Gym2Learn: effect of daily gym class on cognitive performance, academic achievement, and mood/self-esteem

de Groot R, Jarodzka H, Gijselaers J, Kirschner PA

PURPOSE: There is an association between physical activity and brain functioning. However, adolescents as a research group seldom got attention, whereas during adolescence the brain is still in development and thus prone to the stimulating effect of physical activity. Goal of this study is the effect of daily gym classes on cognitive performance, academic achievement, and mood/self-esteem in adolescents.

METHOD: 60 14-15 years old students from lower vocational training received according to a cross-over design during one semester daily gym classes, which was compared with regular gym class (i.e. once a week 2 hours). The effect on cognitive performance (d2 Test of Attention, Symbol Digit Modalities Test, N-back task, logical memory task), academic achievement (GPA for Dutch, English and Mathematics), mood (CES-D), and self-esteem (Rosenberg Self-esteem Questionnaire) was measured. Participants were tested with eye tracking to capture perceptual aspects of cognition, such as information processing level (duration of fixations) or mental workload (pupil dilation). BMI, sex, pubertal stage, smoking, alcohol consumption, socio-economic status, and aerobic fitness (20 m shuttle-run test) were considered as covariates.

RESULT(S): Preliminary results will be available during ISBNPA2013.

CONCLUSION(S): The interdisciplinary approach of the current study is unique in its kind, as well as adolescents as specific research group. Effects on cognitive functioning, academic achievement, mood, self-esteem, and motivation are measured in parallel, which offers possibilities to pronounce upon possible mechanisms. In addition it is the first time that the effects of daily gym classes are measured with an eye tracker.
P451  Physical activity before school, including active commuting to school: associations with cognition and academic achievement in adolescents
van Dijk M, de Groot R, Van Acker F, Savelberg HHCM, Kirschner PA

PURPOSE: Physical activity immediately before school may increase attention, physiological arousal and thereby academic achievement in adolescents. Besides, active commuting to school may stimulate overall physical activity levels. The latter, physical activity is positively associated with cognition and academic achievement in adolescents. Therefore, physical activity before school, including active commuting to school, may stimulate cognitive performance and academic achievement in adolescents. So far, only one study investigated the association between subjectively measured active commuting to school and cognition in adolescents, reporting a positive association in adolescent girls. To date there is no study investigating the association between physical activity before school and cognition and academic achievement in adolescents. Therefore, we investigated the association between physical activity before school, including active commuting to school, and cognition and academic achievement in adolescents.

METHOD: Cross-sectional study in 441 students (grade 7 and 9). Physical activity before school measured objectively with an accelerometer (ActivPAL3™) attached at the thigh. Participants wore the device one week (24 hrs/day). Active commuting to school measured by self-report. Cognitive performance measured by two neuropsychological tests (D2 test of attention, Symbol Digit Modalities Test). Academic achievement (Dutch, mathematics, English) provided by the school. Regression analysis was used to analyse associations between physical activity before school, active commuting to school and cognition and academic achievement.

RESULT(S): In progress. Results will be presented during ISBNPA 2013.

CONCLUSION(S): The objective measurement of physical activity before school and high compliance of the participants (96% participants with useful accelerometer data) are important strengths of this study.

P452  Is the association of physical activity and sedentary behavior with CVD risk factors dependent on weight status? The NEXT Generation Health Study
Iannotti RJ, Pratt C, Li K, D’Elio MA, Olson SB, Fan R, Simons-Morton B

PURPOSE: Associations of physical activity and sedentary behavior with cardiovascular disease (CVD) risk may depend on weight status. The current study examines this hypothesis in a national sample of US adolescents.

METHOD: Height, weight, waist circumference (WC), fasting blood glucose, HbA1c, total cholesterol (TC), triglycerides, low density lipoprotein (LDL-C), high density lipoprotein (HDL),
C-reactive protein, uric acid and systolic (SBP) and diastolic (DBP) blood pressure were assessed in 257 overweight/obese and 260 normal weight adolescents (mean age = 16.2±0.5). A minimum of 4 days of physical activity (MVPA) and sedentary behavior were assessed with accelerometers (wearing time ≥ 500 minutes/day). Data were analyzed with linear regression.

RESULT(S): MVPA was related negatively to WC and DBP, and positively to SBP and uric acid. Sedentary behavior was negatively related to WC, fasting blood glucose, SBP, and uric acid. On average, being overweight was related to less MVPA (22.9 min/day versus 26.3 min/day) and less sedentary behavior (508.6 min/day versus 525.9 min/day). Being overweight was also positively related to WC, TC, LDL, HDL, triglycerides, C-reactive protein, uric acid, and DBP. Weight status moderated associations of MVPA and sedentary behavior with some CVD risks. In overweight adolescents, MVPA was negatively related to DBP. In normal weight adolescents, there was a much greater negative association between sedentary behavior and fasting blood glucose.

CONCLUSION(S): MVPA and sedentary behavior were related to CVD biological markers although these associations were complex. The benefits of physical activity may depend on an adolescent’s weight status.

P453 Physical fitness percentiles for Portuguese children and adolescents aged 10 to 18 years
Santos R, Mota J, Santos DA, Moreira C, Silva AM, Baptista F, Sardinha LB

PURPOSE: This study aimed to produce age- and sex-specific physical fitness (PF) reference data for Portuguese youth; to report the prevalence of youth in the healthy zone of PF according to the FITNESSGRAM® criteria; and to verify the agreement (sensitivity and specificity) between the Portuguese PF percentiles and the healthy zones (HZ) of the FITNESSGRAM®.

METHOD: In 2008 a cross-sectional school-based study evaluated 22 048 Portuguese children and adolescents aged 10-18 years by means of proportionate stratified random sampling. PF (curl-ups, push-ups, a 20m shuttle run test and the modified-back-saver-sit-and-reach) was evaluated using the FITNESSGRAM® Test Battery 8.0. Smoothed percentile curves were estimated using Cole’s LMS method.

RESULT(S): Boys consistently outperformed girls in every PF test. In both sexes and for all PF tests, higher percentile values were observed at older ages. The 50th percentile of all PF tests had the highest accuracy to discriminate between under HZ and HZ of the FITNESSGRAM® criteria.

CONCLUSION(S): Portuguese schools and physical education teachers may considerer the 50th percentile or the FITNESSGRAM® criteria for classifying subjects in the HZ as acceptable cut-offs, above which youth should be considered fit. The reference values presented can be used as normative data and also for baseline values for subsequent surveillance of the PF of Portuguese youth.
P454 Light-intensity physical activity and cardiometabolic biomarkers in US adolescents: NHANES 2003-06
Carson V, Ridgers ND, Howard BJ, Winkler E, Healy GN, Owen N, Dunstan D, Salmon J

PURPOSE: To examine the associations of accelerometer-derived light-intensity (split into low and high) physical activity, and moderate- to vigorous-intensity physical activity (MVPA) with cardiometabolic biomarkers in a large population-based sample of US adolescents.

METHOD: The study is based on a cross-sectional sample of 1731 adolescents, aged 12-19 years from the 2003/04 and 2005/06 National Health and Nutrition Examination Survey. Low light-intensity activity (LLPA; 100-799 counts/min), high light-intensity activity (HLPA; 800 counts/min to < 4 METs) and MVPA (≥ 4 METs, Freedson age-specific equation) were derived from an ActiGraph (model 7164) accelerometer. Cardiometabolic biomarkers, including waist circumference, systolic blood pressure, diastolic blood pressure, HDL-cholesterol, and C-reactive protein were measured. Triglycerides, insulin, glucose, HOMA-%B, and HOMA-%S were also measured in a fasting sub-sample (n=807).

RESULT(S): Adjusted for confounders, each additional hour/day of LLPA was associated with 0.59 (95%CI: 1.2-0.01) mmHG lower diastolic blood pressure. Each additional hour/day of HLPA was associated with 1.7 (2.9-0.4) mmHG lower diastolic blood pressure and 0.04 (0.001-0.07) mmol/L higher HDL-cholesterol. Each additional hour/day of MVPA was associated with 3.5 (5.7-1.4) mmHG lower systolic blood pressure, 5 (1-10)% lower waist circumference, 26 (6-41)% lower insulin, and 16 (5-29)% lower HOMA-%S.

CONCLUSION(S): Consistent with current physical activity recommendations for adolescents, MVPA had favorable associations with many cardiometabolic biomarkers. Time spent in LLPA and HLPA also had some favorable associations with biomarkers. Further studies are needed to identify dose-response relationships for light-intensity activity thresholds to inform future recommendations and interventions for adolescents.

P455 Relationship between body mass index, cardiorespiratory fitness and pulse pressure in Portuguese youth
Moreira C, Santos R, Abreu D, Santos PC, Mota J

PURPOSE: It is well known that obesity and lower cardiorespiratory fitness (CRF) are important risk factors for cardiovascular disease (CVD) in adolescents. Large pulse pressure is also a risk factor for CVD. Therefore, the aim of this study is to determine the relationships between body mass index (BMI), CRF and pulse pressure in a sample of Portuguese youth.

METHOD: A cross-sectional school-based study was conducted on 517 adolescents (220 girls) aged 15-18 years (mean age 16.5±0.9) from the Azorean Islands, Portugal. Anthropometric measurements (height and weight), blood pressure (systolic and diastolic) were measured. BMI was calculated as weight (kg)/height (m²) and pulse pressure was calculated as the
difference between the systolic and diastolic blood pressure. CRF was measured with the 20m-Shuttle-Run-Test from the Fitnessgram battery test as number of laps. Sodium intake was assessed with a semi-quantitative food frequency questionnaire. Smoking status was self-reported and classified as smoker and non-current smoker.

RESULT(S): Partial correlations, adjusted for age, sex, smoking status and sodium intake between pulse pressure and BMI was positively correlated (r=0.359, p<0.001) whereas the correlation between pulse pressure and CRF was negatively correlated (r=-0.106, p<0.05). The results of the linear regression, controlling for age, sex, smoking status and sodium intake, showed that pulse pressure was positively associated with BMI (β= 0.019, p<0.001) and negatively associated with CRF (β=-0.067, p<0.05).

CONCLUSION(S): The results suggest that more emphasis should be placed on improve Azorean adolescent ’s CRF and on BMI reduction in order to maintained a reduced pulse pressure.

P456 Healthy effect of different EPA/DHA proportions of fish oils supplementation: a proteomic approach in rats
Méndez L, García-Egido E, Pazos M, Gallardo JM, Torres JL, Pérez-Jiménez J, Nogués LR, Medina I

PURPOSE: Excessive reactive oxygen species production has been described as an initial key event in the development of alterations as insulin resistance. EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) consumption has been implicated in the prevention of these disorders, but some aspects of their action mechanisms remain unclear. This study has been focused in the determination of the optimal EPA:DHA ratio in diet to reduce oxidative stress, in order to mitigate its deleterious effects. A novel proteomic approach has been used to evaluate tissular oxidative stress.

METHOD: Wistar female rats were supplemented with three different EPA:DHA ratios (1:1, 2:1 and 1:2) during 13 weeks. Soybean and linseed oils were used as oil controls. Tissular protein oxidation was analyzed labeling protein carbonyls with a fluorescent-marker and measuring fluorescence signal on 1D or 2D-gel-electrophoresis. Specific proteins were identified by tandem mass spectrometry (MS/MS).

RESULT(S): Carbonylation protein level was decreased in rats supplemented with fish oils ratios, but rats fed with the EPA:DHA 1:1 proportion showed the lowest oxidation level. Specifically, several proteins were revealed as the main targets of EPA and DHA healthy effects (albumin, argininosuccinate synthetase, 3-a-hydroxysteroid dehydrogenase, aspartate aminotransferase, actin).

CONCLUSION(S): Results showed the capacity of the EPA and DHA supplementation to mitigate cumulative oxidative damage and decrease the risk of developing insulin intolerance. The EPA:DHA 1:1 proportion seem to be the most effective ratio.
P457 Physical fitness and academic performance in Japanese junior high school students
Yamatsu K, Morita N, Nakajima T, Sagawa M

PURPOSE: To determine whether physical fitness was associated with academic performance in Japanese students.

METHOD: Participants were 285 (female: 47.4%, mean body mass index [BMI]: 19.4+/-3.4) 1st grade (7th grade in USA style) students of public junior high schools near Sapporo area in Japan. All students and their parents completed the questionnaires. The physical fitness scores and academic performances (school grade) were received from school records. The physical fitness tests that were authorized by Japanese Ministry of Education, Culture, Sports, Science and Technology were used. The sum total of the 9 subjects grades (Japanese, social studies, math, science, English, music, arts, home economics/vocational-technology, physical education) were used as academic performance scores.

RESULT(S): Physical fitness scores were positively correlated with academic performance scores (r=0.379, p<0.001). Using multiple regression analyses that controlled for several covariates (gender, BMI, household income, mother’s education), physical fitness scores were significantly associated with academic performances (beta=0.358, p<0.001).

CONCLUSION(S): These results suggest that greater physical fitness scores were positively associated with academic performances among Japanese junior high school students.

P458 Differential action of the EPA/DHA ratio on metabolic syndrome markers in animal models: updating healthy evidences on w3 supplementation
García-Egido E, Méndez L, Pazos M, Gallardo JM, Molinar-Toribio E, Torres JL, Nogués LR, Taltavull N, Medina I

PURPOSE: The intake of omega-3 polyunsaturated acids (w3-PUFA) from fish oils is associated with health benefits by reducing metabolic syndrome (MetS) death risks. Despite the fact that accumulating evidences suggest w3-PUFA congeners have selective and independent effects, previous dietary studies overlooked the benefits of w3-PUFA supplement ratios on health. This work aims to study the impact of varying 3-PUFA ratios on supplements seeking to ameliorate MetS lipid markers in model animals.

METHOD: A healthy rat strain (Wistar) and a MetS prone rat strain (SHROB) were used as animal models. Five dietary groups were considered: four were fed with w3 supplements prepared from fish oils enriched in eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in 2:1, 1:1, 1:2 ratios, or with linseed oil; the remaining group was supplemented with soybean oil. Fatty acid profiles from plasma and erythrocyte membranes were measured. Plasma lipids (total fatty acids, triglycerides, cholesterol, HDL and HDL) were also assessed.

RESULT(S): Wistar rats showed changes on fatty acid profiles in agreement with supplementation, yet no relevant variations on MetS lipid markers were observed. On the
contrary, SHROB rats showed highest w3 levels in 2:1 and 1:1 EPA-DHA supplemented groups. Moreover, EPA-DHA supplementation in 1:1 and 2:1 ratios were active to revert plasma lipid markers in MetS prone rats.

CONCLUSION(S): Results show a differential impact on healthy benefits based on w3 PUFA ratios, by suggesting the use of 1:1 and 2:1 EPA-DHA as optimum supplements to prevent the development of MetS.

P459 Association between skipping breakfast and overweight in Portuguese children
Melo Rodrigues PR, Pereira RA, Santana AM, Antunes A, Ferrão MM, Padez C

PURPOSE: Assess the association between skipping breakfast and overweight in Portuguese children.

METHOD: Cross-sectional study including a nationwide representative sample Portuguese children (n=16,746). Parents completed a questionnaire on children’s food habits and family characteristics. Breakfast consumption was ascertained by the following yes/no question: "Does your child eat breakfast regularly?". Weight and height were measured by standard procedures. Weight status was evaluated with age- and sex-specific body mass index (weight/stature2) cut-off points defined by IOTF. Analyses were done considering three age groups: 3-5, 6-9, and 10-11 years old. Chi-square test and multivariate logistic regression models were used to estimate the association between dependent variable (weight status) and independent variable (breakfast consumption), controlled by child sex and parent’s weight status.

RESULT(S): Excess weight (overweight + obesity) prevalence varied across age groups (23.0, 31.0 and 28.0%, respectively, p<0.01), as well as the prevalence of breakfast omission (2.9, 3.2 and 5.5%, respectively, p<0.01). There was higher prevalence of excess weight among children that usually skipped breakfast compared to those who regularly had breakfast (3-5 years old: 30.0 vs 22.0%, p=0.03; 6-9 years old: 42.0 vs 30.0%, p<0.01), although this association was not significant for 10-11 years old children (p=0.13). In multivariate logistic regression models, the chance of excess weight was higher only for 6-9 years old children (OR=1.5, 95% CI=1.2, 2.0) that usually skipped breakfast.

CONCLUSION(S): Among Portuguese schoolchildren from 6-9 years old, skipping breakfast was associated with excess weight, independently of child sex and parent’s weight status.

P460 Association between TV viewing and physical activity and obesity in Portuguese children
Santana AM, Melo Rodrigues PR, Antunes A, Ferrão MM, Padez C

PURPOSE: Examine TV’s effect and physical activity (PA) in the prevalence of obesity in
Portuguese children.

METHOD: Cross-sectional study in a random nationality representative sample of Portuguese 3-12years children (n=17444). Obesity was defined using IOTF cut-offs. Parents answered a questionnaire about children’s habits, TV time/day and PA (inside and outside school). TV was grouped in <2 or ≥2hours/day and PA in “practice” or “not practice”. Children were categorized in three groups (3-5; 6-9; 10-12years). A chi-square test and logistic regression model adjusted for sex and parent’s obesity was done.

RESULT(S): Significant differences according to age were found, whether for obesity (including overweight) (p<0.01), TV≥2h/day (p<0.01), PA (not practicing inside school (p<0.01), and outside (p<0.01)). Obesity prevalence in 3-5years children who don’t practice activities in school was higher compared to those who practice (24.9 vs. 22.1; p=0.03). For 6-9years, was found that obesity prevalence was higher when children watched ≥2h/day TV (29.1 vs. 33.2; p<0.01), didn’t practiced physical activity at school (29.8 vs. 33.8; p<0.01) or outside (28.8 vs. 32.6; p<0.01). No statistically significant associations were found for 10-12years. Multivariate analysis showed that the probability of children with 6-9years being obese increases when they see ≥2h/day TV (OR=1.21, 95%CI=1.08-1.35; p<0.01), not practice activity in school (OR=1.23, 95%CI=1.08-1.39; p<0.01), or outside (OR=1.16, 95%CI=1.05-1.28; p<0.01).

CONCLUSION(S): TV time and PA are differently associated with obesity in the groups, being more influent in the development of obesity in children with 6-9years. For children with 10-12years other factors should be considered the development of obesity.

P461 The influence of active commuting to school on physical activity and weight status in a representative sample of 9 year old Irish children
Murtagh EM, Dempster M, Murphy MH

PURPOSE: To examine the influence of mode of commuting to school on physical activity levels and body mass index in a representative sample of 9 year old children in Ireland.

METHOD: This study utilises data from the ‘Growing Up In Ireland’ study where 8568 children and their primary caregivers were interviewed. Height and weight was objectively measured by researchers and classified using International Obesity Taskforce BMI cut-points (Cole et al., 2000). Given the large sample size, analyses focused on effect sizes (correlation coefficients or Cramer’s V) rather than statistical significance.

RESULT(S): Parental-report of the number of days out of the previous 14 that the child engaged in light (V=0.05, p<.001) and hard exercise (V=0.04, p<.001), child-report of the number of days out of the previous 7 that he/she engaged in physical activity for at least 60 minutes (r=0.03, p=.116) and child-report of how often he/she plays sport (V=0.04, p=.001) and takes exercise (V=0.04, p<.001) were only very weakly associated with mode of commuting to school. Child BMI was also very weakly associated with mode of commuting.
to school \( r=0.03, p=.106 \).

CONCLUSION(S): Mode of commuting to/from school is not substantially associated with child/parental reports of physical activity or child’s BMI. Further analysis of this dataset will seek to identify predictors of physical activity level, weight status and active commuting for Irish children.

**P462 Breakfast consumption and emotional eating among girls associated with sleep duration and obesity**  

PURPOSE: Short sleep duration has been observed to be a risk factor for obesity in youth and adulthood, however the mechanism driving this association is poorly understood.

METHOD: Using cross-sectional data from 2596 girls, age 16-23 years, who responded to the 2011 wave of the Growing up Today Study II questionnaire, we explored two possible mediating mechanisms through which sleep duration could modify energy intake and obesity risk: breakfast consumption and emotional eating.

RESULT(S): In 2011, girls had a mean (SD) BMI of 22.7 (3.5) and 20% were overweight/obese. Overall, 43% slept >8 hours/night, 67% ate breakfast 5 or more times per week, and participants had a mean (SD, range) emotional eating score of 2.0 (0.7, 1.0-5.0). In age-adjusted models, sleep duration (hours/night) was positively associated with frequency of breakfast consumption (\( ß=0.013; 95\% \text{ CI}=0.003, 0.023 \)) and inversely associated with emotional eating score (\( ß=-0.019; 95\% \text{ CI}=-0.033, -0.006 \)). In models controlling for age, dieting, and TV viewing, those with higher sleep duration had somewhat lower odds of overweight/obesity (OR=0.93; 95% CI=0.85, 1.01; \( p=0.10 \)), and controlling for breakfast consumption and emotional eating attenuated this association (OR=0.95; 95% CI=0.87, 1.04; \( p=0.26 \)), thereby signifying two possible mediating pathways. In fully-adjusted models including sleep duration, greater frequency of breakfast consumption predicted lower odds of overweight/obesity (OR=0.81; 95% CI=0.73, 0.90), while emotional eating score predicted higher odds of overweight/obesity (OR=1.18; 95% CI=1.03, 1.35).

CONCLUSION(S): Girls with short sleep duration are less likely to eat breakfast and are more susceptible to emotional eating, which may account for their increased risk for obesity.

**P463 Screen time or physical activity-which is a more important predictor of overweight in Irish 9 year old boys and girls?**  
Lane A, Murphy NM, Kwan M

PURPOSE: Previous research has indicated high screen time (ST) and low physical activity (PA) are independently associated with weight gain. The purpose of this analysis was to examine the combined influence of ST and PA on risk of OW/obesity in a nationally
representative sample of 9-year old Irish boys and girls (n=8569).

METHOD: Participants were parents and children, randomly selected to take part in the Growing Up in Ireland longitudinal study. Both completed interview administered questionnaires and objective measures of height and weight were recorded.

RESULT(S): High ST was equally prevalent in boys and girls but boys were more likely to be high active (p<.05) than girls. Overall, ST was a stronger associate of OW/obesity than PA, regardless of activity status. The combined effect of low PA and high ST on OW/obesity, compared to the reference group of high PA and low ST, was similar across all children. However, risk increased in boys as they went from low ST/low PA to high ST/high PA but not in girls where risk was similar in both of these categories.

CONCLUSION(S): ST of >3 hours per day and the availability of sedentary technology increased risk of OW/obesity in children who reported high and low levels of PA. Changing levels of ST did not have an effect on the likelihood of OW/obesity in girls as long as PA remained high.

P464 Relationship between breakfast frequency and healthy body weight in children aged 9-10 years
Klimešová I, Milkánková L, Šlachtová M, Neumannová K, Elfmark M

PURPOSE: Today there is no doubt that the appropriate body weight is an important determinant of health. It is also evident that a key factor in weight control is diet and physical activity. We focused on eating habits, especially on the breakfast frequency. The study assessed the association between frequency of breakfast consumption and body mass index (BMI) percentile in schoolchildren aged 9-10 years.

METHOD: A total of 149 children (82 boys and 67 girls) aged 9-10 years participated in this study. The children’s BMI was calculated from the exact measurements of the height and weight and then assessed according to age-dependent percentile charts. The Czech National Standard was used to identify children’s weight status as underweight (< 10%), normal weight (10% to 90%), or overweight (> 90%). The frequency of breakfast and its composition was determined using a questionnaire originally developed for this study.

RESULT(S): Regular daily breakfast consumption was reported by 52.4% of children, 11.4% of children claimed they never have breakfast. There was no difference between boys and girls in the frequency of eating breakfast. Statistically significant difference in the regularity of breakfast consumption was found between children in the low, normal, and overweight groups. Eating breakfast daily was reported by 70.5% children with normal weight, 42.1% of underweight children, and 8.6% of overweight children.

CONCLUSION(S): Data indicate that regular consumption of breakfast resulted not only in the lower risk of excess weight, but also in underweight. Eating breakfast regularly resulted in healthier body weight independently of gender.
**P465** Association between amino acids consumption and serum lipid profile in European adolescents participating in the HELENA Study
Bel-Serrat S, Mouratidou T, Huybrechts I, Androutsos O, Gómez S, Molnar D, Kafatos A, Moreno L

PURPOSE: The role of amino acids (AA) consumption on serum lipid profile remains unclear. This study aimed to examine the relationship between AA consumption and serum lipid profile in European adolescents from eight European cities participating in the cross-sectional (2006-2007) HELENA study.

METHOD: Skinfolds thickness, total cholesterol (TC), high density lipoprotein-cholesterol (HDL-c), low density lipoprotein-cholesterol (LDL-c), triglycerides, apolipoprotein B and apolipoprotein A1 were measured in 454 adolescents (44% boys) aged 12.5-17.5 years, and TC/HDL-c ratio and apolipoprotein B/apolipoprotein A1 ratio were calculated. AA consumption was assessed by two 24-hour dietary recalls. Associations were evaluated by multilevel analysis.

RESULT(S): Alanine, arginine, asparaginic acid, glycine, histidine, lysine and serine consumption were inversely associated with serum triglyceride concentrations in both genders. Other AA consumption such as alanine and/or arginine were also inversely associated with serum TC, LDL-c and apolipoprotein B/apolipoprotein A1 ratio in girls, but not in boys. A negative association was observed between alanine, isoleucine, leucine, methionine, serine, tryptophane, tyrosine and valine in girls and TC/HDL-c ratio. This was also true in male adolescents but only for serine and tryptophane. Considerable worse serum lipid profile across tertiles of AA consumption was observed for those adolescents with higher sum of skinfolds compared to those with lower sum of skinfolds.

CONCLUSION(S): An inverse association was found between AA consumption and serum lipids observed to differ according to gender and initial body fat status. Our findings have potentially major clinical implications when considering that adolescents with a healthier lipid profile have also more favorable cardiometabolic risk profile.

**P466** Milk matters: Is there an association between dietary calcium or total milk consumption and BMI in 5-6 year old children participating in the West Midlands Active Lifestyles and Healthy Eating in School Children (WAVES) study?
Kelleher K, Pallan M, Adab P

PURPOSE: Current literature has shown a suggestive, but not conclusive, protective effect between dairy consumption and overweight and obesity. The present study aims add to this area to examine the association between calcium consumption, milk consumption and BMI in a multi-ethnic population of 5-6 year old children in the West Midlands, UK.
METHOD: The CADET food and drink 115-item tick list was used to measure 24-hour dietary intake in 1202 children. Researchers recorded children’s dietary intake during a school day, and parents/carers completed the tick list for the remainder of the 24-hour period. Children’s height and weight were measured and BMI standard deviation scores (z-scores) calculated using UK 1990 growth reference data.

RESULT(S): Preliminary analysis has been performed on a sample (n=555) of the children participating in the study. Mean BMI z-score was 0.26 (SD ± 0.18). 80.8% (n=442) of the CADET tick lists were considered plausible dietary reports based on set criteria. No significant correlations were found between dietary calcium or total milk intake and BMI in either the total group (calcium: B=0.00 (0.00, 0.00), p=0.45; total milk intake: B=−0.001 (-0.02, 0.00), p=0.00) or the plausible reporters (calcium: B=0.00 (-0.001, 0.00), p=0.44; total milk intake: B=−0.001 (-0.002, 0.001), p=0.38.)

CONCLUSION(S): Preliminary analysis does not support the assumption that dietary calcium or total milk intake are associated with BMI in 5-6 year old children in the West Midlands. Further analysis on the full sample and by sex, ethnic and type of dairy subgroup will also be undertaken before firm conclusions can be drawn.

P467 Cardiorespiratory fitness status and cardiometabolic risk markers in 10-11 year old children


PURPOSE: To investigate markers of cardiometabolic risk in 10-11 year old children classified by cardiorespiratory fitness status.

METHOD: Participants completed the following during one laboratory visit:, ultrasound assessments of flow mediated dilation (FMD%) and carotid intima-media thickness (CIMT), measurements of blood pressure (BP), stature, body mass, sitting stature and waist circumference, and an individually calibrated treadmill assessment of cardiorespiratory fitness (VO2peak). Somatic maturity and body mass index (BMI) were calculated. On a separate day, children attended school-based blood sampling mornings to provide fasted venous blood samples. Blood markers included in this study were: high-sensitivity C-reactive protein (CRP), adiponectin, high-density lipoprotein (HDL), total cholesterol and glucose. Participants were classified as fit or unfit according to published thresholds. Multivariate analysis of covariance was conducted to assess differences in cardiometabolic and anthropometric variables between fitness groups, controlling for somatic maturity and sex.

RESULT(S): Complete data were available for 70 participants (n = 41 boys, 39 girls, mean age = 10.77 [0.78] years). Participants in the unfit group had significantly higher: BMI (p < 0.001), waist circumference (p < 0.001) and diastolic blood pressure (p = 0.013) than the fit group. Furthermore, the fit group exhibited significantly higher adiponectin levels (p = 0.001). No significant differences in CIMT, FMD %, cholesterol, systolic BP, or HDL were observed.
CONCLUSION(S): These findings suggest that unfit children exhibited elevated risk factors associated with cardiometabolic disease. Furthermore, data suggest that fitness thresholds could be useful to identify children who may benefit from vigorous physical activity interventions that promote fitness.

P468  Relationship between BMI, waist circumference and objectively measured physical activity between Chinese-Australian and Anglo-Australian adolescents
Strugnell C, Renzaho A, Ridley K, Burns C

PURPOSE: Several reviews have examined the relationship between the body mass index (BMI), physical activity and sedentary behaviour among adolescents. This study examined the relationship between BMI and/or waist circumference with physical activity and sedentary time across two samples of adolescents, a culturally and linguistically diverse (CALD) Chinese-Australian and Anglo-Australian sample.

METHOD: Two-hundred and ten Chinese-Australian and Anglo-Australian adolescents (14.0 y ± 1.2) were recruited using a two-step sampling procedure involving 12 separate Chinese-weekend cultural school campuses and two secondary schools in metropolitan Melbourne. Daily light intensity physical activity (LPA), moderate-to-vigorous intensity physical activity (MVPA) and sedentary time were collected using 7-day accelerometry. Height, weight and waist-circumference (WC) were measured and BMI calculated (weight (kg)/height (m^2)). Multiple hierarchical linear regression analyses were used to examine the relationship between BMI and/or WC and LPA, MPA and sedentary time after controlling for a range of covariates (age, gender and socio-economic status).

RESULT(S): In the final regression model, no significant associations were revealed between MVPA, LPA or sedentary time and BMI or WC among Anglo-Australian adolescents. However, daily LPA was positively associated with BMI (B = 0.02, 95% CI: 0.01; 0.04 kg/m2) and waist circumference (B = 0.08, 95% CI: 0.04; 0.11 cm) among Chinese-Australian adolescents. In addition, CALD specific relationships between age and gender were observed.

CONCLUSION(S): This study is among the first to examine the relationship between physical activity and measures of adiposity among a sample of Chinese or Asian adolescents in Australia, and highlights specific CALD relationships.
P469  Physical activity and, insulin resistance in obese Hungarian children  
Felso R, Erhardt É, Molnar D

PURPOSE: The aim was to assess the number of obese children participating in organized, regular training, and to determine the association between physical activity (PA) and insulin resistance.

METHOD: 231 children (136 boys) were examined, the age was 12.1±2.8 years (mean±SD), body mass index (BMI) was 31.7±4.9 kg/m². Fasting blood tests were performed, Homeostasis Model Assessment (HOMA) was calculated and anthropometric measurement was done. The duration of weekly regular training was asked from the obese children.

RESULT(S): 8.7 % of the girls (n=20) and 10.4 % of the boys (n=24) were participating in regular training every week. The duration of it was significantly shorter in girls compared to boys (140±64 vs 298±111 minutes/week; mean±SD; p<0.002). BMI was significantly different according to the physical activity (children with PA: 30.0±4.7 vs children without PA: 32.1±4.9; p<0.015). HOMA was significantly different among prepubertal and pubertal children (4.1±3.4 vs 5.2±2.5; p<0.020), but it was similar in both gender, and the duration of regular training did not have an effect on it.

CONCLUSION(S): Obesity and puberty are important factors for the development of insulin resistance. It’s known that physical activity decreases during puberty, especially in obese children, so engagement of these children in regular physical activity is necessary.

P470  The contribution of different types of physical activity to helping adolescents achieve the current physical activity recommendations, and their subsequent impact on health  
Woods CB, Tannehill D, Walsh J

PURPOSE: The purpose of this study was to evaluate participation in, and contribution of, different types of physical activity - physical education (PE), extra-curricular and community based sport and active school transport - to the achievement of physical activity guidelines (PAGL; > 60 minutes of moderate to vigorous physical activity (MVPA) daily), and subsequent health status of adolescents.

METHOD: This cross-sectional study had adolescents (N=4,122, mean age = 14.5 years ± 1.7; 52% female) complete a valid and reliable self-report questionnaire. A sub-sample (25%) completed a battery of physical health measures; cardiovascular fitness, body mass index, blood pressure, waist circumference and wore accelerometers.

RESULT(S): Twelve percent met the PAGL. Extra-curricular and community based sport contributed significantly, active school transport contributed for females, and minutes of PE did not contribute to PAGL achievement. Most had a healthy BMI (77%), 17% were
overweight, 5% obese, 2% were underweight. Most had a healthy BP (74%), aerobic fitness (71%), and a healthy waist circumference (85%). The four health outcomes were summed to provide an individual health profile (range=0 to 4; 0 = least healthy to 4 = most healthy). The average health profile was 2.9 + 1.1. The best health profile was found in youth who met the PAGL. Age, gender, socio-economic status and area of residence inequalities were evident both in uptake of different types of physical activity and consequently in achievement of the PAGL.

CONCLUSION(S): Targeted interventions are needed to tackle these inequalities, particularly for community based sport and physical activity opportunities.

P471 Pedometer determined physical activity, BMI and energy expenditure of Greek preschoolers

PURPOSE: The aim of this study was to investigate possible associations among weekday and weekend step counts, body mass index (BMI), and energy expenditure in a sample of Greek preschoolers.

METHOD: A total of 91 preschoolers from 10 public Kindergartens in Komotini, located in Northern Greece volunteered to participate in this study. BMI for each child was calculated using the formula weight/height², and obesity was defined based on cut-off criteria from the IOTF (Cole et. al. 2000). PA was assessed using an Omron HJ-720IT-E2 pedometer worn for 7 consecutive days. The HJ-720IT-E2 offers the additional benefits of estimating energy expenditure in calories.

RESULT(S): The mean steps were about 9,925±3,400 per weekdays and 8,076±2,791 per weekend days. Based on BMI standards mean step counts for “normal” group (13,436±1755) were significantly (p<.001) higher than in “overweight” (8,592±2,259) and “obese” group (7,629±2,669) in weekdays. In weekend days, “normal” group (10,048±2,780) were significantly higher (p<.001) than in the “overweight” (7,208±2,033) and “obese” group (6,907±2,387). Additionally energy expenditure expressed in calories were significantly more (p<.001) in “normal” group in weekdays and weekend days (134±21weekdays/116±32weekend days) than in “overweight” (89±18 weekdays / 87±21weekend days) and “obese” group (83±61weekdays / 79±39 weekend days).

CONCLUSION(S): The present study reveals a high prevalence of obesity and physical inactivity among Greek preschoolers. In addition preschoolers were significantly less active in weekend days than in weekdays. Therefore, concerted interventions are needed to combat childhood obesity, promote physical activity, and discourage sedentary habits among Greek preschoolers.
**P472**  Cross-sectional associations of physical activity frequency and health-related quality of life in a representative sample of German male and female adolescents  
Finne E, Lampert T, Bucksch J, Kolip P

**PURPOSE:** It is widely accepted that physical activity (PA) is related to better health-related quality of life (HRQoL). However, few studies have tested this assumption in adolescents. We examined the relations of PA frequency with self-reported HRQoL in German youth, controlling for possible sociodemographic confounders, screen-time, sleeping duration, smoking, pubertal timing, BMI, and body image.

**METHOD:** The 11- to 17-year-old subsample of the German Health Interview and Examination Survey (KiGGS) was used (n=6 813; 51.3% male). Cross-sectional associations of self-reported physical activity frequency with HRQoL subscale scores (according to the KINDL-R instrument) were examined by hierarchical linear regression models, adjusting for the clustering of the sample.

**RESULT(S):** Higher PA frequency was significantly associated with better HRQoL on all subscales, except for school functioning in boys and familial well-being in girls. Variations were greatest in terms of social well-being in boys (effect size d=0.61) and physical well-being in girls (d=0.41). Dose-response-relationships were observable, especially in boys. While in boys HRQoL increased steadily until daily PA, girls’ maximum HRQoL was already reached at a frequency of 3-5 times/week, which was similar in HRQoL to daily PA.

**CONCLUSION(S):** A higher PA frequency was associated with better self-reported HRQoL in both genders, even after adjusting for relevant covariates. Our results support the assumption that PA leads to better well-being in adolescents, although no causal relationship can be confirmed with these cross-sectional data. The optimal PA frequency in terms of well-being appears to be daily PA in boys and at least 3-5 times per week in girls.

**P473**  Associations of blood lipid profile and physical fitness (EUROFIT) in urban and rural Ecuadorian adolescents  

**PURPOSE:** Physical fitness has been proposed as a health marker during adolescence. Currently little is known about the fitness performance and its association with blood lipid profile in adolescents from low and middle income countries. We assessed if differences in physical fitness performance explained differences in blood lipid profile among urban and rural Ecuadorian adolescents.

**METHOD:** A cross-sectional study was conducted between January 2008 and April 2009 in 648 Ecuadorian adolescents (52.3% males) aged 11 to 15 years old attending secondary schools in Cuenca (urban n=490) and Nabón (rural n=158). Data collection included anthropometric measures, application of the EUROFIT battery and blood samples in a
subsample (n=301).

RESULT(S): According to FINESGRAM standard, 59% of the adolescents exhibit unhealthy levels of physical fitness. Urban adolescents had significantly better levels of triglycerides and HDL-c as well as significantly higher mean scores in five EUROFIT items (20m shuttle, speed shuttle run, plate tapping and vertical jump) than rural adolescents. The associations of blood lipid profile with EUROFIT items were not different among urban and rural adolescents.

CONCLUSION(S): The fitness performance does not explain differences in blood lipid profile. More studies are needed in order to explain these differences. However, the high proportion of unhealthy fitness and blood lipid profile makes clear the need to develop programs aimed to improve fitness performance and blood lipid levels among Ecuadorian adolescents.

P474 Milk intake and leisure-time physical activity related to abdominal obesity among adolescents
Abreu S, Santos RR, Moreira C, Vale SS, Santos PC, Mota J, Moreira P

PURPOSE: Analyze the association between milk intake, leisure-time physical activity (LPA) and abdominal obesity (AO) in adolescents.

METHOD: This study was a cross-sectional analysis. A total of 1,515 adolescents aged 15-18 was evaluated. AO was defined by a waist circumference at or above the 90th percentile. Adolescent food intake was measured using a semi-quantitative food frequency questionnaire, and milk intake was categorized as <2servings/day and ≥2servings/day. LPA was assessed via a self-report questionnaire and participants were divided into active and low-active groups on the basis of their reported LPA. The association between milk intake, LPA and AO was evaluated by logistic regression analysis adjusting for confounders (age, smoking, parental education, energy intake).

RESULT(S): The prevalence of AO was 21.5% in boys and 31.3% in girls (P<0.001). The proportion of AO was higher among low-activity group, compared with active group, only in boys (boys:29.8% vs. 20.0%, P=0.034, girls:31.5% vs. 31.2%, P=0.909, respectively). The proportion of AO was higher among adolescents who reported a milk intake of <2 servings/day compared with those with an intake of ≥2servings/day, only in girls (boys:23.1% vs. 20.7%, P=0.484; girls:34.7% vs. 26.8%, P=0.013). After adjustments, only in girls, milk intake was negative predictor of AO (OR=0.54, CI95%:0.33-0.83, P<0.05) whereas no significant associations were found with LPA in both genders.

CONCLUSION(S): In our sample, milk intake seems to be protective against AO in girls. These results suggest that milk intake may be related to body fat distribution. Although in our study no association was found for LPA, it is described that physical activity is one of several behavioral factors important for prevention of AO.
P475 Patterns of adolescent sports participation in Australia and relationship with health behaviors
Vella S, Okely A, Cliff D

PURPOSE: To understand the patterns of organized sports participation in Australia and its association with weight status, compliance with physical activity and electronic screen time guidelines, and selected dietary habits.

METHOD: Cross-sectional study of 12,188 students aged between 12 and 17 years (M=14.47 ± 1.25 years; 53% male). Participants self-reported their participation in organized sports, compliance with national physical activity, screen time, and fruit and vegetable consumption guidelines, and consumption of high-sugar drinks and high-fat food. Weight status was calculated using measures of height and weight.

RESULT(S): Organized sports participation is higher in males, rural/remote areas, and English and European speaking adolescents. Participation in organized sports was not associated with measures of adiposity. Higher levels of participation in organized sports were associated with an increased likelihood of complying with national physical activity, screen time, and fruit and vegetable consumption guidelines. An even greater likelihood was associated with higher rates of participation for compliance with physical activity and fruit and vegetable guidelines. There was no association between organized sport participation and consumption of high-sugar drinks or high-fat foods.

CONCLUSION(S): Participation in organized sports is associated with important health behaviors. However, it is not associated with measures of adiposity, or the consumption of sweetened beverages and high-fat foods. If sport is to be a population health initiative it needs to address both activity and dietary behaviours. The benefits of organized sports participation in Australia are particularly great for people of a non-English speaking background.
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