

**The
International Society
of
Behavioral Nutrition
and
Physical Activity
(ISBNPA)**

First Annual Meeting

July 12-13, 2002

The Fred Hutchinson Cancer Research Center

Seattle, WA

ABSTRACTS

Friday, 8:30 am

First Plenary Session

- Title:** “Environmental Interventions and Policy Strategies to Promote Community Physical Activity and Healthy Food Choices”
- Chairperson:** Simone A. French
- Discussant:** Adam Drewnowski
- Participants:** Lawrence D. Frank
Charlotte Claybrooke
Donna B. Johnson
- Purpose:** This symposium provides an overview and specific examples of community-based environmental interventions and policy to promote physical activity and healthy food choices in the community.
- Rationale:** Recent population-wide increases in obesity are largely due to environmental influences on physical activity and eating behaviors. Environmental interventions are needed to promote greater physical activity and healthier food choices in the population. Policy strategies can facilitate the development and implementation of environmental interventions in the community.
- Objectives:** Environmental interventions and policy strategies for promotion of physical activity and healthy food choices in the community will be presented. Cutting-edge examples of specific research and community intervention approaches will be provided. Policy, implementation and evaluation issues will be addressed.
- Summary:** An overview of environmental influences on physical activity and eating behavior, and policy strategies to address these influences, will be presented. Measurement of urban form and its effects on travel behavior and physical activity will be addressed. Data from the Sartraq.net travel survey describes associations between urban design characteristics such as density, land use mix, and connectivity, and decision choices about travel modalities. Research using Geographic Information Systems and individual-level physical activity data further examines measurement and evaluation issues regarding urban form and community travel and physical activity behaviors. The process of policy development and coalition building among diverse community groups will be described. Policy and environmental changes to increase community physical activity and healthy food choice behaviors to prevent obesity will be addressed. Policies to promote walkability and use of non-motorized transportation will be presented. An integrative summary will be presented and the audience will be engaged for discussion.

URBAN FORM AND PHYSICAL ACTIVITY: IMPACTS OF COMMUNITY DESIGN ON NON-MOTORIZED TRAVEL AND HOUSEHOLD ACTIVITY PATTERNS

Lawrence D. Frank, Ph.D., ASLA, AICP
Tom Schmid, Ph.D., MPH

Recent research conducted within transportation planning documents relationships between urban form and travel choice (Frank, 2000; Cervero and Ewing, 2001). This research illuminates ways in which the built environment can promote or inhibit non-motorized – human powered travel (Moudon and Hess, 1998). Supporting information suggests that the level of walking and biking is decreasing over time and is being supplanted with increased reliance on the personal vehicle. Contemporaneously, research in the public health field shows increasing levels of obesity within recent years (Mohkdad et al, 1999). Efforts to promote healthier living through increased levels of rigorous activity have met with limited success. Such behavioural shifts, such as joining a gym, often require structural lifestyle interventions. Research suggests that these are often difficult to achieve and especially difficult to retain (Dishman, 1998). Given the growing need to promote physical activity, it is becoming increasingly important to articulate interventions that support increased levels of moderate activity that can be integrated directly into daily activity patterns. This paper presents an analysis of data collected in the central Puget Sound Region on physical activity patterns, travel, and urban form. Findings suggest that increased access to open space and retail and entertainment services is associated with increased levels of physical activity in general, and non-motorized travel in particular. These findings support the need for improvements to the built environment to support increased physical activity. However, it is important to note that this research does not conclude that the built environment is directly linked with *health outcomes* or even *obesity*, which are functions of diet, age, genetics, and other factors.

POLICY DEVELOPMENT AND WORKING WITH COMMUNITIES

Donna B. Johnson, Ph.D.

The process of developing a state and local policy document to promote health through changes in the urban environment in Washington State will be described. The document is based on a meeting titled, “The Interface of Urban Design, Public Health, and Physical Activity in Preventing Obesity.” The meeting was supported by a broad range of agencies and coalitions including state and local departments of health, universities, the National Park Service, Office on Women’s Health, CDC, elected officials, planners and physical activity advocates. Plenary sessions by researchers and advocates were followed by interactive discussions of policy implications. A draft policy document was developed and posted to the web for comments and review. This document can be used by media representatives, planners, public health practitioners and advocates.

ENVIRONMENT AND POLICY INTERVENTIONS FOR OBESITY PREVENTION: A STATE PLAN

Charlotte Claybrooke, MS

Purpose: Develop a plan to address environment and policy changes related to physical activity and nutrition for Washington State. Methods: A Washington State Nutrition and Physical Activity Advisory Group was formed to provide input for the content of the plan. The advisory group included State Department of Health, Local Health Departments, Office of Superintendent of Public Instruction, Skagit Co. YMCA, Seattle Pacific University, Bicycle Alliance of Washington, American Cancer Society, Climate Solutions, Eastern Washington University, WA Dept of Transportation, Group Health Cooperative, WSU Cooperative Extension, WA State Food & Nutr Council, 5 A Day Coalition, WA State Dietetic Assoc, Washington State Department of Agriculture, UW Nutritional Science Program, National Park Service, Office of Community Development, Senior Services of Seattle/King County, and the Children’s Alliance. National and international experts provided information to advisory group members in the early part of the planning phase. Advisory group members shared their expertise with each other and worked to form a common understanding of the issues. Preliminary planning and a literature review provided a framework for a facilitated planning process in which the basic contents of the plan were determined. Drafts of the plan were shared with advisory group members to insure that the plan represented their views and interests. Results: A comprehensive plan to address environment and policy changes related to physical activity and nutrition has been completed. Next Steps: Execute the components of the plan. (Note: This is a part of the ENVIRONMENTAL INTERVENTIONS AND POLICY STRATEGIES TO PROMOTE PHYSICAL ACTIVITY AND HEALTH FOOD CHOICES presentation that is being chaired by Simone French.)

Second Plenary Session

Friday, 10:30 am

Title: "Environmental Correlates of Diet & PA using Geographical Information Systems (GIS)"

Chairperson: Jennifer Fisher, Ph.D.

Discussant: Allen Cheadle, Ph.D.

Participants: Jim Sallis, Ph.D.
Rebecca Lee, Ph.D.
Sonya Jones, Ph.D.
Chanam Lee, Ph.D.

Summary: Geographical Information Systems offer the capability of integrating and analyzing vast amounts of geographic data to facilitate the study of spatial relationships between people and the environments in which they live. The application of GIS technology to diet and physical activity aspects of environments is relatively new and holds potential for understanding macro-level influences on the collective behavior of communities as well as individuals within those communities. Speakers will discuss conceptual and methodological approaches to using GIS technology. Cutting edge research using GIS to understand diet and physical activity environments will be presented including the obesigenic capacity of neighborhoods, land use affecting community "walkability" and "bikability," as well as disparities in community accessibility to supermarkets, convenience stores, fast food restaurants, and physical activity resources based on race and wealth. The session will end with a critique and discussion of the promise and limitations of GIS for understanding environmental aspects of diet and physical activity:

ECOLOGICAL ANALYSIS OF PHYSICAL ACTIVITY

Jim Sallis, Ph.D.

USING GIS TO EXAMINE OBESIGENIC ENVIRONMENTAL FACTORS THAT MAY INFLUENCE PHYSICAL ACTIVITY AND DIETARY HABITS

Rebecca E. Lee, Ph.D.

Physical inactivity and poor dietary habits are associated with the growing prevalence of overweight and obesity. Research has focused on individual determinants of physical activity and dietary habits. Recent hypothesizing has pointed to a role for obesigenic environments, where environmental physical and social factors influence physical activity and dietary habits. For example, obesigenic environments may have few physical activity resources and poor quality food sources as well as inadequate social structures such as poor neighborhood socioeconomic status and detrimental local policies. This talk will demonstrate Geographic Information Systems (GIS) technology and several applications in understanding obesigenic environments. GIS provides a method to link environmental factors to individual-level behavioral data. To that end, this presentation will use a "hands on" approach to illustrate how to (1) geocode individual addresses, (2) define areas of environmental influence, (3) collect data on neighborhood environmental physical or social structures, (4) link environmental and individual level data, and (5) calculate how environmental factors may constrain or facilitate individual physical activity and dietary habits. GIS technology can be used to explore relationships between environmental physical and social structures and individual physical activity and dietary habits. These relationships may be used, in turn, to describe the obesigenic capacity of neighborhoods. GIS technology and research provide novel strategies to understand and define health behavior and point to new ethical considerations. Understanding the environment in which physical activity and dietary habits occur may suggest innovative intervention strategies for obesity prevention.

RETAIL FOOD ACCESSIBILITY, RACE, POVERTY AND WEALTH: POTENTIAL ENVIRONMENTAL DETERMINANTS OF NUTRITION

Sonya Jones, Rhonda Ryznar, Margaret E. Bentley

Health disparities among White, African-American and other ethnic populations in the US have received a great deal of attention the scientific literature and popular press recently. The focus of many of these studies has been the unequal health care received by members of different racial groups in the US. However, the different living and work environments of many African-American and White individuals is also likely to create health disparities, particularly in nutrition and physical activity related diseases. In this study, we examine the relationship of retail food accessibility to the racial and economic variation in census block groups in Durham, NC. Using the potential model, we developed indicators of supermarket, convenience store and fast food restaurant accessibility across the county. We found that there is no difference in supermarket accessibility by neighbourhood racial or economic composition. However, as the proportion of the block group that is African-American rises, convenience store and fast food restaurant accessibility rises. Also, as the proportion of the block group that is below 100% of the income-to-poverty ratio rises, convenience store accessibility rises. Using a spatial error regression model, we found that race is the strongest positive predictor of convenience store and fast food restaurant accessibility when controlling for poverty and affluence. This study points to the need for comprehensive local planning for health to improve the balance of food resources in African-American neighbourhoods.

USING GIS TO MEASURE WALKABILITY AND BIKABILITY OF BUILT ENVIRONMENT: WBC PROJECT

Chanam Lee and Anne Vernez Moudon

Walking and bicycling are attractive sources of physical activity and viable modes of transportation. They help reduce not only side effects of automobile dependence, but also health threats from sedentary lifestyles. However, appropriately designed built environment that supports these activities must be provided first. Supportive environments for walking and bicycling may contain certain properties such as medium to high densities, mixed land use, and facilities such as sidewalks and bike lanes.

This presentation briefly introduces a Center for Disease Control and Prevention (CDC)-funded project, called the Walkable and Bikable Communities (WBC) project. This project is to develop (an) environmental audit instrument(s) to be used for local jurisdictions and communities to encourage walking and bicycling for both physical activity and transportation purposes.

The presentation then focuses on the Geographic Information System (GIS) applications for this project. GIS techniques and measures to understand walkability and bikability of built environment will be presented. Issues of spatial scales, and opportunities and limitations of GIS-based methods will be also discussed.

Friday, 12:30 pm

First Symposium

Title: "Diet and Physical Activity Influences on Child and Adult Cognition"

Chairperson: Ron Kleinman, MD

Discussant: Ron Kleinman, MD

Participants: Nancy Auestadt, Ph.D.
J. Michael Murphy, Ed.D.
Arthur F. Kramer, Ph.D.

Purpose: To overview cutting edge research on whether and how diet and physical activity influence cognitive processes.

GROWTH, VISUAL ACUITY, AND EARLY DEVELOPMENT IN FULL-TERM AND PRETERM INFANTS FED FORMULAS WITH OR WITHOUT ARACHIDONIC ACID AND DOCOSAHEXAENOIC ACID

N Auestad, PhD, et al

Breastfeeding is associated with enhanced development, but the extent to which this can be explained by specific components in human milk and/or to genetic or sociodemographic characteristics of women who elect to breastfeed is not known. Research over the past decade has examined whether docosahexaenoic acid (DHA) and arachidonic acid (AA), two fatty acids found in human milk but historically not in infant formulas, are needed in the infant diet for optimal visual and cognitive development. In randomized, controlled companion trials with full-term (N=404) and preterm (N=470) infants, formulas with or without AA+DHA were fed from ~3 d to 1 yr of age (gestation-adjusted for preterm infants) with human milk feedings permitted in some groups. Growth, visual acuity (visual evoked potential (VEP) and/or acuity card procedure) and infant development (Bayley Scales of Infant Development; MacArthur Communicative Developmental Inventories; Fagan Test of Infant Intelligence; Infant Temperament) were examined up to 14 m. Comparisons among groups were made by ANCOVA. No differences among term infants fed human milk or formula with or without AA+DHA were found on the visual or developmental tests. Visual acuity (VEP) was enhanced in preterm infants fed nutrient enriched formulas with AA+DHA to 6 m. Some subgroups of preterm infants fed formula with AA+DHA or human milk exclusively to term adjusted age scored higher on developmental tests. In these trials, developmental advantages in the first year in relation to formulas with AA+DHA or human milk appear unique to infants born prematurely.

PHYSICAL ACTIVITY AND NEUROCOGNITIVE FUNCTION IN THE ELDERLY

Arthur F. Kramer, Ph.D.

The presentation will provide a critical review of the literature on the relationship among improvements in aerobic fitness, cognition, and brain function, particularly for older adults. The presentation will begin by describing previous cross-section and longitudinal human research which have examined the relationship between fitness and cognition. I will then describe the results of a recent meta-analysis, that included longitudinal fitness studies conducted over the past thirty-five years, that we conducted to examine the methodological and theoretical factors which influence the fitness-cognition relationship. This analysis revealed robust but selective benefits of fitness training on neurocognitive function. Next, I will then describe the results of on-going cross-sectional and longitudinal studies in which we are examining changes in cognition and brain function, as indexed by functional magnetic resonance imaging (fMRI) and event-related brain potentials, in response to improvements in the aerobic fitness of healthy older adults. Finally, I'll conclude by describing issues for future research as well as potential applications of what we have already learned.

PSYCHOSOCIAL, COGNITIVE AND NUTRITIONAL CONSEQUENCES OF HUNGER IN LOW INCOME CHILDREN IN THE UNITED STATES

Ronald E. Kleinman, MD
J. Michael Murphy, Ed.D.

Hunger and food insufficiency affect millions of young children in the United States. Low income children are at particular risk to experience persistent hunger, in spite of federally supported nutritional support programs. While the physical and psychological consequences of severe malnutrition are well established, the health and psychosocial outcomes of chronic food insufficiency are less well understood. This discussion will review studies conducted in low income school age children over the past 10 years that examine the effects of persistent hunger on behavior, academic performance, school attendance and nutrient intake. These studies, based on teacher, parent and child measures, consistently demonstrate that poor, hungry children have significantly more behavioral problems, poorer academic performance and lower intakes of critical nutrients compared to their poor but not hungry peers. Finally, data from studies that have examined the effect of a universal school breakfast program, alleviating hunger and improving performance among low income children will be presented. Increased participation in this simple and low cost intervention results in extraordinary improvements in the outcomes measured and provides support for further study of the effect of school meals on the mental and physical health of young children.

Friday, 12:30 pm

Second Symposium

Title: “ACTIVATE: A Childhood Overweight Prevention Initiative”

Chairperson: Richard Elder, Ph.D.

Discussant: Richard Elder, Ph.D.

Participants: Keith-Thomas Ayoob, Ed. D., RD, FADA
Harold W. Kohl, III, Ph.D.
David A. Schultz, Ph.D., M.Div.

Purpose: ACTIVATE is a consumer communications outreach program designed to help children and their families achieve healthy lifestyles through regular physical activity and good nutrition. ACTIVATE uses unprecedented in-depth consumer research—focus group, ethnographic, in-home interviews and quantitative—to track consumer knowledge and perceptions of the overweight problem, define appropriate audiences for messages, and develop customized program elements in order to deliver personalized and achievable advice for healthy living.

Rationale: Overweight/obesity is a major public health problem. Especially alarming is the increasing prevalence among children. Current prevention strategies and health promotion messages are not having the desired effect. Behavioral approaches and messages involving the entire family unit are needed to assist children in developing healthy eating and physically active lifestyles.

Objectives: Recognize that existing interventions have not had the desired effect in reversing the trend of increasing childhood obesity incidence.

1. Better understand the consumer psyche—identify key motivators and obstacles for children and parents in preventing childhood obesity.
2. Learn how to prevent obesity and begin the process of behavior change via effective communication on healthy eating and physical activity.
3. Learn how to harness the power of the family structure when conveying this information.

Summary and Format:

1. Research findings will be presented to demonstrate the complexity of the issue, the important role of family dynamics, and the need to address the obesity epidemic with comprehensive programs incorporating nutrition, physical activity, and behavioral science.
2. The Panel, consisting of a child psychologist, health communicator, registered dietitian, and exercise physiologist, will address ways the research can be applied to develop more effective intervention and prevention strategies, as well as provide a basis for further research.

Following the presentation, there will be an opportunity for the audience to ask questions and receive feedback from the speakers.

ACTIVATE: A CHILDHOOD OVERWEIGHT PREVENTION INITIATIVE

Keith-Thomas Ayoob, Ed.D., R.D., F.A.D.A.

Purpose: To gain a better understanding of: (1) how children (aged 9-12) and their parents think and feel about nutrition, healthy eating, weight and health and (2) which messages and support mechanisms may be most effective in encouraging them to begin the process of changing existing behaviors.

Methods: Qualitative consumer research included: (1) 16 focus group interviews among children in grades 3 – 7 and parents of children in these grades and (2) mini-ethnographic studies that included in-home interviews, in-home observation, and diaries of six families.

Communication concepts were developed and reactions to these concepts were obtained during 25 one-on-one interviews conducted with 17 6th and 7th graders and 8 parent pairs.

Results/findings:

1. Children and parents both relate obesity more to food than to physical activity.
2. Children expressed no sustainable interest in concepts like “nutrition” or “healthy eating”.
3. Children want parental guidance and emotional support.
4. Parents did not view overweight as a health issue.
5. Parents fear they may cause unhealthy eating behaviours.
6. Parents did not necessarily consider themselves good role models.
7. Parents were unsure of how to address the issue of overweight.

Conclusions: Results revealed a gap between parents' ability to help support their child in developing healthy eating practices and children's need for such parental support. The research findings are being used to develop effective communication approaches and specific messages to encourage children to eat healthily and to better equip parents to provide the support their children need.

ACTIVATE: A CHILDHOOD OVERWEIGHT PREVENTION INITIATIVE

David A. Schultz, Ph.D., M.Div.

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Communication concepts were developed and reactions to these concepts were obtained during 25 one-on-one interviews conducted with 17 6th and 7th graders and 8 parent pairs.

Results/findings:

1. Children have almost total control over what they eat and what physical activity they engage in.
2. Children and parents want help setting reasonable goals.
3. Children want ongoing involvement and inspiration from parents.
4. Parents believe their children will outgrow the problem.
5. This issue goes to the heart of the parent/child relationship challenging “who's in charge”?
6. Children and parents need help defining and measuring “fitness” and “health”.

Conclusions: Research findings show that interventions to shift behaviour toward healthy lifestyles should involve entire family and require effective communication. Focusing efforts on one group, either kids or parents, is not as effective as designing family approaches to promote healthy eating and active living.

ACTIVATE: A CHILDHOOD OVERWEIGHT PREVENTION INITIATIVE

Harold W. Kohl, III, Ph.D.

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Communication concepts were developed and reactions to these concepts were obtained during 25 one-on-one interviews conducted with 17 6th and 7th graders and 8 parent pairs.

Results/findings:

1. Children are unsure of what “being fit” means – they need help defining fitness.
2. Children are concerned with how weight relates to performance and appearance, not to health.
3. Children want ideas for physical activity beyond organized sports.
4. Children want guidance and encouragement from parents.
5. There is a lack of guidance and role modelling from parents; most health information comes from school and not from parents.
6. Parents would like more information and help communicating with their kids.

Conclusions: Research showed that children are requesting support from their parents and parents are unsure of how to offer support in promoting physical activity and healthy eating. These research findings provide the basis in developing specific information and delivery mechanisms to offer kids and parents this requested support.

Friday, 2:00 PM

Paper Session 1

SCHOOL-BASED INTERVENTIONS

Beau Porte Room

USING DATA TO CHANGE LOCAL AND STATE SCHOOL HEALTH EDUCATION POLICY

Karen J. Coleman

Purpose: To describe the use of children's overweight and aerobic fitness prevalence data to change local and state policy regarding school health.

Methods: Height, weight, skinfolds, and performance on a 9 minute run were assessed during the 1999/2000 school year as baseline for the El Paso Coordinated Approach to Child Health (CATCH) program evaluation. In addition, literature searches were performed in computerized data bases and by hand to locate the latest prevalence data nationwide and in Hispanic communities for children's overweight, aerobic fitness, asthma, type 2 diabetes, and soda and snack food consumption. All of these data were then presented to various school boards and media outlets in El Paso, TX as well as the Texas Medical Association and the Texas State Legislature.

Results: The largest school board in El Paso voted to renegotiate a \$20 million dollar exclusive rights contract with Coke and Pepsi to only include 100% juice and water in elementary and middle schools. The Texas State Legislature passed a law requiring coordinated school health in all elementary schools in Texas and recommending that 30 minutes of daily physical activity be provided for all elementary school children.

Conclusions: Local prevalence data can be used to change local and state policy regarding children's health. Investigators should plan portions of their grant funding to be devoted to preparing data summaries and suggestions for use to be disseminated to school staff and local and state agencies involved in public policy formation.

FOOD ENVIRONMENT IN SECONDARY SCHOOLS: A LA CARTE, VENDING MACHINES, FOOD POLICIES AND PRACTICES

Simone A. French, Mary Story, Jayne A. Fulkerson and Anne Faricy

Objective: The school food environment can have a significant impact on adolescents' dietary quality because a large proportion of youth's total daily energy is consumed at school. "Competitive" foods sold independently from the School Lunch Program comprise an increasing share of the school food environment. This study describes the food environment in 20 secondary schools participating in TACOS, a two-year, school-based nutrition intervention in Minnesota, USA.

Methods: Trained research staff collected data on the availability and nutritional content of foods in A La Carte (ALC) and vending machines (VM). Surveys of Principals and Food Service Directors measured school food policies and practices.

Results: Overall, 36.4% of the foods in ALC and 35% of those in VM met low fat criteria. The largest share of ALC was chips/crackers (11.6% of total); average 9.7 items per school; 29 fat grams per serving. Fruits/vegetables comprised 4.5% of ALC share; 4.2 items per school; 0.6 fat grams per serving. The median number of VMs per school was 12 (4 soft drink; 2 snack; 5 other). Over two-thirds of the schools reported having soft drink VM contracts. Eighty-eight percent of the snack and 37% of the soft drink VMs were turned on all hours. Few food-specific school policies were reported. Food or beverage advertising and promotion was allowed in one-third of the schools.

Conclusion: Greater attention to availability of healthful foods/beverages and school food policies is warranted, given the importance of these environmental influences on students' food choices.

PROMOTING HEALTHY LIFESTYLE TO HONG KONG PRIMARY AND SECONDARY STUDENTS: THE "FUN-IN-SEVEN" PROGRAM

Georgia S. Guldan., K.M. Au Yeung, Wan, C.W., K.Y. Choi and K.H. Chui

School-based programs can play a key role in developing lifelong healthy eating and physical activity habits among student populations. However, surveys of Hong Kong children and adolescents and their schools indicate that they are not benefiting from such programs. Therefore, a yearlong pilot program, "FUN IN SEVEN", was developed and evaluated. The multidisciplinary intervention aimed to combat obesity by promoting healthy eating and physical activity among local students; develop systematic, appropriate curricular materials; and enrich the participating schools' "health culture". The program took the form of a controlled intervention with a pre/post evaluation in 12 primary ($n=3,156$ students and parents) and secondary ($n=4,274$ students) schools. The intervention's key features included dissemination of seven theme-based waves of age-appropriate activities, some integrated into class teaching, while working as partners in teams with teachers and students from each school. The seven themes included breastfeeding, the Food Pyramid, physical activity, healthy breakfast, healthy lunch, healthy eating out, and healthy snacks. Evaluation showed that the programs at both levels successfully ($p<0.05$) impacted on the students' knowledge, attitudes, and practices. It was most effective at primary level, and least effective among the adolescent males. Also, parents of the primary students showed little positive change. However, the project did improve the six participating schools' 'health cultures', and resulted in a website for all teachers and students. The authors conclude that the FUN-IN-SEVEN activities should be developed and disseminated further among students, teachers, and parents in Hong Kong and integrated into the curricula for primary and secondary schools.

WEIGHT BEARING PHYSICAL ACTIVITY AMONG MIDDLE SCHOOL GIRLS: BASELINE RESULTS FROM IMPACT STUDY

Steven H Kelder, D.M. Hoelscher, J. Richardson, A. Hergenroeder, R.S. McPherson and J.L. Ward

Since dietary and activity patterns developed during childhood and adolescence contribute to formation of peak bone mass, risk factors for osteoporosis originate in youth and can be prevented through adequate consumption of calcium and weight bearing physical activity. Very little has been reported on weight bearing physical activity habits of girls. The IMPACT study is a 2-year school-based health education program for middle school girls designed to increase mean calcaneal Stiffness Index by promoting increased consumption of calcium-containing foods and weight bearing physical activity. A total of 719 girls with a mean age of 12 years were enrolled in the study, consisting of 72% White, 12% Hispanic, and 5% African-American. At baseline, three Self-Administered Physical Activity Checklists (SAPAC), were taken within a single week (two weekdays, one weekend day). SAPAC consists of a checklist of 25 common physical activities; students report minutes spent in these activities before, during and after school during the previous 24 hours. Activities were classified as weight bearing activities (WBA) and non-weight bearing. 652 students completed all three measures; average daily total minutes of activity was 107.4. The average minutes of WBA was 84.0; 7.3 before, 27.4 during, 49.5 after school. Average minutes of non-WBA was 18.4; 1.1 before, 7.1 during, 10.2 after school. The top 5 WBA's across all girls were: walking (14.9 min/d?); walk/run (8.9); dance (8.2); indoor chores (6.5); and running (5.2). Baseline data indicate that there are opportunities to increase WBA in adolescent girls before, during and after school.

MAINTENANCE OF A SCHOOL-BASED CVD PREVENTION PROGRAM OVER TIME: THE CATCH INSTITUTIONALIZATION STUDY

Deanna M. Hoelscher, H.A. Feldman, L.A. Lytle, S.K. Osganian, C. Johnson, E. Stone, S.H. Kelder, G.S. Parcel and P.R. Nader for the CATCH Collaborative Group

Developing and evaluating environmental programs to influence students' opportunities for healthful choices has been a focus of school-based health promotion research. However, few studies have examined the sustainability of these programs and organizational-level change. The Child and Adolescent Trial for Cardiovascular Health (CATCH) was a behaviorally-based health program to impact CVD risk factors in elementary students. Results from the main trial show that, after 3 years of intervention, CATCH significantly altered children's nutrition and physical activity behaviors as well as the school environment. The purpose of this study was to determine the maintenance of CATCH school-level changes in former intervention ($n = 56$) and former comparison schools ($n = 20$) 5 years post-intervention. Original study schools were recruited at the 4 sites: CA, LA, MN, & TX. Standard protocols were used for analysis of physical education classes (System for Observing Fitness Instruction Time), collection and analysis of 5 days of school lunch menus, and teacher surveys to determine health instruction in the classroom. An institutionalization score for schools was developed, using variables indicative of program component maintenance: % PE class spent in vigorous and moderate-to-vigorous physical activity, % kcal from fat and saturated fat, and class time devoted to CATCH topics. Former intervention schools had a higher mean institutionalization score than former control schools ($p<0.001$). Of the variables examined in the study, training had the greatest impact on maintenance of CATCH. Thus, behaviorally-based environmental program changes can be maintained over time, with staff training having a significant effect on institutionalization.

THE ASSOCIATION OF SCHOOL-LEVEL ENVIRONMENTAL FACTORS WITH INDIVIDUAL-LEVEL DIETARY PRACTICES OF YOUNG ADOLESCENTS

Martha Y. Kubik, Leslie A. Lytle, Peter J. Hannan, Cheryl L. Perry and Mary Story

Purpose: The present study assessed the association of certain school-level environmental factors, which included fried potatoes served to students on the school lunch program and the presence of a la carte programs and vending machines, with young adolescents' total daily consumption of fruits, vegetables, total fat and saturated fat. To our knowledge, this is one of the first studies to examine such associations.

Methods: A cross-sectional research design was utilized. The presence of an a la carte program, the number of school stores, snack and beverage vending machines and the number of servings of fried potatoes served to students on school lunch were measured in 16 schools. A random sample of 598 seventh grade students attending these schools completed 24-hour dietary recall interviews. Mixed model analysis of variance techniques were used to test hypothesized associations.

Results: Presence of a school a la carte program was inversely associated with students' fruit ($p=0.005$) and fruit and vegetable intake ($p=0.02$) and positively associated with mean percent of calories from total fat ($p=0.02$) and saturated fat ($p=0.03$). Snack vending was inversely related to fruit consumption ($p=0.03$). Fried potatoes served on school lunch were positively associated with vegetable ($p=0.004$) and fruit and vegetable intake ($p=0.009$).

Conclusions: Our findings suggest that school-based vending and a la carte programs are associated with less healthful food consumption among young adolescents. Such findings underscore the need to examine and target environmental-level variables related to dietary practices, if healthy eating is to become normative behavior for school-aged youth.

Friday, 2:00 PM
Paper Session 2
Measurement issues
St. Foy Room

PREDICTING FOOD ESTIMATION ABILITIES FOR PRIMARY PREVENTION AND DIETARY ASSESSMENT PURPOSES

Guadalupe X. Ayala, Jo Malahy, Lavonda Mickens and John P. Elder

Purpose: Present baseline results from a randomized controlled trial designed to improve food portion size estimation abilities. This study examines current estimation abilities and predictors of abilities by type of food (e.g., liquids versus solids versus amorphous).

Methods: A convenience sample of 76 women was recruited from the community and randomly assigned to one of three experimental conditions. Women were excluded if they were on a special diet for medical reasons or if they had ever been diagnosed with an eating problem. The baseline assessment included a face-to-face interview measuring constructs such as Stages of Change, self-efficacy, and issue involvement. Women were also asked about their sedentary and physical activity behaviors, food consumption behaviors by way of three 24-hour record-assisted dietary recalls within a one-week period, measurement of their height and weight to obtain a measure of their body mass index, and tested on their food portion size estimation abilities using real food and food models.

Results: A standardized measure of difference in estimated amount versus actual amount was computed for each food and collapsed by food type. Greater estimation errors were observed for solid foods, particularly those with a negative valence (i.e., brownies). Similar results were observed for amorphous and liquid foods with a negative valence (i.e., mayonnaise and cooking oil). Differences were observed in the variables predicting estimation errors by type of food.

Conclusion: Improving portion size estimation ability is an important target for the prevention of obesity, improving chronic disease management and the dietary assessment process.

Online Dietary Assessment and Analysis

Gladys Block and Torin Block

The Block food frequency questionnaire (FFQ) and accompanying nutrient analysis software have been modernized to operate Online via the World Wide Web, or by email. A brief physical activity-screening component has also been included. The Online FFQ (O-FFQ) can be incorporated into epidemiologic research or behavior change programs. The O-FFQ facilitates programs being conducted using emerging technologies for data capture and analyses in distributed computing environments. The data capture interface of the O-FFQ is designed for respondent self-administration; the interface has been modified and improved over several test cycles. Nutrient and food group analysis occurs online automatically, and can be immediately displayed to the participant. Nutrient data are also stored in database format and are accessible Online to the investigator. The O-FFQ was tested and compared against the paper/pencil version of the FFQ, with acceptable coefficients ($r > 0.70$). The ease of use provided by the O-FFQ has stimulated innovative applications in epidemiologic research and behavior-change programs. For example, the O-FFQ was incorporated into a successful online nutrition intervention program for members of a worksite, providing participants with immediate feedback on their dietary status. The O-FFQ is also in use in several online research initiatives studying the relationship between diet and disease. Finally, it is being used as a classroom-teaching tool in public health programs and medical schools. The Block O-FFQ is a cost- and time- effective tool for diet and behavior change investigators.

VALIDATION OF MEASUREMENT MODELS FOR DIETARY FAT INTAKE BEHAVIOR OF LOW-INCOME WOMEN

Mei-Wei Chang, Roger Brown, Susan Nitzke, Linda C. Baumann

Understanding factors predicting dietary fat intake behavior is likely to enhance the effectiveness of nutrition education programs. The validity of a 38-item instrument was examined with a convenience sample of 211 non-pregnant low-income women who had child/children enrolled in the Head Start or the Women, Infants, and Children program in southern Wisconsin. Fourteen items were chosen from the Health and Taste Attitudes Questionnaire (HTAQ) to measure orientation toward health and hedonic characteristics of foods, and 24 items were chosen from the Food Choice Questionnaire (FCQ) to measure food choice motivation. Using factor analysis, three hypothesized measurement models were evaluated based on the study's theoretical framework, the PRECEDE model. Confirmatory factor analysis showed that two hypothesized factor models did not fit but one had excellent fit ($\chi^2/df = 1.6$, NNFI = 1.0, CFI = 1.0). Based on exploratory factor analysis, the item pool was reduced to 36 items. Then, confirmatory factor analysis showed discriminant validity and excellent model fit (χ^2/df ranged 1.5 to 2.0; NNFI ranged .97 to 1.0; CFI ranged .98-1.0) with all parameters significant ($P < .001$). Construct reliabilities ranged from .91 to .98, and all factors except one had internal consistency greater than or equal to 0.7. Items that had been developed with Finnish (HTAQ) and English populations (FCQ) demonstrated different pattern structures when applied to low-income American women, but these scales were valid for measuring fat intake behavior in this American low-income population.

THE RELIABILITY OF THE DUTCH PACE ASSESSMENT FORMS AND THE EFFECT OF FEEDBACK REGARDING FITNESS AND HEALTH ON STAGE OF CHANGE

Karin Ingeborg Proper, Vincent H. Hildebrandt, Allard J. van der Beek, and Willem van Mechelen

Background: The actual stage of change regarding physical activity and nutrition can be determined using PACE assessment forms. Subsequently, PACE scores support individual counseling on physical activity and nutrition. Purpose: 1. To assess test-retest reliability of the Dutch PACE assessment forms and 2. To assess the effect of feedback on the individual fitness and health status on self-reported stage of change. Methods: 299 civil servants volunteered in the study. All subjects filled in a questionnaire, as well as PACE assessment forms, and were tested for body composition, blood pressure, blood cholesterol, and aerobic capacity. Subjects were randomized in an intervention or a reference group. The intervention group received a consultation with the sports physician, who gave feedback on the individual's status of fitness and health. After the consultation, intervention subjects filled in PACE assessments forms again. The reference group did not receive any feedback and filled in PACE forms again directly after having been tested. Test-retest reliability of the PACE assessment forms was assessed calculating weighted Cohen's Kappa and intraclass correlation coefficients (ICC). The influence of feedback on self-reported stage of change was determined using a Chi-square test and ANOVA. Results: Kappa varied from 0.73 to 0.85. The ICC varied from 0.76 to 0.89. The ANOVA showed a significant effect of feedback for the PACE score concerning "calorie intake and weight management". No effect was found for physical activity, nor for the other two nutrition topics. Conclusions: The PACE assessment forms are reliable. Feedback can produce a change of behavior change and should receive attention in health promotion interventions.

SYSTEMATIC ERRORS OBSERVED IN COMPARING THREE SELF-REPORT MEASURES TO TOTAL ENERGY EXPENDITURE FROM DOUBLY LABELED WATER

James R. Hebert, Charles E. Matthews, Thomas G. Hurley, Cara B. Ebbeling, Yunsheng Ma, Susan Druker and Lynn Clemow

Self-reported energy intakes (EI) estimated were derived from a food frequency questionnaire (FFQ), seven-day dietary recall (7DDR), and seven-day 24-hour dietary recalls (24HR). The FFQ and 7DDR were administered once before and once after a 14-day metabolic period during which total energy expenditure was determined using the doubly labeled water method (TEE_{dlw}). Seven 24HR were conducted over the 14-day period. Data obtained from 80 healthy women (mean age = 49.1 years) were fit to linear regression models in which the EI estimates were the dependent variables and estimates of social desirability and social approval traits, body mass index [weight (kg)/ height (m)²], and TEE_{dlw} were fit as independent variables. In college-educated women there was an underestimate associated with social desirability on the FFQ (-42.24 kcal/day/point on the social desirability scale; 95% CI: -75.48, -9.00). For college-educated women with an average social desirability score (-17 points) this would equal an underestimate of 507 kcal/day compared to women with the minimum score (4 points). The 7DDR was associated with a differential effect of social approval when comparing by education; i.e., there was a difference of 36.35 kcal/day/point between the two groups (-14.69 in women with = college and 21.66 in women with < college) (95% CI: 10.25, 62.45).

Social desirability and social approval distort energy intake estimates from structured questionnaires, in a manner that appears to vary by educational status. Results observed have important implications for subject recruitment, data collection, and for methods of detection and control of biases in epidemiologic studies.

PERCEIVED NEED, IS IT A VARIABLE WORTH CONSIDERATION?

Monique M. Raats, Paul Sparks, Moira Geekie and Richard Shepherd

There have been a number of suggestions regarding extensions to the Theory of Planned Behaviour: these include perceived need, a measure of the extent to which it is felt necessary to carry out the behavior in question. In a study looking at people's intentions to make ten dietary changes, multiple regressions of intentions on cognitive attitude, affective attitude, subjective norm, perceived control, anticipated affect and perceived need revealed perceived need to be a significant predictor of intention for all of the behaviors studied. Similarly, in a study looking at mothers intentions to give their babies different weaning foods, multiple regressions of intentions, on attitude, subjective norm, perceived behavioural control, perceived difficulty, anticipated affect, moral obligation and perceived need revealed perceived need to be a significant predictor of intention for six of the eight foods studied. The results would argue for the extension of the theory of planned behaviour to include perceived need and it might be warranted to focus on the benefits of particular foods in future interventions. Given that perceived need to change has been identified in this and previous research, as an important motivational influence, we consider that this variable should be researched further. Especially important are the reasons why people have the perceptions of need to change that they do and how these perceptions might be influenced by subsequent information. However, while dietary habits are an obvious public health issue, at an individual level, many people may see few health benefits in changing their own dietary habits.

Friday, 2 PM

Paper Session 3

Transtheoretical Model Research

Porte St. Louis Room

STAGES OF MOTIVATIONAL READINESS FOR PHYSICAL ACTIVITY: COMPARISON OF DIFFERENT ALGORITHMS

Gaston Godin, N., Owen, B. Nolin and D. Prud'homme,

The aim of this study was to compare two approaches to classify individuals into stages of motivational readiness for physical activity and test which one was better explained by attitude and perceived behavioral control, as defined by Ajzen (1991). The first approach tested consisted of combining both intention and behavior in order to determine clusters of individuals; such clusters correspond to different stages of motivational readiness. The second approach consisted in grouping the same individuals by using the stage of change (SC) variable of the Transtheoretical Model (TTM). A self-administered questionnaire completed by 20,430 respondents assessed the theoretical variables. The cluster solution was better than the SC approach in classifying individuals into stages. The cluster solution was also better explained by attitude and perceived behavioral control ($p < 0.0005$). The results of this study support the idea that stage of motivational readiness for physical activity may be better characterized when both recent past behavior and intention in the near future are simultaneously taken into consideration.

MULTIPLE BEHAVIOR INTERVENTIONS FOR WEIGHT MANAGEMENT: A PROGRAM OF RESEARCH

Sara S. Johnson, Julie A. Wright, James O. Prochaska and Janice M. Prochaska

More than 50% of Americans are overweight. Multiple behavior interventions that address nutrition and exercise have the potential to contribute to weight loss and maintenance. This study developed measures of Transtheoretical Model (TTM) constructs (i.e., decisional balance, processes of change, and self-efficacy) for four behaviors: moderate exercise, dietary fat reduction, calorie reduction, and emotional distress without eating. The sample included approximately 1050 overweight adults (mean age 50.80; mean BMI = 32.26; 55.5% female; 93% Caucasian) from a nationally representative population who responded to a mail survey that assessed TTM constructs and nutrient intake (Block Food Frequency, FFQ). Measures of each construct of the TTM were developed for each behavior using Jackson's Sequential Method of Measurement Development and employing split-half cross validation. The measures of the TTM constructs for dietary fat and calorie intake were validated against the data gathered in the concurrent administration of the FFQ. Objective self-reported measures of moderate exercise and emotional distress management were used to validate these measures. Using the normative data gathered in the measurement development study, a multiple behavior, evidence-based intervention was developed. The efficacy of this intervention, which will be delivered over a one-year period, is being examined in a randomized control trial (N=1015) of proactively recruited overweight adults. The inclusion of objective measures of exercise and dietary intake (i.e., accelerometers and 3, non-consecutive, unannounced 24-hour-dietary-recalls) will be discussed. The presentation will include a demonstration of the interactive intervention, as well as the data from an initial feasibility and acceptability trial (N=250).

THE APPLICATION OF THE TRANSTHEORETICAL MODEL TO REDUCING FAT INTAKE

Andrew Moore and Richard Shephard

The transtheoretical model was developed originally for addictive behaviors but in recent years has also been applied to dietary behaviors. Questions arise, however, regarding the validity of the model in this domain. The present study is an intervention on fat intake with type 2 diabetics, comparing a stage-matched intervention to a general intervention and control. The results reported are the baseline data from this study. Participants (n=955) completed a questionnaire assessing stage of change for fat intake, dietary behaviors associated with fat intake, optimism, decisional balance, processes of change and demographic variables. When participants were classified on the basis of stage of change, those in the pre-action stages performed significantly fewer of the low fat behaviors than those in the post-action stages. Differences also emerged between those in precontemplation and other stages in the use of processes and decisional balance, while self efficacy was higher for those in maintenance than in the other stages. However, when participants were classified on the basis of performance of low fat behaviors into low, medium or high then significant differences emerged between all groups in the use of processes, the decisional balance pros and self efficacy. The use of processes simply increased as low fat behaviors increased. The results do not fit the classic transtheoretical model in that different processes are not emphasized at different points of change, suggesting that there are problems with applying the model to dietary behavior. Future work will test the efficacy of stage-matched interventions in this group.

EFFECTIVENESS OF STAGE-TAILORED MULTIPLE BEHAVIOR INTERVENTIONS FOR DIABETES MANAGEMENT IN TWO RANDOMIZED CLINICAL TRIALS

Joseph S. Rossi, Laurie Ruggiero, Susan Rossi, Geoffrey Greene, James Prochaska, Lynn Edwards, Michael Vallis, Helen Jones, Bernie Zinman, Rick Chung and Neil Shikuma

Two randomized clinical trials were conducted comparing diabetes treatment-as-usual (TAU) to *Pathways To Change*[®] (PTC), an individualized, stage-tailored intervention based on the Transtheoretical Model. Targeted behaviors included blood glucose self-testing, healthy eating, and smoking. The first trial enrolled 1029 individuals from clinics in Toronto and Halifax. The second enrolled 403 individuals from a managed care organization in Honolulu. TAU consisted of usual health care, including traditional diabetes education. PTC included quarterly personal feedback (expert system) reports, stage-based self-help manuals, 6-8 monthly newsletters, and quarterly personal counseling via telephone (Canada only). Results are based on the post-intervention, 12-month assessment. The Canadian trial found significant intervention effects for self-testing (PTC = 31.2%, TAU = 18.8%, $p < .001$) and healthy eating (PTC = 57.5%, TAU = 47.9%, $p < .01$). Smoking did not reach traditional significance levels due to small N, but was consistent with previous population-based results (PTC = 25.9%, TAU = 15.9%, $p = .086$). The Hawaiian trial also showed significant results for self-testing (PTC = 28.1%, TAU = 18.5%, $p < .01$) and diet (PTC = 33.3%, TAU = 19.8%, $p < .01$). There were too few smokers for analysis. Stage-matched behavioral interventions also had significant effects on biomedical indicators (e.g., HgbA1c). These results demonstrate the potential of stage-matched interventions to impact multiple behaviors simultaneously for disease management in clinic and managed care populations. Results also suggest that stage-matched behavioral interventions have the potential to positively affect the health of entire populations of individuals with diabetes, not just those who attend clinics or who are ready for change.

MEDIATORS OF BEHAVIOR CHANGE: COMPARING EXERCISE WITH FRUIT AND VEGETABLE CONSUMPTION

Claudio R. Nigg, D. Riebe, G. Greene, P. Clark, J. Rossi, F. Lees, P. Burbank, N. Owens, C. English, C. Garber, N. Fey-Yensan, A. Luisi, C. Padula, R. Dufresne, S. Rossi, L. Ruggiero, P. Jordan, S. Saunders, K. Stillwell, M. Greany and J. Prochaska

Theoretical models enable us to build knowledge and understand how and why people are motivated or unmotivated to adopt and/or maintain healthy behaviours. They allow for the study of complex networks of variables, tests of hypotheses, and possible explanatory mechanisms for behaviour change. Models/theories of behaviour change have been hypothesized to apply across behaviours allowing the development of principles of change. Principles of behaviour change may allow the integration of individual behavioural interventions to increase the impact on mortality/morbidity. This study compared the mediators of two adoption behaviours (exercise-EX; fruit and vegetable consumption-FV) within the Transtheoretical Model of Behaviour Change. Two independent samples of older adults completed an EX or FV survey including pros, cons, self-efficacy and stage of change for the respective behaviours (EX sample: N= 504; 73.4% female; 95.2% Caucasian; 60.2% <\$20K; mean age=74.5±6.8; BMI=26.7±5.1. FV sample: N= 504; 74.3% female; 94.2% Caucasian; 50.8% <\$20K; mean age=73.9±6.5; BMI=26.4±4.7). To allow comparison across samples, mediator scores were transformed to T-scores. All ANOVA's of the mediators by stage were significant (Bonferroni corrected $p < .008$). Behaviour-specific pros and self-efficacy increased across stages, as hypothesized. However, the effect sizes for the pros and self-efficacy were about 3 times larger for EX ($\eta^2 = .28; .33$, respectively) versus FV ($\eta^2 = .10; .07$, respectively). Further, although the effect size was identical ($\eta^2 = .04$), the cons presented an M pattern for EX and an inverted U for FV across stage. Although, some similarities exist between the mediators of EX and FV, several differences with implication for intervention are noted.

EFFICACY OF EXPERT SYSTEM INTERVENTIONS IN PRIMARY CARE PATIENTS TO DECREASE SMOKING, DIETARY FAT, SUN EXPOSURE AND RELAPSE FROM MAMMOGRAPHY

Wayne F Velicer, James Prochaska, Colleen Redding, Joseph Rossi, Xiaowu Sun, Susan Rossi, Geoffrey Greene, Joseph Fava, Robert Laforge, Michael Goldstein, William Rakowski, Judy DePue, and Beverly Ehrlich

Treating multiple health behaviors simultaneously in populations could enhance health and reduce health care costs. Four stage-matched expert system interventions were evaluated in a randomized clinical trial with primary care patients. The four risk factors targeted were smoking, high fat diet, sun exposure, and non-compliance with regular mammography screening. Eligible patients (N = 5382) were recruited from a large managed care organization, screened, and randomised to treatment or control. At baseline, 30% were smokers, 72% were at-risk for sun exposure, 70% were at-risk for dietary fat; and 22% were at-risk for mammography noncompliance (women over 50). The treatment group received three tailored feedback reports mailed to their homes for up to four risk behaviors. At the final 24-month assessment, the percent of treatment versus control group participants reaching criterion (Action or Maintenance stage) for each behavior were: for smoking, 25.4% vs. 18.0% ($p < .05$); for sun protection, 25.4% vs. 12.5% ($p < .05$); and for dietary fat reduction, 28.8% vs. 19.8% ($p < .05$). For mammography, of those in A/M at baseline, the relapse rate in the treatment group was 2.6% compared to 6.1% in the control group ($p < .05$) at 24-months. GEE analyses confirmed significance of treatment effects on all 4 behaviors. Results demonstrate that stage-matched expert system interventions can be used as a multiple risk factor intervention to reduce smoking, fat in diets, sun exposure and relapse from mammography screening.

First Invited Lecture

Title: “New Models of Measurement of Psychosocial Variables: Item Response Techniques”

Chairperson: Louise C. Mâsse, Ph.D.

Purpose: This presentation will: (1) outline the advantages of using Item Response Theory (IRT) to determine the psychometric properties of psychosocial variables; (2) present the usefulness of IRT to assess change over time; (3) overview item banking and how computerized adaptive testing may be used in our field; and (4) identify the methodological challenges associated with IRT.

Overview of Theory:

IRT provides a comprehensive assessment of the functioning of an item that is not readily available by using Classical Test Theory or by conducting a factor analysis. Therefore, this presentation will overview theoretical of IRT models; discuss the assumptions of IRT, types of dichotomous (1-, 2-, and 3-parameter models) and polytomous (graded response, partial credit, and rating) IRT models; outline the process to evaluate a psychosocial scale with IRT; and contrast the information obtained with IRT with other procedures (classical test theory and factor analysis). In nutrition and physical activity, many instruments are used to determine change over time and by using item banking and computerized adaptive testing it is possible to develop measures that are more precise and sensitive to change. Examples from the literature will serve to highlight these theoretical issues and provide guidance for researchers interested in using these procedures in nutrition and physical activity. Methodological issues that are unique to the field of nutrition and physical activity will be discussed.

Conclusions: IRT provides item and scale-level indices that are linked to scale scores and it is this particular feature that allows for a more in-depth evaluation of psychosocial variables and the development of instruments that are sensitive to change.

Friday, 6 PM
 Poster Session 1A
 Obesity
 Panorama Room

DIFFERENCES IN DAILY PHYSICAL ACTIVITY AMONG OBESE AND NON-OBESE BOYS

Paula Santos, Sandra Guerra, José Carlos Ribeiro, Carol Leandro, José A. Duarte, Jorge Mota

Obesity is emerging as worldwide problem affecting both developed and developing countries. A secular decrease in energy expenditure is seen to have major responsibility on this health-related problem. Few studies have attempted to analyze the daily activity patterns in children with different body composition. The aims of this study were to determine and compare the level and patterns of daily physical activity in obese and non-obese boys using accelerometry. The sample consisted of 57 boys ($X = 11.3 \pm 2.6$). The sample was categorized as obese ($n=18$) and non-obese ($n=39$) according the health-related cut off points (Obese = 25% Fat) suggested by Lohman et al., (1992). Physical activity was assessed using a CSA. In spite higher values of the daily physical activity, no significant differences were found between groups (obese = 592.2 count.min⁻¹ and non-obese = 621.1 count.min⁻¹). As expected non obese children engaged in more moderate-and-vigorous activity (151.7 min./day) than obese (136.8 min/day). However no significant differences were found out. The data of this study did not show differences in total amount of physical activity patterns between obese and non-obese boys. Further studies are required to clarify the relationship between activity level and obesity.

SCREENING AND FAMILY EDUCATION: AN OVERWEIGHT PREVENTION PILOT STUDY

Virginia R. Chomitz, Ellen Kramer, Robert J. McGowan, JuHee Kim and Jessica J. Collins

Objective: This study evaluated the effect of sending a child's weight information home to parents. Our intervention hoped to increase: 1) parents knowledge on their child's weight status and 2) parent's motivation to initiate child weight management.

Methods: Trained PE teachers in four public schools in Cambridge, MA measured students' weight and height. ($n=1396$, aged 5 to 14) The students' families were randomized into three groups. The personal information group (PI) received individualized height, weight, and BMI category (CDC/NCHS) with healthy lifestyle information ("2-1-5" (The "2-1-5" message: 2 hr maximum of TV watching daily, 1 hr or more physical activity daily, and consumption of 5 or more servings of fruit and vegetable daily)). The general information group (GI) received only "2-1-5", and the control group (C) received "2-1-5" after being surveyed. A telephone survey was conducted for randomly selected families with forced sampling of overweight children. There was a 50% response rate (400/793).

Findings: In the (PI) group, 69% of the family answered that they had received the mailing and 74% read most or all ((GI) group only 34% reported receiving the mailing and 47% read). The majority of families want the information each year 81% (PI) and 76% (GI). The percent of families who identified their child's weight status as overweight (above 95th BMI percentile) correctly were 50% (PI), 49% (GI), and 27% (C). The percent of families who have or intend to act because of weight concerns for their child since receiving the package were 32% (PI), 21% (GI), and 8% (C).

Conclusion: There was a strong positive effect on intervention delivery and parents' motivation to increase involvement with their child's weight status compared to general information and control group.

PEDIATRICIAN IDENTIFICATION OF FACTORS CONTRIBUTING TO CHILDHOOD OBESITY

M. Elizabeth Passehl

Nearly twenty-five percent of American children are above-average weight. Pediatricians are the gateway to family intervention through early identification of risk for childhood obesity and advice regarding intervention strategies, including referral to treatment programs.

Children's Healthcare of Atlanta, (Children's) offers a pediatrician-referred community program, FIT KIDS, for families with above-average weight children (> 85th tile BMI) age 6 – 12 years. Families entering FIT KIDS report using multiple failed attempts at restrained feeding to manage their child's weight. In contrast, program strategies revolve around a non-diet approach to planned family meals, positive parenting skills around feeding, and increasing physical activity. Referring pediatricians may be unfamiliar with this approach yet relate concerns over restrained feeding practices or dieting for children and request information on alternative strategies for treating these families.

To enhance physician education strategies and referrals, Children's developed a nominal scale survey of known contributing factors to childhood obesity, including restrained feeding. The survey was mailed to 170 pediatricians and sixty completed responses (35%) were obtained. The most frequently identified contributing factors to childhood obesity were: screen time (90%); calorie dense, low nutrient foods (80%); sweetened drinks (78%); overscheduled families (72%); inactivity (68%); parent lifestyle (65%); genetics (63%); overeating (62%); parenting skills (58%); overfeeding history (57%). Only 8 responses (13%) indicated parents restricting food or children dieting as factors contributing to childhood obesity.

These findings indicate the need to educate physicians and families on the effectiveness of establishing positive eating dynamics and the negative consequences of food restriction as an intervention strategy.

Friday, 6 PM
 Poster Session 1B
 Testing the effects of information
 Panorama Room

EFFECTS OF A TARGETED MAGAZINE ARTICLE ON MOTIVATION TO EXERCISE AND EXERCISE UNDERTAKEN

Katherine Appleton and K. Humphrey

The media has long been considered as a potential vehicle for the widespread communication of health promotion messages. The most effective focus of such messages however, remains to be discovered. This study aimed to investigate the effects of targeted information on motivation to exercise and exercise undertaken. The effects of two magazine articles - one focussing on the benefits of exercise for fitness, one focussing on the benefits of exercise for weight loss, were investigated in individuals who exercised regularly either for reasons of fitness or for reasons of weight loss. Using a repeated measures design, motivation to exercise and exercise undertaken were compared in ten female fitness- exercisers and ten female weight-loss-exercisers after reading each magazine article. Motivation to exercise was measured using 100mm visual analogue scales, exercise undertaken was measured using energy expended whilst running on a treadmill, based on body weight, speed, incline and time spent running. Significant increases in motivation to exercise were found following both articles (smallest $F(1,18)=41.80$, $p<0.01$), although both articles were equally effective at increasing motivation, and for both groups of exercisers. Significant increases in energy expended were found following the fitness-focused-article compared to the weight-loss-focused-article (238 vs. 194 kcal.) ($F(1,18)=4.59$, $p=0.04$). Effects however, were similar for both groups of exercisers. These findings suggest that focussing on the benefits of exercise for fitness may be an effective means of increasing motivation to exercise and exercise undertaken in regular exercisers. These findings however also suggest that targeted information may not increase the effectiveness of health promotion messages.

TESTING THE IMMEDIATE EFFECTS OF COMPUTER-TAILORED WEB-BASED NUTRITION EDUCATION

Anke Oenema and Johannes Brug

Intake levels of fat, fruit and vegetables are not in accordance with recommendations for most people. Nevertheless many people do not intend to change to healthier diets. Lack of awareness of personal intake is thought to be a major barrier in motivating people to behavior change. Based on the Precaution Adoption Process personalized feedback on intake levels is proposed as a strategy to influence awareness. Computer-tailored, personalized feedback is a very promising strategy to encourage people to change their diets. The present study examined two personalized feedback interventions: a web-based computer-tailored nutrition education program and a written self-test. The interventions were tested against a control condition in which general nutrition information was provided

A randomized controlled trial, with a pre-test post-test design, was conducted. Three hundred adults participated in the study. Outcome measures were awareness and intention to change and appreciation of the intervention.

Anovas and Ancovas showed significant differences in awareness and intentions between the tailored intervention group and both the self-test and control groups. There were no significant differences between the self-test group and the control group. Furthermore, the tailored intervention was appreciated best.

Conclusions: It was concluded that a web-based tailored nutrition education program is a promising means to make people aware of their dietary intake levels and thus motivating them to change to a healthier diet. Self-tests did not outperform the control condition, therefore, self-tests seem to be not more effective in influencing awareness and motivation to change than general nutrition information.

ADVERTISING CONTENT IN FREELY-DISTRIBUTED, PHYSICAL ACTIVITY PROMOTING PRINT MATERIALS

Bradley J. Cardinal

Speculation as to whether print materials aimed at promoting physical activity behavior might be being used by commercial product vendors for the purpose of advertising dates back at least 15 years. At present, however, no empirical study could be located that specifically addressed this issue. The purpose of this study was to systematically evaluate and empirically document the advertising content in physical activity print materials. Free print materials (e.g., brochures, leaflets, pamphlets) that informed and/or instructed people about physical activity were obtained from 80 different sources: commercial product vendor ($n = 28$), government ($n = 13$), nonprofit, and professional association ($n = 16$). Using content analysis methodology, materials were examined for inclusion of logos, advertising statements, and references to specific brands. Both intra- and inter-judge reliability for the coding procedures were adequate ($>75\%$ agreement). The vast majority of materials contained logos (92.5%), slightly less than half contained advertising statements (46.3%), and 16.3% made references to specific brands. Overall, 65.2% of the materials coming from nonprofits contained advertising statements, followed by 50% of commercial product vendors', 30.8% of governments', and 25% of professional associations' materials. Also, 39.3% of the materials coming from commercial product vendors included references to specific brands, whereas no materials coming from nonprofits did, and $<10\%$ of materials coming from government or professional associations did. Health professionals should be aware that physical activity print materials that are available for free distribution to the public often do contain a substantial amount of advertising content.

Friday, 6 PM
 Poster Session 1C
 Describing populations
 Panorama Room

OBJECTIVELY MEASURED PHYSICAL ACTIVITY CORRELATES WITH INDICES OF THE INSULIN RESISTANCE SYNDROME IN DANISH 3RD GRADE CHILDREN

Søren Brage, Niels Wedderkopp, Lars Bo Andersen and Karsten Froberg

Purpose: To relate insulin resistance measures to objectively measured physical activity.

Methods: School-based, cross sectional study of 589 randomly selected children (310 girls, 279 boys, mean (\pm SD) 9.6(\pm 0.44) years, 33.6 (\pm 6.4) kg, 1.39 (\pm 0.06) m) from the city of Odense, Denmark as part of the European Youth Heart Study.

Fasting blood samples were analysed for serum insulin and glucose. Physical activity was measured with the uniaxial CSA model 7164 accelerometer, worn for at least 3 days. Anthropometric measurements, height and weight were obtained by standard methods.

Pearson correlations were performed to model serum insulin, log serum insulin, and the product of insulin and glucose level from average CSA output (counts \cdot min⁻¹), adjusted primarily for age, sex, and start of puberty, and secondly also for height and CSA unit.

Results: Mean fasting serum glucose ranged 4.1-6.5 mmol/L with a mean (\pm SD) of 5.1 (\pm 0.37) mmol/L. All indices of the insulin resistance syndrome were negatively correlated to CSA output, with the strongest partial correlation ($R=-0.2$, $p<0.001$) being that to log serum insulin (maximally adjusted). All relations improved by additional adjustment for height and CSA unit.

Conclusions: Even in the normal range of glucose tolerance, physical activity is negatively correlated to indices of the insulin resistance syndrome. Adjustment for height and CSA unit improves the strength of the relations, presumably due to frequency dependency and inter-instrument differences.

Our data suggest that all children should be encouraged to engage in physical activity to maintain good glycemic control and establish healthy habits.

DIETARY INTAKE, PHYSICAL ACTIVITY AND BODY MASS INDEX IN THE UNITED STATES: GENDER, RACE AND AGE GROUP DIFFERENCES

Paul A. Cotton

This study assessed the relationship between dietary intake, physical activity frequency and body mass index (BMI) using data for 5744 adults 20 years and older, exercisers (3477) vs. non-exercisers (2267), who participated in the 1994-96 Continuing Survey of Food Intakes by Individuals. Black exercisers with a BMI of 25 - <30 consumed 190.96 more kilocalories than whites in the same BMI group. Exercisers 20-29 years of age BMI of 20 - <25 consumed 20.17 grams more protein and 65.15 grams of carbohydrates than their non exercising counterparts. Black exercisers with a BMI of 25 - <30 consumed 22.92 grams more total fat than whites in the same BMI group. Statistical analysis was conducted using SUDAAN, a software package, which uses the survey's sample design to compute variance estimates. Contrast statements were used to perform a series of paired t-test of the mean values. Over all age groups, exercisers consumed an average of 274 more calories than non-exercisers. When exercise frequency and caloric intake were examined, a significant difference in caloric intake was found for only one of the six age groups in the exercising population. The study concluded that dietary intake of exercisers is significantly different from non-exercisers for specific macronutrients and varies based on exercise frequency; body mass index and age group.

THE RELATION BETWEEN LOW INCOME AND HOUSEHOLD FOOD EXPENDITURE PATTERNS IN CANADA

Sharon Kirkpatrick and Valerie Tarasuk

Purpose: Despite indications of nutritional vulnerability among low-income Canadians, the impact of income on food purchasing patterns is not well understood. This study was undertaken to examine the relation between low income and household food expenditure patterns among a representative sample of Canadian households.

Methods: A secondary analysis of sociodemographic data and one-week food expenditure data for 9793 households who participated in the 1996 Family Food Expenditure Survey conducted by Statistics Canada. Low-income households were identified using Statistics Canada's Low Income Measures. Multiple regression analysis was used to compare food expenditure patterns between low-income and higher income households.

Results: Total food expenditures, expenditures at stores, and expenditures in restaurants were significantly lower among low-income households compared to other households. Despite allocating a slightly greater proportion of their food dollars to milk products, low income households purchased significantly fewer servings of these foods. They also purchased fewer servings of fruits and vegetables than higher income households. The effect of low income on milk product purchases persisted when the sample was stratified by education and expenditure patterns examined in relation to income within strata. Among low-income households, the purchase of milk and grain products was lower for households who had to pay rents or mortgages than for those without housing payments.

Conclusions: Our findings indicate that among Canadian households, access to milk products and fruits and vegetables may be constrained in the context of low incomes. This study highlights the need for attention to the affordability of nutritious foods for low-income groups.

CONSISTENCY IN FOOD GROUP CONSUMPTION PATTERNS FROM CHILDHOOD TO YOUNG ADULTHOOD: THE BOGALUSA HEART STUDY

Miriam Morales, D.K. Demory-Luce, T.A. Nicklas, T. Baranowski and I. Zakeri

Changes in eating patterns may result when children make the transition from childhood to young adulthood. 24-hour recalls were collected on a bi-racial sample [68% Euro-American (EA) and 32% of African-American (AA)] of 246 adults (aged 19 to 28) who also participated in a cross-sectional survey when they were 10-year-olds. At age 10, more fruits/fruit juices and mixed meats ($p \leq 0.05$), desserts, candy and milk ($p \leq 0.0001$) were consumed than in young adulthood. More sweetened/unsweetened beverages (BEV), cheese, and seafood ($p \leq 0.0001$), snacks, and beef ($p \leq 0.05$) were consumed in young adulthood than at age 10. Milk consumption decreased for both genders, but overall intake was higher for males ($p \leq 0.0001$). BEV consumption increased, being greatest for EA ($p \leq 0.001$) and males ($p \leq 0.05$). Breads/grains and candy consumption decreased, being greatest for AA. Positive consistency was defined as consumption at age 10 and at adulthood (Y-Y) and negative consistency as no consumption at those two time periods (N-N). Y-Y was highest for vegetables (73%), breads/grains (93%), and BEV (81%). N-N was highest for veal/lamb (99%), beef and milk (52%) and fruits/fruit juices and desserts (50%). Among participants with inconsistent consumption (N-Y), children more were likely to consume fats/oils, vegetables, breads/grains, BEV, condiments, beef, meats, and fvy than at young adulthood ($p \leq 0.025$). In contrast, more children with inconsistent consumption (Y-N) consumed more mixed meats, desserts, poultry, snacks, and pork than in young adulthood ($p \leq 0.05$). Data indicate that food consumption patterns do vary by ethnicity, gender and age, which have implications when designing nutrition intervention programs for target populations.

Friday, 6 PM

Poster Session 1D

Working with ethnic communities

Panorama Room

“ES FACIL”, A COMMUNITY BASED SOCIAL MARKETING CAMPAIGN TO INCREASE FRUIT AND VEGETABLE CONSUMPTION IN A LATINO COMMUNITY IN NORTHEAST METROPOLITAN LOS ANGELES

Joan C. Gustavson, Johanna Asarian-Anderson, Norliza Tayag and Andrew R. Gustavson

California Project LEAN (Leaders Encouraging Activity and Nutrition), Los Angeles Region is conducting a community based social marketing campaign, to improve the nutritional health in a low income Latino community in northeast metropolitan Los Angeles. Specifically our goal is to increase fruit and vegetable consumption by one serving per day at the family meal. The name of the campaign is “*¡Es Fácil! Solo Agnuegue Un Fruta o Verdura Mas Todos Los Dias Su Familia Merece Buena Salud.*” Formative research was used to determine the target audience; low-income Spanish speaking Latino women with children enrolled in the Head Start Program and/or elementary school. A series of community involvement groups and focus group testing were conducted to develop and refine materials for the campaign. Results from these groups indicated, women were requesting culturally acceptable recipes and classes on how to prepare fruits and vegetables. A two-month intervention phase centring on a community cookbook of recipes promoting fruits and vegetables is currently being conducted. A newsletter promoting campaign messages was developed and has a mail-in coupon for a free cookbook. Newsletters and posters with recipes have been placed in local markets, schools, Head Start Programs, WIC clinics, medical clinics and churches. A questionnaire measuring fruit and vegetable consumption was administered before the campaign began in the experimental area and a control area. The questionnaire will be administered again to the two groups after the intervention to test the effectiveness of the campaign. Follow-up focus groups will be conducted to capture qualitative data.

DESCRIBING PHYSICAL ACTIVITY PATTERNS IN KAHNIEN'KEHAKA (MOHAWK) CHILDREN

Lucie Lévesque, Lise Gauvin, Serge Desrosiers

Accurately assessing the physical activity is crucial to understanding the determinants of physical activity involvement in children and in developing effective interventions. The overall goal of this study was to assess the concurrent validity of the physical activity interactive recall (PAIR), a culturally sensitive computerised previous-day recall for evaluating the topography of physical activity of Kahnien'kehaka (Mohawk) children. The PAIR is an innovative instrument that solicits many senses (sight, hearing, touch) through a combined use of visual graphics and sound; no reading is required. In the fall of 2000, 159 students (86 girls, mean age = 10.2 years, SD = 1.0; 73 boys, mean age = 10.2, years SD = 1.1) from two elementary schools located in Kahnawake (QC, Canada) completed the PAIR on three consecutive days to report previous-day physical activity for one non-school-day and two school-days. The PAIR yielded a total daily activity score. Concurrent validity was assessed with the Computer Science and Applications, Inc. (CSA) activity monitor worn on three consecutive days preceding each PAIR administration. Mean CSA counts per minute were averaged to reflect total daily physical activity. Correlation analyses showed a small statistically significant relationship between the CSA and PAIR ($p < .05$). Further analyses showed significant between-person variability of physical activities according to day of the week (i.e. school-days vs non-school-day). We conclude that PAIR and CSA tap into different dimensions of the construct of physical activity.

INFLUENCES ON FRUIT AND VEGETABLE CONSUMPTION IN SOUTHERN, LOW-INCOME, AFRICAN AMERICAN YOUTH

Elaine Fontenot Molaison, J. Stuff, C. Connell, K. Yadrick and M. Bogle

Purpose: This qualitative study assessed personal and environmental factors influencing fruit and vegetable (F&V) consumption in 42 10-14 year old southern low-income African American youth (21 M, 21 F) as a basis for intervention planning.

Methods: A question schedule based on social cognitive theory was used in six single-sex focus groups to assess preferences for F&V, benefits and barriers to consumption, and intake of F&V as it related to locus of control, self-efficacy, social support, and behavioral capacity.

Results: Fruit and vegetable preferences were primarily based on taste. While participants indicated they liked the sweet taste of fruit, they described vegetables as "yucky" or "nasty." Participants indicated they would eat fruits or vegetables for general health, to provide energy, improve skin appearance, and to aid in sports performance. Lack of availability at home and at the grocery store were noted as barriers to consumption. The youth indicated that decisions about F&V consumption were made primarily by their mothers and grandmothers. All groups except 13-14 year old males indicated high levels of self-efficacy for choosing fruits and vegetables in a variety of situations. Participants in all groups indicated that family provided social support for F&V consumption, but support from peers was minimal because most of them ate "junk." Regarding behavioral capability, the majority of youth indicated they helped with preparation of meals and snacks, and some indicated they were totally responsible for meal and snack preparation at home.

Conclusions: Interventions designed to influence behavior should target identified personal and environmental factors that mediate F&V consumption.

NUTRITION EDUCATION PREFERENCES OF LIMITED RESOURCE AFRICAN AMERICAN YOUTH

Marjyua Lartey-Rowser, K. Yadrick, C. Connell and E. Molaison

Purpose: This study used a qualitative approach to identify nutrition education method preferences of limited income African American youth as part of an intervention planning process.

Methods: We conducted 6 single-sex focus groups with 21 boys and 22 girls, aged 10-14. Data analysis steps included: a) debriefing of moderator and assistant noting nonverbal communication and principal themes; b) transcription of audiotapes; c) content analysis of transcripts with question-by-question review and coding by two independent coders. Methods reported most frequently as having been used to teach nutrition to youth in the past were formal presentations by teachers, informal education by parents and relatives, and use of the arts (plays, songs). Computer games were a preferred method for both boys and girls. Boys described tasting parties and use of cartoon characters such as Rug Rats as preferred approaches, and girls liked cooking experiences. Videos and traditional methods including use of blackboard, overhead projector, printed materials, and writing exercises were described as unappealing or "boring." One boy suggested that a traditional lecture style approach would appeal to "people that are smart...[not] people like us." The youths indicated that posters and graphic materials should include people that they can identify with, "like somebody that's had experiences that we went through," not those who "got money" or are "thin" or "anorexic." Girls expressed more interest in and enthusiasm for nutrition education than boys. Effective nutrition education for this audience should incorporate interactive learning approaches.

NUTRITION ATTITUDES IN DIVERSE POPULATIONS OF BLACK WOMEN

T. Elaine Prewitt, Marian Fitzgibbon, Ramon Durazo-Arvizu and Melinda R. Stolley

African Americans, compared to whites, experience higher rates of cardiovascular disease (CVD), including hypertension and heart disease. CVD and other chronic disorders linked to dietary intake are also directly or indirectly linked to obesity. Significant effort has been devoted to understanding health-related attitudes and disease risk, and while knowledge acquisition is hypothesized as important in the process of behavior change, some studies suggest a disparity in CVD risk factor knowledge and attitudes between demographic groups. However, understanding the dimensions of health and nutrition related attitudes among African Americans is limited by the fact that diverse sociodemographic characteristics are often not considered in studies that include African Americans. This study was conducted to determine the relationship between attitudes about healthy eating and cardiovascular disease risk among two socio-economically diverse groups of African American women. Participants were age 18 and older and selected from two separate community based diet intervention studies, one conducted in a working class, middle income suburb of Chicago, IL (Fat Reduction Intervention Trial in African Americans, (FRITAA), n=331) and the other in a public housing complex in the city of Chicago (Hip-Hop to Health, (HH), n=170). Nutrition attitudes, demographic characteristics, height, weight, blood pressure and cholesterol were collected for both groups. BMI was correlated with helpless/unhealthy nutrition attitudes for both groups (FRITAA $r = .3$, $p < 0.001$; HH, $r = .26$, $p < 0.001$). Blood cholesterol was significantly correlated with health conscious attitudes among FRITAA participants ($r = 0.16$, $p < 0.001$). Age was inversely correlated with food exploration ($r = -0.18$, $p < .001$), helpless/unhealthy ($r = -0.25$, $p < .001$) and meat preference ($r = 0.13$, $p < .05$) attitudes in FRITAA participants, and positively correlated with health conscious attitudes ($r = 0.21$, $p < .05$) among HH participants. Attitudes about nutrition and CVD risk vary among diverse populations of African American women. This information could be helpful in the design and implementation of culturally appropriate dietary interventions.

Friday, 6 PM
 Poster Session 1E
 Physical activity interventions for post-
 menopausal women
 Panorama Room

TYPES AND INTENSITIES OF PHYSICAL ACTIVITY PERFORMED IN A YEARLONG EXERCISE INTERVENTION AMONG POSTMENOPAUSAL WOMEN

Melinda L. Irwin, Yutaka Yasui, Shelley Tworoger, Cornelia Ulrich, Kristin LaCroix, Heather Nakamura, Lynda McVarish, Deborah Bowen and Anne McTiernan

Information on types and intensity of physical activity (PA) performed by older women is limited. We conducted a randomized trial designed to examine the effects of 1-year of exercise versus control on breast cancer biomarkers among 173 sedentary, overweight, postmenopausal women. In this analysis we determined the frequency and intensities of activities performed by women randomized to the exercise intervention as they attempted to meet the intervention goals. The intervention consisted of facility (treadmill walking and stationary bicycling) and home exercise (participant's choice of exercise) of at least 45 minutes of moderate-intensity exercise 5 days/week for 12 months. Exercise adherence was monitored by facility attendance and weekly activity logs. Participants wore heart rate (HR) monitors during all facility and some home exercise sessions. Of 87 women randomized to exercise, 6 dropped the intervention (after 3 months). Eighty-three percent of the 4,524 expected activity logs were completed. A total of 25,278 activities were recorded in the logs reflecting 38 different activities. Walking was the most reported activity at the facility (61%) followed by bicycling (24%), weight training (3%), and aerobics (1%). Similarly, participants mostly chose walking (69%) when exercising at home followed by biking (8%), weight training (7%), and aerobics (3%). HR was available for 68% of the activities; mean HR was $81\% \pm 9\%$ of maximal HR ($68\% \pm 15\%$ of HR reserve). Information about the types and intensity of PA performed in this study provides a model to enhance participation in future long-term exercise studies.

EVALUATION OF AN EXERCISE INTERVENTION ON THE OCCURRENCE AND SEVERITY OF MENOPAUSE SYMPTOMS IN POST-MENOPAUSAL WOMEN: THE PHYSICAL ACTIVITY FOR TOTAL HEALTH STUDY

Erin Janelle Aiello, Yutaka Yasui, Cornelia M Ulrich, Shelley S Tworoger, Melinda Irwin and Anne McTiernan

In post-menopausal women, regular exercise may decrease estrogen levels by reducing fat mass. Although women with lower estrogen levels tend to have worse menopause symptoms, investigators have considered exercise as a therapy for reducing menopause symptoms. However, no clinical trials have evaluated the impact of exercise on menopause symptoms. We evaluated the effect of a yearlong, randomized, moderate/intense exercise intervention on menopause symptoms and their severity in 173 post-menopausal women (87 exercisers, 86 controls) who were aged 50-75, not taking estrogen, overweight, and sedentary. Using logistic regression, odds ratios and 95% confidence intervals comparing intervention to control subjects for self-reported menopause symptoms and their severity were calculated at 3, 6, 9, and 12 months, and over all months. Among exercisers, the proportion of women reporting symptoms at 12 months was greater than baseline (hot flashes +9.2%, memory problems +1.1%, depressive feelings +8.1%, night sweats +10.3%, and sleep problems +8.1%). No significant ORs of menopause symptoms or their severity comparing exercisers to controls were noted after adjusting for baseline symptoms, age, ethnicity, oral contraceptive history, herbal hormone history, and marital status. There is some suggestion of an increase in night sweats (OR=1.40, 95% CI=0.56-3.47) and a decrease in memory problems (OR=0.57, 95% CI=0.29-1.10) among women ≤ 60 years comparing exercisers to controls. P-values for trend tests over time were 0.20 and 0.24, respectively, and lack of significance may be due to small sample sizes. In conclusion, a moderate/intense exercise intervention does not appear to have a consistent effect on menopause symptoms in overweight women.

EFFECT OF AN EXERCISE OR STRETCHING INTERVENTION ON SELF-REPORTED SLEEP MEASURES IN POST-MENOPAUSAL WOMEN

Shelley Slate Tworoger, Y. Yasui, N. Ulrich, E. Aiello, M. Irwin, D. Bowen, A. McTiernan

Two studies reported that short-term exercise programs improved self-reported sleep quality in unhealthy individuals. To extend this research area, we examined the effect of a randomized, year-long, moderate/intense exercise (n=87) or stretching (n=86) intervention on self-reported overall sleep quality, use of sleep medication, trouble falling asleep, and sleep duration over the previous month among post-menopausal women. Subjects were overweight, sedentary, not taking hormones, and aged 50 to 75. Using generalized estimating equations, we determined odds ratios and 95% confidence intervals, for both interventions, comparing sleep measures at follow-up (3, 6, 9, and 12 months) to baseline, adjusting for age, season, usual time of intervention, employment, and marital status. We examined whether adherence to the exercise intervention and usual time of exercise were associated with sleep measures, after adjusting for age, season, employment, and marital status. Stretchers had a reduced risk (OR=0.5, 95% CI=0.3-0.8) for using sleep medications over the year compared to baseline. Among morning exercisers, those with $\approx 80\%$ adherence (goal=225min/wk) had a decreased risk of having trouble falling asleep (OR=0.4, 95% CI=0.1-1.0) and of short sleep duration (OR=0.3, 95% CI=0.1-0.9) compared to less adherent morning exercisers. Among evening exercisers, those with $\approx 80\%$ adherence had an increased risk of using sleep medication (OR=4.6, 95% CI=1.3-16.7) and a decreased risk of short sleep duration (OR=0.1, 95% CI=0.05-0.5) compared to less adherent evening exercisers. This study suggests that a stretching program may reduce use of sleeping medication in post-menopausal women. The effect of moderate/intense exercise may depend on the amount of exercise and time of day performed.

Friday, 6 PM
Poster Session 1F
Various
Panorama Room

**RELIGIOUS LEADER SUPPORT IN FAITH COMMUNITY -
BASED DIETARY INTERVENTION RESEARCH: A CRITICAL
FACTOR**

Deborah B Bowen, Riki Mafune and Natalie Jacobsen

Level of support of faith community leadership can affect the success of a dietary change intervention program in faith communities. Studies have shown that when a faith community is given a public health policy that is supported by a religious leader, there is a higher rate of intervention activities and membership participation in the intervention. The Eating for a Healthy Life project will identify the level of religious leader support within faith communities and its effect on the number of intervention activities allowed in those faith communities. The types of support offered by religious leaders are:

Excellent support: Leader is involved in planning meetings and intervention activities. Announces the presence of EHL activities and encourages members to participate in those activities and to use the materials at home. Encourages members to follow EHL guidelines at potlucks and social activities when the EHL project staff is not present. Self motivated announcement of public health policy. Connects the EHL message with the spiritual message.

High support: Leader seen at intervention events and encourages members to participate as well. Will announce EHL events and the public health policy to congregation with a reminder from EHL staff.

Moderate support: Leader makes announcements when asked and sometimes will be involved in an intervention activity.

Poor support: Leader allows the project into the church but doesn't make announcements when asked. Doesn't participate in intervention activities and doesn't encourage members to participate. May express negativity toward EHL project and staff.

**CALCIUM INTAKE IN 5TH GRADE GIRLS: COMMON
SOURCES AND ASSOCIATIONS WITH OTHER NUTRIENTS
AND FAT**

Jayne A. Fulkerson, Simone A. French, Mary Story and John H. Himes

Purpose: Determine the associations between calcium intake and other nutrients and fat intake of 10-11 year old girls, and examine differences in calcium sources by calcium intake levels.

Methods: Using 1 day of 24-hour dietary recall, we classified 193 girls into approximate tertiles of calcium intake (T1:<950mg, T2:950-1299mg, T3:1300+mg) and compared nutrient and fat intake (controlling for energy), calcium supplement use, and body mass index (BMI) across tertiles. Calcium intake by source was determined by dividing group levels of calcium from each of 4 sources (milk, cheese, fortified fruit juice, bread) by total calcium intake for each of the tertile groups.

Results: Tertile 1 girls had significantly higher intakes of total polyunsaturated fatty acids, total fat, and % fat in diet than tertile 3 girls ($p<.01$). Tertile 3 girls had a significantly higher intake of % protein in diet ($p<.001$) and a significantly lower intake of caffeine than girls in tertiles 1 or 2 ($p<.001$). Intake of vitamin D was significantly positively associated with calcium intake ($p<.001$). There were no significant differences between groups in total saturated fat, % carbohydrate in diet, iron, cholesterol, sucrose, supplement use, or BMI. Girls in all groups received most of their calcium from milk (T1 = 39.9%, T2 = 46.6%, T3 = 55.8%) and cheese (T1 = 15.7%, T2 = 12.4%, T3 = 13.1%). Tertile 1 girls were more likely to ingest calcium from bread products than fruit juice.

Conclusions: Calcium consumption at the RDA level is associated with higher intakes of vitamin D and lower total fat and caffeine intake among young girls. Skim milk and fortified fruit juice should be considered for promotion among girls who do not ingest the recommended amount of calcium.

Friday, 7:00 pm

First Dinner Plenary Session

First Dinner Plenary Session (____ Room)

“What are the causes of the worldwide epidemic of obesity and what are the responsibilities of academia, government and industry to address it:?”

-Moderator: Wendy Rodgers, Ph.D. University of Alberta

-Panel: _____, Grocery Manufacturers Association
_____, Business Manager, Seattle TV
_____, Microsoft

Diane Finegood, Ph.D.

Scientific Director

Institute of Nutrition, Metabolism and Diabetes

Canadian Institute for Health Research and,

Professor

School of Kinesiology

Simon Fraser University

British Columbia

_____, CDC-P

_____, Univ ?

_____, Univ ?

Purpose: This panel will discuss the issue of "What are the causes of the current epidemic of obesity, and what are the responsibilities of academia, government and industry in addressing this problem?" The panel will include representatives of the food and inactivity promoting (TV, electronic games) industries, diet and physical activity academia, a government research funding agency, and a government activist agency. Each panelist has been asked to make a 5 minute talk addressing the question. Following these brief presentations, the moderator will encourage discussion among the panelists and then entertain questions from the audience. This is an important international health issue with both diet and physical activity aspects. The perspectives of the various players are valuable to inform national policy and research.

Breakfast Roundtables
Sponsored by General Mills (Cafeteria)

Saturday, 7:30 am

Table 1. Ideas for programmatic initiatives on behavioral issues in physical activity
-Louise C. Masse, Ph.D.

Table 2. The International Journal of Behavioral Nutrition and Physical Activity
-The Editors: Simone French, Ph.D. and Anthony Worsley, Ph.D.

Table 3. Design of a Large Longitudinal Study to Identify the Cause of Obesity
-Richard Black, Ph.D., ILSI

Table 4. New Thrusts for ISBNPA
-David Crawford, Ph.D.

Third Plenary Session

Saturday, 8:30 am

Title: "Public Health Nutrition and Physical Activity in Europe after Eurodiet

Chairperson: Michael Sjostrom, Ph.D., Agneta Yngve, Ph.D.

Participants: Michael Sjostrom, Ph.D.
Knut-Inge Klepp, Ph.D.
Agneta Yngve, Ph.D.
Michael Sjostrom, Ph.D.

Purpose: To review state of the art public health nutrition research and policy in the European Union. In Europe, Public Health Nutrition includes both diet and Physical Activity.

PUBLIC HEALTH NUTRITION AND PHYSICAL ACTIVITY IN EUROPE AFTER EURODIET; PROMOTION STRATEGIES

Michael Sjöström and Agneta Yngve

It started with the Treaty in Rome in 1957, allowing freedom of movement of people in between the EU member states, including health care workers and their patients. The Single European Act of 1987 introduced articles concerning health legislation and the first Public Health Program was adopted. In 1993, when the Maastricht Treaty on the European Union came into force, the Community gained a specific competence in public health allowing the creation of a coherent Public Health Strategy. The treaty actually stated that emphasis should be given to Health Promotion and Prevention of Diseases. Current Health Promotion Program was adopted 1996.

EURODIET was initiated in 1998, with the support of DG SANCO in the Commission. The aims with the project were to contribute towards a co-ordinated EU and member state health promotion program on nutrition, diet and health lifestyles by establishing a network, strategy and an action plan for the development of European dietary guidelines, which will provide a framework for the development of national food-based dietary targets. The project report (2001) included particular components of an EU nutrition policy: a) Breastfeeding, b) Physical activity, and c) Fruit and Vegetable consumption.

In the year 2002 a new Community Action Program on Public Health will be adopted and come into force from 2003, and last until 2008. The Program places special emphasis on 1) improving health information, 2) establishing a rapid response mechanism, and 3) tackling health determinants through prevention and health promotion. Nutrition and physical activity are important issues, and action is based on the recommendations from EURODIET.

BREASTFEEDING – THE DEVELOPMENT OF A EUROPEAN PROMOTION STRATEGY

Agneta Yngve and Michael Sjöström

During the last few years it has become clear that Europe does not have a good surveillance system for breastfeeding. Data are not compiled nor reported in a regular and comparable way. The few data that are collected and reported are pointing at very large differences in breastfeeding prevalence. The information that can be found regarding determinants for breastfeeding is scarce. Successful breastfeeding promotion in Europe needs to cover the following aspects:

- Effective assessment tools need to be developed including determinants
- Intervention tools should be developed, supported by the analysis, linking to previous projects and programmes.
- A strong EU recommendation for breastfeeding should be developed.
- An analysis concerning the International Code of Marketing for Breast Milk Substitutes should be undertaken in the EU member states.
- Breastfeeding issues should be covered in the curricula for training of health professionals as well as in school curricula.
- Resources should be made available for model interventions as well as for research on breastfeeding issues.

Today the EU Monitoring programme is including breastfeeding as a part of a whole system, which will soon be implemented in all member states. The European Commission DG SANCO has granted funding for a European breastfeeding promotion project, starting this year. The Council of the EU supports breastfeeding promotion in a Resolution in Nutrition and Health. This resolution was signed in 2000 by all health ministers of the member states and is a strong signal to support breastfeeding promotion, building on the work done in EURODIET and the so called French Initiative. We have great possibilities of making progress in breastfeeding promotion in the next few years. The key words for success must be analysis, exchange of information and joint ventures.

PHYSICAL ACTIVITY – MONITORING AND SURVEILLANCE

Michael Sjöström and Agneta Yngve

Physical inactivity is a global public health issue. However, the scope of the problem around the world has been difficult to gauge. Although a number of countries have assessed physical activity as part of their national health surveys, they have used a variety of definitions and questionnaires. In order to better assess the risk of physical inactivity at a national, regional and global level a greater degree of standardization is required.

In Geneva 1998 a group of physical activity researchers from all six continents, came together to develop a questionnaire that could be used in population-based national surveys to assess health-related physical activity in a comparable manner across countries. After an extensive process of question development, pilot testing, and revision, 8 questionnaires were tested for reliability and validity in 14 centers in 12 countries on 6 continents. The 8 questionnaires included both long and short versions, which were divided by mode of administration (telephone or self-complete) and the reference period recalled (usual week or past 7 days). Eight further European countries/centers tested the short version, in the EUPASS project (within the development of European Health Monitoring System), and some European Centers within the WHO EUROHIS project.

The initial results are promising, and suggest that the IPAQ instruments are ready for use to compare population estimates of physical activity. The WHO/Euro/WHO PAHO and the EU are currently developing international health monitoring projects and are likely to adopt the IPAQ. A number of prevalence studies will also be conducted according to a common protocol (The International Physical Activity Study, IPAS).

Saturday, 10:30 am

Third Symposium

Title: "Issues of Control in Physical Activity"

Chairperson: David A. Dzewaltowski, Ph.D., Kansas State University

Discussant: Deborah J. Bowen, Ph.D., The Fred Hutchinson Cancer Research Center

Participants: Gaston Godin, Ph.D., University of Laval, Quebec
Edward McAuley, Ph.D., University of Illinois
David A. Dzewaltowski, Ph.D., Kansas State University

Summary: Social psychological theories of behavior change have helped researchers identify control constructs that may determine physical activity and lead to the development of effective intervention strategies. Evidence that control constructs are important in the physical activity domain is increasing. Therefore, the antecedents of control may be important targets for intervention development. This symposium will define control constructs according to the theory of planned behavior and social cognitive theory, and link these theoretical constructs to physical activity. Furthermore, the hypothesized antecedents of control and their influence on physical activity will be examined. The first presentation will provide theoretical and operation definitions of control constructs according to the theory of planned behaviour. Then, evidence that perceived behavioural control mediates the influence of control beliefs on exercise intentions will be reviewed. This section will conclude with a discussion of what could be the direct contribution of power beliefs on intention over and above perceived behavioural control. The second section of this symposium will provide theoretical and operational definitions of control constructs according to social cognitive theory. The role of affective, social, and behavioral influences on efficacy expectations and subsequent long-term maintenance of activity will be illustrated with data on older adults. The section will conclude with a discussion of potential strategies to be implemented at the end of exercise programs to enhance efficacy for maintenance of long-term exercise behavior. The final presentation will provide theoretical and operational definitions of control constructs in school settings, according to social cognitive theory. The role of environmental influences on efficacy expectations and physical activity will be illustrated with multilevel data (middle school, youth.). This section will conclude with a discussion of the possible relations between diverse environmental variables and self-efficacy using multilevel (ecological) models and social cognitive theory. This symposium will conclude with a discussion of issues regarding control that are shared among physical activity and nutrition behavior.

DOES PERCEIVED BEHAVIORAL CONTROL MEDIATE THE EFFECT OF CONTROL BELIEFS ON INTENTION MOTIVATIONAL READINESS FOR PHYSICAL ACTIVITY: COMPARISON OF DIFFERENT ALGORITHMS

Gaston Godin, Ph.D.

The aim of this study was to verify if a measure of perceived behavioural control (PBC) mediates the relationship between control beliefs (Σp) and intention in the Theory of Planned Behaviour (TPB). The mediation model was tested among a data set of eight studies concerned with the application of the TPB in the field of health. Structural equation modeling was used to test the mediation effect. In two of the eight studies, PBC completely mediated the effect of control beliefs on intention. However, the results of two others studies did not support the mediation model. Finally, in four of the eight studies, PBC partially mediated the relationship between control beliefs and intention. The overall indexes of outcome indicated that PBC mediated only partially the effect of control beliefs on intention ($Z_{Sobel} = 5.15, p < 0.001$; $Z_{Baron \& kenny} = 5.16, p < 0.001$). It was concluded that in further applications of the TPB, it would be relevant to verify whether control beliefs explains or does not explain a significant portion of the variance in intention after controlling for the effect of PBC on intention and for the effect of control beliefs on PBC.

THE ROLE OF AFFECTIVE, SOCIAL, AND BEHAVIORAL INFLUENCES ON EFFICACY EXPECTATION AND LONG-TERM MAINTENANCE OF ACTIVITY IN OLDER ADULTS

McAuley, E., Marquez, D.X., Jerome, G.J., & Canaklisova, S.

Considerable research exists to suggest that self-efficacy is a consistent correlate of physical activity. This association appears to be particularly important during the adoption phase of activity and in the prediction of long-term activity beyond program termination. Additional factors such as exercise-induced affect, social support, and attitudes have also been identified as having the potential to influence adherence to activity. In the context of a six-month randomized controlled trial with 18-month follow-up, we tested the extent to which adherence during the trial, affective responses to exercise, exercise value, and social support had either a direct or indirect effect through the mediation of exercise-self-efficacy on adherence at six-month follow-up. Older (Mean Age = 66 yrs; N=174) were randomly assigned to either a stretching/toning or walking condition for six months and measures of self-efficacy, social support, exercise affect, and frequency assessed at the end of the program. Energy expenditure at 18-months follow-up was employed as the outcome variable. Only self-efficacy at program end had a significant influence on activity. However, social support, affect, frequency, and value all had indirect effects on activity through the mediation of self-efficacy. Our findings offer some support for the social cognitive perspective that self-efficacy is an important determinant of long-term exercise behavior and is influenced by affective, social and behavioral influences. The findings will be discussed in terms of potential strategies to be employed at the end of exercise programs to effectively enhance efficacy for maintenance of long-term exercise behavior.

DOES SELF-EFFICACY MEDIATE ENVIRONMENTAL INFLUENCES ON PHYSICAL ACTIVITY: A MULTILEVEL APPROACH

Dzewaltowski, D.A., Milliken, G., Estabrooks, P.A., and Hill, J.

Few studies have examined if self-efficacy mediates the influence of environmental variables on physical activity. When researchers examine this question, environmental variables are often measured as individual perceptions and thus, are analyzed on an individual level. The handling of environmental variables in this way may result in different findings than analyses that use multileveled (i.e., individual and environmental level) data. Hierarchical mixed models methods provide the opportunity for researchers to analyze both environment and individual influences simultaneously. We simulated a physical activity data set with 16 schools and 20 students per school and generated two variables, one called self-efficacy that was measured on the individual and one labeled environment that was measured on the school. Then, we ran a set of analyses using SAS system procedures with different terms the models in an attempt to examine the effects on the analyses when an inappropriate individual level model is used in the analysis using PROC GLM, compared to a multilevel analysis using PROC MIXED. The results illustrated that the effect for self-efficacy is much larger in the multilevel model. Therefore, multilevel mediation analyses were conducted on baseline data collected for a group randomized trial of 16 schools and 2,300 6th grade youth with environmental variables measured on the school and self-efficacy measure on the individual. The findings demonstrate that self-efficacy may mediate the relationship of school environment variables with physical activity. We will discuss the possible interplay between diverse environmental variables and self-efficacy using social cognitive theory and multilevel (ecological) models.

Saturday, 10:30 am

Fourth Symposium

Title: "Computerized Assessment of Diet and Physical Activity"

Chairperson: Gregory J. Welk, Ph.D., Iowa State University

Discussant: Ron Kleinman, MD, Harvard Medical School

Participants: Charles E. Matthews, Ph.D., University of South Carolina
Gregory J. Welk, Ph.D., Iowa State University
Lenore Arab, Ph.D., University of North Carolina at Chapel Hill
Karen W. Cullen, DrPH, RD, LD, Baylor College of Medicine

Summary: An underlying measurement challenge in both physical activity and nutrition research is the need for valid and reliable measures of the behavior. This has long been recognized as an important research priority, but it is becoming increasingly evident that the development and refinement of better assessment techniques is critical to answer progressively more complex questions in both areas. Accurate assessments are needed for surveillance to better understand patterns and trends in the population. Accurate measures are also needed for epidemiological purposes to better understand links to various health outcomes. With respect to behavioral research, accurate assessments are needed to better test theories of physical activity and diet behaviors or to determine if interventions can promote positive changes in these behaviors. If there is considerable error in the assessment, the power to detect change is reduced and large sample sizes are required to test these relationships. Clearly, advances in measurement techniques would improve our ability to more effectively study, predict, and promote both physical activity and nutrition.

This session will describe current state of the art measurement techniques that are available to assess physical activity and nutrition. Emphasis is placed on computerized methods since these are becoming more common and may potentially be more effective than traditional approaches. Because there are unique issues associated with the assessments in children and adults the sessions will cover assessment issues for adults and children separately. Dr. Chuck Matthews will first provide an overview of measurement approaches for assessing physical activity in adults and highlight some of the more promising computerized approaches. Dr. Greg Welk will then review measurement issues in children and describe several computerized approaches that may be useful for this population. Dr. Lenore Arab will describe and demonstrate the use of a computerized dietary assessment available for adults. Dr. Karen Cullen will provide an overview of the unique issues associated with assessing nutrition behaviors in children and describe some current computerized tools being used in her research. Collectively, the presentations in this symposium will provide a broad introduction to the various assessment techniques that are available to assess physical activity and nutrition.

COMPUTERIZED ASSESSMENT OF PHYSICAL ACTIVITY IN ADULTS

Charles E. Matthews, Ph.D., University of South Carolina

In selecting an assessment of physical activity (PA) behaviors in adults, investigators must balance the measurement objectives of their project, the cognitive challenges the assessment imposes on respondents, and the impact natural variation in PA behaviors may have on statistical measures of effect. Increasingly, selection of PA assessments must also be considered in the context of administering equally complex and administratively demanding nutritional assessments. This session will address a number of these issues by describing the cognitive processes involved in providing PA self-reports (i.e., memory storage and retrieval) and by describing the sources of variation in PA behaviors (i.e., seasonal, day of the week, intra-, and inter-individual variation). It will also describe the development and testing of a computerized 24-hour PA recall (24PAR) system that can be administered in parallel with 24-hour diet recalls. The 24PAR was designed, drawing upon existing PA recall methods, to be administered in an open-ended interview in which the type and duration of activities reported are directly entered into a computer. Linkage with the Compendium of Physical Activities enables the retention and quantification of the rich detail of over 500 activities encountered in daily life, including those associated with physical inactivity. Initial results from 24PAR system development and evaluation in comparison to PA logs, motion sensors (accelerometers, pedometers), and questionnaire-based assessments will be presented. In addition, use of the 24PAR in ongoing PA and nutrition intervention studies will be discussed.

WEB-BASED MULTI-MEDIA DIETARY ASSESSMENT TOOL FOR NUTRITIONAL RESEARCH

L. Arab, M. Anthony, Prentice E, University of North Carolina at Chapel Hill

Cost based compromises in dietary assessment have led nutritional research to interviewer-less instruments that are easy to code and enter, free of portion sizes, without a meal structure and with limited frequency options for ease of processing. These compromises have not been due to belief that such developments elicit more valid and precise responses. Cognitive research has demonstrated that individuals recall and respond more accurately to visual images than text, and retrieve diet more readily with meal cues than when all food consumption occasions are combined. In the interest of developing a more cognitively advanced, quantitative dietary assessment tool and making it widely accessible to research we have designed an audio and food-picture based dietary assessment tool modeled after the strengths of a diet history. It contains 2500 pictures of foods and portion sizes, has a nutrient database allowing for 6000 food options, and an extensive component to assess information on nutritional supplement use. It is a CASI (computer assisted self-interview) approach that requires no personnel for administration. Focus group testing of this multi-media approach has shown it to be highly acceptable to elderly, underprivileged and individuals with little prior computer literacy. This methodology presents an opportunity for more quantitative assessment of habitual total diets and nutrient intakes from all sources. This should enhance nutritional research on large populations or within small studies. The low cost, the use of audio and color images, the language independence of the system and the reliance on images for accurate communication has the potential to greatly enhance assessment techniques in nutritional epidemiology.

COMPUTERIZED ASSESSMENT OF PHYSICAL ACTIVITY IN CHILDREN

Gregory J. Welk, Ph.D., Iowa State University

Assessing physical activity behaviors in children poses some unique measurement challenges. Activity in children tends to be sporadic and highly intermittent. Children also have less developed skills for recall of physical activity information. This session will review some of the unique characteristics of children and describe the most promising methods for collecting physical activity data on children. Emphasis will be placed on two different computerized approaches that have recently become available. The first is a computerized self-report instrument (*ACTIVITYGRAM*) that is available within the *FITNESSGRAM* youth fitness software. This instrument is conceptually similar to the widely used Previous Day Physical Activity Recall (PDPAR) instrument. An easy to use computer interface and prompts on the screen help to enhance data collection with this instrument. Results from recent studies comparing the *ACTIVITYGRAM* and PDPAR to objective information from activity monitors will be described. The second approach is a computerized direct observation instrument (BEST) that allows activity (or other variables) to be objectively coded on a second by second basis. This system can be used to produce highly detailed records of children's physical activity and is useful as a criterion measure to validate other activity assessments in children or for small-scale studies on children's physical activity patterns. The results of some recent studies using this technique will be described to illustrate its potential to enhance research on physical activity assessment in children.

ELECTRONIC METHODS OF FOOD INTAKE RECORDING AMONG CHILDREN

KW Cullen, DrPH, RD, LD, Tom Baranowski, Ph.D., Janice Baranowski, MPH, RD, LD, Noemi Islam, MPH, Baylor College of Medicine

There are substantial validity and reliability concerns about virtually all current methods of assessing children's diet. Interactive multimedia provide potentially powerful tools for assessing diet by capturing children's attention, graphically displaying foods, providing lists of foods to encourage accuracy of recognition memory and manipulating sequences of images to facilitate estimation of portion size. Two interactive multimedia approaches to dietary assessment with children have been reported with children: Asian Assist and FIRSS (Food Intake Recording Software System). This presentation will compare and contrast these two methods in regard to what aspect of diet they were trying to quantify, what procedures were used to elicit dietary information and what was done to estimate food group and/or nutrient consumption. Comparisons will also be made in regard to obtained validity and reliability coefficients, ease of use, cost, time needed to complete and other aspects of performance. Issues that need to be addressed to further develop these instruments and enhance validity and reliability, e.g. features introduced to address children's cognition and thereby facilitate speed and accuracy, will be identified. Possibilities for immediate feedback on intake to children will be explored. While it is clear that dietitian conducted 24 hour dietary recalls are considered the best method available at this time, they are also enormously expensive and often not feasible within the context of large trials. While computerized assessment will not likely exceed the accuracy of dietitian conducted 24 hour recalls (because of the skilled dietitian's ability to query), once developed they offer the promise of substantially reducing the costs

Saturday, 12:30 pm

Second Invited Lecture

Title: "A New Paradigm for Obesity Prevention Research"

Chairperson: Shiriki K. Kumanyika, Ph.D., MPH, University of Pennsylvania

Purpose: Obesity prevention research seeks to identify ways to prevent inappropriate or excess weight gain at any stage of life. Like research on obesity treatment, research on obesity prevention requires intense attention to determinants of energy intake, energy expenditure, energy balance, and body image. However, unlike obesity treatment, for which success can be judged from an individual case, success in obesity prevention is a population outcome--reduction in the number of people who become overweight or obese or, more broadly, stabilization of weight in the already overweight or obese. The population focus and absence of a treatment-seeking clientele are potentially problematic for obesity prevention research at least when compared to research on treatment. A critical question is then how knowledge gained from the field of obesity treatment applies or does not apply to research on prevention. Should obesity prevention researchers attempt to build on the accomplishments of the field of obesity treatment or move as far as possible away from the treatment paradigm? Should we, instead, work more within the rubric of "prevention science", perhaps forming alliances with researchers studying other population health problems? An equally critical set of questions relates to how knowledge and perspectives from diverse domains such as urban planning, transportation, family studies, reproductive biology, feminism, economics, labor relations, organizational behavior, and public policy can be brought more into the mainstream of obesity prevention research. An overarching paradigm to guide research on obesity prevention may ultimately need to incorporate these non-traditional obesity research domains. We will also need new methodological strategies. For observational studies we will need ways to effectively track societal influences, arising in *any* sector, that affect food intake and physical activity levels. For experimental obesity prevention research we will need approaches that can be implemented and evaluated in natural settings. Mechanisms for surveillance of body mass index levels in the general population and in high risk subgroups will be an essential component for evaluating both types of obesity prevention research.

Saturday, 2:00 pm

Fifth Symposium

Title: "Family Influences on Children's Diet & PA"

Chairperson: Frank Franklin, M.D., University of Alabama at Birmingham

Discussant: Frank Franklin, M.D., University of Alabama at Birmingham

Participants: Richard Shewchuk, Ph.D., University of Alabama at Birmingham
Jim Sallis, Ph.D., San Diego State University
Leann Birch, Ph.D., Pennsylvania State University

Purpose: To overview recent research on how to investigate family influences on children's diet and PA and report what has been found.

Saturday, 2:00 pm

Sixth Symposium

Title: "Innovative Uses of Media for Diet and Physical Activity Change"

Chairperson: Scott Going, Ph.D., University of Arizona

Discussant: Deborah Tate, Ph.D., Brown University

Participants: Timothy Lohman, Ph.D., University of Arizona
Cheryl Ritenbaugh, Ph.D., Kaiser Permanente Center for Health Research
Judith Prochaska, Ph.D., University of California at San Francisco
Johannes Brug, Ph.D., Maastricht University

Purpose: The increased availability of computers, along with recent advances in communications, offers exciting possibilities for delivering cost-effective health promotion programs to large audiences. Computer-tailored education programs have the potential for providing real-time assessments and individualized feedback about behaviours, motivations, attitudes, barriers, and skills that support behaviour change. Interactive technology, e.g., the Internet and the world-wide web, has greatly expanded reach and offers many possibilities for supporting computer-tailored, individualized programs. For example, the ease and rapidity of online information exchange supports frequent updates of participants' intervention profile, presumably supporting more rapid response to changing status. Moreover, the variety of online media (text, audio, video, links to other resources) that can be accessed as often as desired supports a diverse and individualized approach that is difficult to achieve with more traditional approaches. Of course, the application of this technology creates new challenges, e.g., how best to design websites based on sound models that are appealing to the intended user, and more research is needed to test computer-tailored approaches for encouraging healthy eating and increased physical activity. Thus, this symposium will review ongoing work to develop computer-tailored education and interactive technology for promoting healthy dietary changes and physical activity in adolescents and adults within the context of obesity prevention, osteoporosis prevention and other public health challenges.

MAINTENANCE OF WEIGHT LOSS THROUGH THE INTERNET

T.G. Lohman, Ph.D., J. Ricketts, Ph.D., S.B. Going, Ph.D., P.J. Teixeira, Ph.D.

The use of a specifically designed web site to foster the maintenance of weight loss in the population of middle aged, overweight women was tested in a study of 133 participants. All participants had completed a 16-week intervention including a core curriculum designed to facilitate slow weight loss (up to 1lb/week). After the 16-week program (mean weight loss = 5.1 ± 3.8 kg), subjects were assigned at random to an internet/no internet intervention and were followed for one year. Individual goals following the 16-week intervention were weight loss for some and maintenance of weight loss for others. The password-protected interactive website included curriculum materials from the 16-week program, tools to log and estimate energy intake and physical activity expenditure, weekly update requirements including self-report of activity, eating and scale weight, feature articles on new information, chat room, bulletin board, among other features. Several indexes have been formulated to assess frequency and type of web usage and its relation to weight loss, namely, number of hits in the site, number of days with hits, and number of messages posted/read in internal mail and bulletin board. We will test hypothesis that subjects in the internet group showed improved weight loss after 1 year, in comparison with the no-internet group. We will also establish the relation of internet usage to weight maintenance on loss within the internet group.

COMPUTER-MEDIATED INTERVENTIONS FOR NUTRITION & PHYSICAL ACTIVITY CHANGE IN PRIMARY CARE SETTINGS

Judith J. Prochaska, Ph.D., MPH

PACE+ computer-mediated interventions for adolescents and adults were developed to facilitate physical activity (PA) and nutrition counseling in primary care settings. PACE+ used tailoring technology to screen multiple behaviors and generate individualized action plans. Separate programs were developed for adolescents and adults. Behavioral targets were moderate and vigorous PA, fat intake, fruit and vegetable intake, and overeating (adults only). Patient information was synthesized for ease-of-use by clinicians. PACE+ was completed in the waiting room prior to the provider encounter. The current study reports findings from feasibility and acceptability studies conducted in 6 adult and 6 adolescent primary care clinics. Adolescent (N=252, 56% male, age M=15 years, 46% Caucasian) and adult (N=285, 24% male, age M=38 years, 70% Caucasian) participants completed onsite and 1-week satisfaction surveys. Half the samples completed 4-month self-report measures to evaluate changes in behavior. A subsample of participating providers (N=13) and office staff (N=15) also completed satisfaction surveys. The majority of adults and adolescents reported liking PACE+ (>90%) and perceiving the feedback as personally relevant (>65%). A majority (77%) of clinical staff recommended PACE+ for use in primary care. Among adolescents and adults, all outcomes improved over time ($p < .05$), with those who targeted a behavior tending to improve more, with the exception of vigorous PA for adolescents. Computer-mediated interventions to improve PA and dietary behaviors in adolescents and adults were found to be feasible and acceptable with some evidence of supporting changes in behavior. Randomized controlled trials are currently underway to evaluate efficacy of the PACE+ programs.

USING THE INTERNET TO CHANGE DIET AND PHYSICAL ACTIVITY IN ADOLESCENT GIRLS

Cheryl Ritenbaugh, PhD, MPH, Lynn DeBar, PhD, MPH, Megan Porter, RD, Gina Keppel, BA.

The Youth Osteoporosis and Understanding Total Health (YOUTH) study at the Kaiser Permanente Center for Health Research is a randomized controlled trial to test the efficacy of a lifestyle intervention to build bone and prevent bone loss in 227 women, 14-16 years of age at baseline. Participants, greater Portland metropolitan area Kaiser Permanente members, are randomly assigned to a two-year health education or lifestyle intervention program.

Focus group data collected at baseline and during a pilot phase helped create a website for each group to enhance the interventions. The website consists of a home page with links including a bulletin board, participant scrapbook, health questions and answers, incentive points information, YOUTH resources and tips, progress toward YOUTH goals, and a caption contest. Participants login to access the website; the site tracks the number of visits and links accessed.

In 2001 over 75% of participants visited the web site. Approximately half of participants repeatedly visit the site. 57% of the intervention group view their own progress, 61% of the full cohort view their point totals. The "fun stuff" menu is the most frequently visited link (64%), followed by the bulletin board and the scrapbook. An approximately equal number of girls from each group visit and return to the web site. The web site builds community among participants from a widespread geographic area and aids communication between participants and group leaders as one component of a multi-faceted intervention. In this population, it contributes to the intervention, but cannot carry it alone.

THE PAST, THE PRESENT AND THE FUTURE OF COMPUTER-TAILORED NUTRITION EDUCATION

Johannes Brug, Ph.D.

Computer-tailored nutrition education is an innovative and promising way to motivate people to make healthy dietary changes. It provides respondents with individualized feedback about their dietary behaviors, motivations, attitudes, norms and skills, and mimics the process of person-to-person dietary counseling. The nutrition counseling expertise is documented in a computer-program. In the present paper the rationale for and practice of computer-tailored nutrition education is introduced, based on well-established models of planned health education and promotion. Furthermore, a short summary of the empirical evidence for the effectiveness of computer-tailoring in nutrition education is presented and future directions for research and practice are suggested.

The available evidence indicates that computer-tailored nutrition education is more effective in motivating people to make dietary changes than general nutrition information, especially for reduction of dietary fat. The effectiveness of computer-tailoring has been attributed to the fact that individualized feedback draws better attention, is processed more intensively, contains less redundant information, and is appreciated better than more general intervention materials. Interactive technology, e.g. the Internet and the World Wide Web, offer promising possibilities for the application of computer-tailored nutrition education, and a first controlled study on web-based computer-tailoring shows promising results. However, using the Web for interactive personalized nutrition education also presents new challenges. Computer-tailored nutrition education shows promising results in motivating people to reduce their intake of dietary fat. More research is needed to test computer-tailored interventions with more objective dietary assessment methods and to further explore the working mechanisms of computer-tailoring.

Saturday, 4 PM
Paper Session 4
Research with children
Beau Porte Room

GOAL SETTING IS DIFFERENTIALLY RELATED TO CHANGE IN FRUIT, JUICE, & VEGETABLE CONSUMPTION AMONG 4TH GRADE CHILDREN

Karen W. Cullen, Issa Zakeri, Tom Baranowski, Janice Baranowski and Erin W. Pryor

The impact of goal setting in a dietary change program on the fruit, 100% juice, and vegetable consumption was assessed among 671 4th grade students [18% White, 43% African-American, 31% Hispanic, and 8% Asian/Other; 48% boys; 66% low income]. The 10-session intervention included setting 2 fruit-juice, 4 vegetable, and 3 general FJV goals. Students attained 70% of the fruit-juice goals, 61% of the vegetable goals, and 51% of the general goals. Significant post fruit-juice consumption predictors were interaction terms between the number of fruit-juice goals attained with baseline fruit-juice consumption and baseline preferences. At low levels of fruit-juice preferences, number of goals attained was related to increased post fruit-juice consumption, but attaining only one goal led to more fruit-juice consumption among those with high baseline fruit-juice preferences ($r^2 = 0.25$). Post fruit-juice consumption did not vary with goal attainment for those with low baseline fruit-juice consumption, but was higher for those with mean or higher baseline consumption who attained only one goal. Post fruit-juice consumption was higher for those with high baseline preferences and consumption if they attained more general goals ($r^2 = 0.26$). Post vegetable consumption was related to attaining 1 vegetable goal ($r^2 = 0.18$) or 1 general goal ($r^2 = 0.17$), among those with higher vegetable preferences. The interaction term of attaining the specific snack vegetable goal with baseline vegetable consumption was a significant predictor of post vegetable consumption in a model with a quadratic term ($r^2 = 0.25$). This is the first evidence that goal attainment was somewhat effective in promoting dietary change among children.

IS THE ACCURACY OF FOURTH-GRADERS' RECALLS OF SCHOOL BREAKFAST AND SCHOOL LUNCH GREATER WHEN CHILDREN ARE PROMPTED TO REPORT MEALS AND SNACKS IN REVERSE ORDER COMPARED TO CHRONOLOGICAL ORDER?

Suzanne Domel Baxter, W. O. Thompson, Z. Yin, F. H. A. Frye, C. H. Guinn and M. L. Baglio

According to general memory research, reverse order reporting is more accurate than chronological. This study tested whether accuracy of children's school breakfast and lunch recalls is greater when prompted to report in reverse versus chronological order. A stratified sample of 121 fourth-graders equally distributed by race (black, white) and gender was randomly selected from 671 children. Each was observed eating school breakfast and lunch twice, and interviewed twice (once/order) regarding the previous day's 24-hour recall using a multiple pass protocol the morning after being observed. Items observed and/or reported were weighted (combination entree=2, condiment=0.33, else=1) and categorized as matches (observed and reported), omissions (observed but not reported) and intrusions (not observed but reported). Omission and intrusion rates were calculated with 0% considered perfect. Amounts observed and/or reported were obtained and coded in servings (none=0.0, taste=0.10, little bit=0.25, half=0.50, most=0.75, all=1.0, and >1=actual number). Total inaccuracy captured errors in reporting items and amounts with 0 considered perfect. Results from paired t-tests failed to indicate significant differences in reverse versus chronological order in 1) omission rates (57%±28% [mean±sd] versus 56%±25%; $p > 0.947$; $r = 0.137$); 2) intrusion rates (32%±26% versus 37%±25%; $p > 0.160$; $r = 0.064$); and 3) total inaccuracy (6.37±2.87 versus 6.90±3.13; $p > 0.152$; $r = 0.11$). However, many children reported in chronological order when prompted in reverse. Omission rates, intrusion rates, and total inaccuracy were similar to 51%, 39%, and 7.1, respectively, from another study with fourth-graders interviewed in chronological order up to 3 times each. Research is needed to improve the accuracy of dietary information from children.

COMPARISON OF METHODS FOR ASSESSING CHILDREN'S PHYSICAL ACTIVITY

Ronald J. Iannotti, T. S. Horn and R. P. Claytor

One of the deterrents to physical activity (PA) research with children has been the lack of good methods for simultaneously assessing PA and psychosocial influences. This study examines heart rate (HR) monitoring and self-report (SR) for assessing daily PA and energy expenditure (EE).

Thirty-six children ages 8 to 13 participated in a laboratory visit and 3 or 6 days of PA monitoring. HR and oxygen consumption were measured during a two-part exercise test which included low intensity activity and a progressive maximal exercise test. Regression analyses related HR to EE for each child. Daily PA was then assessed with 12 hours of minute-by-minute HR readings. Each evening, children were interviewed about PA during the same period.

Contrary to previous findings, a simple, linear regression of HR on EE explained over 90 percent of the variance in most of the children. Polynomial regression frequently added to the variance explained but rarely more than 5% of the variance. Four methods of estimating children's PA during the 12-hour period were compared: converting the full-range of HR values to EE based on the individual child's regression equation; only including periods with flex HRs greater than 70% of maximum HR; using SR of episodes of moderate to vigorous PA; and only using PA episodes of at least 20 min duration confirmed by both SR and HR monitoring. Although all four measures were significantly related, each has advantages and disadvantages. SR alone provided an overestimate of duration and frequency of PA episodes compared with the other methods.

Results support the use of multiple methods for assessing PA in children. SR is less labor intensive than direct observation and provides information about environmental and psychosocial influences. Complementing SR with HR or other direct measures of PA may provide more accurate estimates of PA.

LOWER LEVELS OF PHYSICAL FITNESS IN LOW-INCOME LATINO GIRLS

Lizzette Rojas, Roberto Treviño, Oralia García and Laura Dempsey

Studies have shown that low-income Latino children have lower levels of physical activity than more affluent Latino and Non-Latino children. In this study, physical fitness levels in mostly low-income Latino children will be described.

Baseline measures were collected in September 2001 and post-intervention measures will be collected in May 2002. Physical fitness was measured by a modified Harvard Step Test using Polar heart rate monitors. A physical fitness score (PFS) was calculated by dividing the total time of exercise in minutes by the sum of three heart rate values measured at 0, 1, and 2 minutes post exercise. For this study, PFS was divided in three categories: unacceptable (less than 65), marginally acceptable (between 65 and 79) and acceptable (greater than 79).

Complete data were available on 1,421 students (708 boys and 713 girls). From these, 40.7% had unacceptable, 49.1% had marginally acceptable and 10.2% had acceptable PFS. Within the unacceptable category, the percentage of girls (59.7%) was higher than the percentage of boys (40.3%). Within the acceptable category, however, the percentage of girls (29%) was lower than the percentage of boys (71%).

The results suggest that the majority of these children are below acceptable physical fitness levels. This unhealthy behavior was more pronounced in Latino girls than in boys. It is hopeful that programs like the Bienestar Health Program may reverse this established risk factor for diabetes in both boys and girls.

THE 1999 CALIFORNIA CHILDREN'S HEALTHY EATING AND EXERCISE PRACTICES SURVEY: FROM RESEARCH TO POLICY IMPLICATIONS

Angie Jo Keihner, S. Foerster, S. Sugerman, M. Oppen, S. Jolly and P. Goel

Purpose of the Survey: To collect dietary intake and physical activity data for state-level surveillance of California children. Method: The survey, designed for children age 9-11, used a demographically balanced market research panel method combining a mail survey with a telephone follow-up. In the spring of 1999, the parent-assisted two-day diet and exercise diary was collected by mail from 814 children. The follow-up telephone interview contacted 394 children for key attitude and knowledge information. Results: The response rates for the mail and telephone surveys were 41% and 51% respectively. Of the children surveyed, just under one-third were at risk of overweight (BMI $\geq 85^{th}$ and $< 95^{th}$ percentile) or already overweight (BMI $\geq 95^{th}$ percentile). Participation in school meal programs and nutrition education classes was associated with greater fruit and vegetable consumption. Children eating school lunch consumed more fluid milk and ate less sweet foods. One-quarter of children reported having a school cafeteria with fast food and 16% reported having soda vending machines at school. All differences reported are statistically significant at $p < .05$. Conclusion: Utilizing the findings to advocate for policy changes with elected school district officials and legislators will be discussed.

RELATIONSHIP BETWEEN PHYSICAL FITNESS LEVELS AND PERCENT BODY FAT IN LOW-INCOME LATINO CHILDREN

Roberto P. Treviño, Lizzette Rojas, Oralia Garcia, Laura Dempsey, Zenong Yin and Arthur Hernandez

Recent studies have shown an epidemic increase in childhood obesity. The purpose of this study is to learn if correlations exist between physical fitness and obesity in low-income Latino children.

This study involved 1,420 fourth grade students from the San Antonio Independent School District (SAISD). In the SAISD, 88% of students are Latino and over 90% are from low-income households. Physical Fitness scores (PFS) and % body fat (%BF) were collected in September 2001. PFS was measured by modified Harvard step test using Polar heart rate monitors. The PFS was calculated by dividing the total time of exercise in minutes by the sum of three heart rate values measured at 0, 1, and 2 minutes post-exercise. PFS was divided into unacceptable (< 65), marginally acceptable (65-79) and acceptable (> 79). Percent body fat was measured by bioelectric impedance analysis.

The table shows the average %BF for each PFS percentile. The higher the PFS percentile, the lower was the average % BF. PFS and % BF were highly negatively correlated ($r = -0.48$; $p < .01$)

PFS	%BF
UNACCEPTABLE	33%
MARGINALLY ACCEPTABLE	24%
ACCEPTABLE	19%

This study shows the strong inverse relationship between PFS and %BF. Increasing physical fitness levels may be a good start to reverse the increasing trends in childhood obesity.

Saturday, 4 PM
 Paper Session 5
 Physical activity research
 St. Foy Room

NET HEALTH BENEFITS OF STARTING TO CYCLE TO WORK

Katherine Appleton, Birgitta Gatersleben and David Uzzell

Cycling to work offers a practical and sustainable means of increasing physical activity for much of the general U.K. population. The net health benefits of active travel such as cycling to work, however, remain to be fully investigated. This study investigated the effects of starting to cycle to work on physical and psychological health. Twenty-one new cyclists (did not previously cycle to work) and fourteen regular cyclists (regularly cycle to work) were recruited into the study. Physical and psychological health was measured every two weeks for as long as each participant wished to remain in the study, using measures of aerobic fitness, muscular fitness, fasting body mass index and body composition, exposure to carbon monoxide, frequency and severity of injuries sustained, positive and negative affect (Watson, et al, 1988), and general physical and psychological health (Goldberg, 1978). Following two weeks of cycling, significant increases in muscle fitness (smallest $F(1,20)=7.20$, $p=0.01$), and decreases in negative affect (smallest $F(1,11)=5.26$, $p=0.04$) were found in new and regular cyclists. Significant increases in concentration of carbon monoxide in the breath following a cycling journey compared to beforehand were also found in new cyclists ($F(1,20)=9.83$, $p=0.01$). Following four weeks of cycling (6 new cyclists and 6 regular cyclists), significant increases in aerobic fitness ($F(2,10)=4.20$, $p=0.05$) and muscular fitness (smallest $F(2,10)=5.25$, $p=0.03$) were found in new cyclists, significant increases in limited muscular fitness were found in regular cyclists (smallest $F(2,10)=4.10$, $p=0.05$). No effects in concentration of carbon monoxide in breath were found at four weeks. Taken overall, these findings suggest that cycling to work is beneficial for health if sustained for at least four weeks.

HEALTH OPPORTUNITIES WITH PHYSICAL EXERCISE: THE HOPE TRIAL

Mace Coday, Jennie Ma, Lynn McKee and Brad McCollum

This describes a randomized behavioral intervention trial to reduce sedentary behavior in working poor persons referred from The Church Health Center, a primary care clinic for those without health insurance who are gainfully employed. Referrals for overweight, inactivity, and chronic health conditions were made to The Hope and Healing Center (HHC) for preventive care and wellness services. Referrals to Hope and Healing were screened for enrollment into a research study comparing supportive peer mentoring versus provider communication to increase physical activity levels. The Health Opportunities with Physical Exercise (HOPE) Trial recruited 361 participants age 25-65 who were randomly assigned to either standard care exercise program at HHC ($n=121$), standard care at HHC plus peer support ($n=120$), or standard care at HHC plus provider supervision ($n=120$). Preliminary baseline analyses show that the randomization procedure was successful. Participants are evenly distributed across the three study groups by age, gender, and race. Criteria for enrollment included sedentary lifestyle, body mass index (BMI) ≥ 25 kg/M², and desire to begin a regular program of physical activity. Baseline BMI was available on 304 enrollees showing no significant difference by age categories (<50 and 50-65). However, BMI was higher (35.7 versus 33.6, $p < .01$) in blacks ($n=212$) than whites ($n=83$). Information on baseline fat intake, readiness to increase fruit and vegetable consumption, lipids, and smoking status will be presented.

DELIVERY AGENT CHARACTERISTICS PREDICT COUNTY LEVEL ADOPTION OF A PHYSICAL ACTIVITY INTERVENTION

Paul Estabrooks, David A. Dzewaltowski, Russell Glasgow, Lisa Klesges

Cooperative Extension is a state wide-diffusion system that provides an infrastructure that has the potential to adopt and deliver physical activity interventions that have a large reach into the population. Within the system there are delivery agents in each county responsible for the translation of health-based information from research into practice. These agents determine the needs of the communities they serve and plan strategies and program to address those needs.

Purpose: To determine: (1) the prevalence and predictors of physical activity (PA) of health program delivery agents, and (2) the relationships between agents' PA characteristics and subsequent adoption of a physical activity promotion program for community implementation.

Methods: County agents responsible for county health promotion (n=91) completed interviews that assessed PA self-efficacy, value and participation. Subsequent county adoption of a PA promotion program was monitored.

Results: Fifty-five, 35, and 10 percent of the agents respectively, were meeting CDC recommendations for PA, active but not meeting recommendations, and inactive. Higher self-efficacy and value significantly predicted higher agent PA. Agents who met recommendations were significantly more likely to adopt the program for their county (69% adoption rate) compared to those who were less active (41% adoption rate) and inactive (11% adoption rate).

Conclusions: Delivery agent PA is related to the adoption of county level PA programs. Interventions that target delivery agent self-efficacy and value should increase agent PA and subsequent adoption of county programs thereby enhancing the reach of such initiatives into the population.

LONG-TERM FOLLOW-UP OF A SUCCESSFUL CULTURALLY TAILORED EXERCISE INTERVENTION FOR LOW-INCOME LATINO WOMEN

Melbourne F. Hovell, Mary M. Mulvihill, Sandy Ho, Michael Buono, James Sallis, Donald Slymen and Irais Estrada

Study purpose was a long-term follow-up of physical fitness/activity of 133 healthy, low-income community Latinas who participated in a study of a culturally tailored, behavioural exercise intervention. Few interventions have been conducted in this group, which is at high risk for obesity & diabetes. The initial study showed the 6 mo. exercise intervention was effective in increasing fitness/vigorous activity, with decrement at 12 mos., although group differences in fitness/activity remained. At follow-up, 133 of 179 participants were measured (78 exercise, 55 control). 53 were from cohort 1 (3 year fu) and 80 were from cohort 2 (2 year fu). Women were 72% married, 27% employed, with a mean age of 31.4 (6.4) years, 8.4 (3.4) years education, 2.6(1.32) children, and 112 (68) mos US residence. 5% were US born; most were from Mexico. 45% were overweight, 26% obese. Results of student's t tests showed vigorous exercise (measured by questionnaire) ($t=1.48$, $DF(128)$, $p=.14$) and fitness (absolute VO_2 measured by maximal exercise test) ($t=1.914$, $DF(121)$, $p<.058$) were not different between the groups by 2-3 years out while % meeting ACSM exercise guidelines was: 21% of exercise group vs. 7% of controls, ($p<.05$). There was no moderate activity, walking or BMI change with intervention/difference at follow-up. Results suggest that, similar to the general population, more intensive/comprehensive intervention approaches are needed to alter limited exercise and high overweight/obesity seen in the low-income Latino population. Common barriers that must be addressed by culturally tailored interventions for low-income Latino women will be discussed.

A RANDOMIZED CONTROLLED TRIAL OF THE EFFECTIVENESS OF TELEPHONE SUPPORT IN INCREASING PHYSICAL ACTIVITY LEVELS IN PRIMARY CARE PATIENTS

Beverly B. Green, Tim McAfee, Linda Madsen, Madlen Caplow, Michael Hindmarsh and Diana Buist

Background: Physician counseling of patients to increase physical activity has had limited success in changing behavior. Providing organizational support to primary care providers and their patients may increase effectiveness.

Objective: This study evaluates the effectiveness of a telephone-based intervention to increase physical activity among patients who exercised less than 15 minutes daily and wanted to increase their physical activity over a six-month period.

Design: This was a randomized controlled trial of 316 patients age 18-65 who were recruited from a mailed health risk assessment. Baseline and 6-month post-intervention telephone assessments were conducted by telephone.

Setting: One family physician's patients in a suburban community.

Intervention: 3 sessions of telephone-delivered motivational counseling.

Main outcome measures: Physical activity score (PACE-11 activity level) 6 months after the intervention.

Results: After adjusting for baseline exercise, there was a significantly higher level of self-reported exercise among individuals randomized to the intervention at the six-month follow-up. The mean level of activity at follow-up for the intervention group was a PACE score of 5.37 compared to 4.98 in the control group ($p<0.05$). In the secondary analysis that was limited to individuals who received the intervention the effect was stronger (PACE score of 5.58 compared to 4.94, $p<0.013$).

Conclusions: Patients can be recruited using a health-screening questionnaire to receive a telephone delivered behavioral intervention to successfully increase their physical activity levels.

CHARACTERIZATION OF TOTAL AMOUNT AND BOUTS OF MODERATE AND VIGOROUS PHYSICAL ACTIVITY IN AFRICAN AMERICAN WOMEN

Melicia C. Whitt, Scarlett Bellamy and Shiriki Kumanyika

To characterize patterns of moderate/vigorous physical activity (MVPA) in African American (AA) women by bout length, volunteers (n=55; ages 39.6 ± 8.7 [range 25 - 55], BMI 31.3 ± 7.9 kg/m² [range 17.9 - 56.4 kg/m²]) were recruited in urban areas in the eastern United States. Accelerometer data (CSA, Inc) on minute-by-minute physical activity (PA) were collected over 4 days on two separate occasions approximately 6 months apart. Participants accumulated 31.9 ± 18.0 minutes/day of MVPA, primarily in short bouts lasting 1 - 4 (median: 11.9 bouts/day) and 5 - 9 minutes (median: 0.8 bouts/day). Bouts lasting ≥ 10 minutes were less common (median: 0.1 bouts/day). Participants accumulating ≥ 30 minutes/day in MVPA (n = 29) had more bouts of PA lasting 1 - 4, 15 - 19, and ≥ 30 minutes compared to those with < 30 minutes/day (all $p < 0.05$). Most (97%) participants with ≥ 30 minutes/day in MVPA had at least one bout lasting ≥ 10 minutes; however, few women obtained MVPA in the recommended pattern of one 30 minute bout or 3 - 4 bouts lasting ≥ 10 minutes. Analyses by bout length provide insights that are not derived by tabulating only total minutes. Since the health benefits of moderate activity accumulated in bouts < 10 minutes have not yet been established, activity analyzed as total minutes could be misleading in studying associations between PA and health outcomes. In addition, health promotion messages about moderate PA should specify both pattern and duration.

Saturday, 4 PM
 Paper Session 6
 Reviews, obesity and other research
 Porte St. Louis Room

TRANSLATING RESEARCH TO PRACTICE: EXAMINING THE EXTERNAL VALIDITY OF SCHOOL-BASED BEHAVIOR CHANGE INTERVENTIONS

Paul Estabrooks and David A. Dziewaltowski

Health promotion strategies that target schools for behavior change interventions can reach a broad range of students. However, determining the extent to which these interventions are effective across a variety of students and diverse school conditions is dependent on the representativeness of the samples studied. Purpose: The purpose of this paper was to examine the external validity of school-based health behavior interventions. Methods: Controlled studies ($n=32$) of interventions promoting good nutrition, physical activity, or smoking cessation/prevention conducted in schools and published in 12 leading health behavior journals between 1996 and 2000 were reviewed. The RE-AIM framework was used to evaluate the extent to which each paper reported on elements of reach (i.e., rate and representativeness of students), efficacy (i.e., the magnitude of effect), adoption (i.e., rate and representativeness of schools), implementation (i.e., degree to which the intervention was administration as intended), and maintenance (i.e., level of individual and organizational sustainability of effect). Results: The reporting rates across the RE-AIM dimensions varied substantially (Reach=81.5%; Efficacy=94%; Adoption=25%; Implementation=34%; Maintenance=80% for individuals, 0% for schools). Most notably, few studies reported if the characteristics of the sample represented the broader population of students (reach) or schools (adoption). Among studies reporting on the RE-AIM dimensions, participation rates were generally high (average 80%), adoption rates were moderate (average 57%), and reports of implementation were high (80%). Conclusion: To increase the potential to translate controlled research to "real-world" practice conditions, a stronger emphasis should be placed on reporting the representativeness of the sample of students and schools.

QUANTITATIVE REVIEW OF MULTIBEHAVIORAL PHYSICAL ACTIVITY & DIETARY INTERVENTIONS WITH ADOLESCENTS

Judith J. Prochaska and James F. Sallis

This paper synthesizes the literature on combined physical activity (PA) and dietary interventions for adolescents. A literature search (1966-2001) using Medline and PsychInfo included published interventions with a control group that targeted both behaviors with adolescents (11-18 years). Interventions for special needs populations were excluded. Weighted effect ratios—number of significant effects for an outcome divided by the total number of effects—were calculated for PA, fitness, and dietary measures separately. Effect sizes (ES) were calculated as a Pearson correlation coefficient for studies reporting sufficient statistics. Subgroup analyses and repeated follow-ups resulted in multiple effects per study. Thirteen studies met criteria—11 were school-based; 8 had a family component. Eight studies used randomization, often at the school level; 7 interventions referenced a theoretical orientation. Intervention duration (2 mo.-5 years) and sample sizes (42-2376) ranged dramatically. Of 48 tests for PA, the majority (59%) was nonsignificant, 35% indicated an intervention effect, and 6% a control group advantage. Eight of 20 fitness tests (40%) and 27 of 80 dietary tests (34%) indicated a significant intervention effect. From 8 studies, 36 ES were calculated. Mean ES were -0.25 for PA, 0.30 for fitness, and 0.23 for dietary outcomes. The 95% confidence intervals for fitness (0.06,0.54) and dietary (0.14,0.31) ES were significant ($p<0.05$). The 95% CI for PA (-0.53,0.02) was nonsignificant ($p=0.07$). Overall effects were modest, with strongest findings for fitness and nutrition. PA effects tended to be negative. Study limitations (reliance on self-report, missing data) and recommendations for future research will be discussed.

FINAL RESULTS OF SISTERTALK: A CABLE-TV DELIVERED WEIGHT CONTROL PROGRAM FOR BLACK WOMEN

Kim M. Gans, Patricia M Risica, Thomas M. Lasater, Shiriki K. Kumanyika,

SisterTalk is a five-year grant to develop, deliver and evaluate a weight control program for Black women in Boston via "live" cable television. Extensive formative research was used to develop a culturally appropriate intervention. The intervention included twelve weekly hour-long TV shows and then four monthly booster shows mailed on video. Participants also received accompanying written materials in the mail. We recruited four cohorts of women totalling 374 participants. Diet (measured by a Food Habits Questionnaire), physical activity, height and weight (calculated BMI) were measured at baseline, and at 3, 8 and 12 months.

Intervention participants had significantly more change in diet than control group participants from baseline to three months (-0.30 vs. -0.11, $p < .001$) and baseline to twelve months (-0.27 vs. -0.14, $p < .05$). Changes in physical activity were larger for intervention compared with control participants at all three time points, though not significantly. BMI change was significantly different between intervention and control between baseline and 3 months (-0.28 vs. +0.07, $p < .05$). The intervention group also appeared to demonstrate better weight maintenance than the control group (8 months: BMI -0.18 vs. +0.05 and 12 months: BMI +0.01 vs. +0.06). Overall, the SisterTalk intervention was successful in helping participants change diet and lower their BMI in the short-term. Efforts are underway to disseminate the SisterTalk program beyond local cable access and extend the length of the intervention to achieve longer term behavior changes.

CHANGES IN SELF-EFFICACY AND SOCIAL SUPPORT PREDICT IMPROVEMENT IN DIETARY AND EXERCISE BEHAVIORS IN HIGH RISK WOMEN ENROLLED IN THE MEDITERRANEAN LIFESTYLE PROGRAM

Deborah J. Toobert, L. Strycker, M. Barrera, R. Glasgow, S. Huck.

We will present data from a theory-based intervention for achieving long-term behavior change in women with type 2 diabetes. Epidemiological and clinical studies suggest that diabetes is generally associated with an increased risk for coronary heart disease (CHD) that is greater in women than it is in men. The objective of this two-stage trial was to test the efficacy of improvements in lifestyle behaviors including diet and physical activity (PA), together with different types of social support for maintaining improvements. The first stage compared short-term (6-month) outcomes in 110 women receiving usual care (UC) with 140 receiving a comprehensive lifestyle management intervention. Outcomes included multiple CHD risk lifestyle behaviors (diet was measured by Fat and Fiber Behavior Questionnaire, NCI Fruit and Vegetable and Fat screeners, Food Frequency Questionnaire, and self-monitored adherence to the Mediterranean Diet); PA was measured by: Champs, 7-day self-monitored exercise), and psychosocial mediators of change including self-efficacy (Sallis Self-Efficacy for Diet and Exercise, supportive resources (UCLA social support, MOS Social Support Survey, Chronic Illness Resources Inventory, Neighborhood Cohesion, 7-day self-monitored support). Using separate MANCOVA equations for diet and exercise, we evaluated the effects of treatment condition, baseline level of adherence, and psychosocial change scores. Treatment condition and baseline scores consistently predicted levels of adherence (all p 's = .000) for both dietary and exercise outcomes. Changes in self-efficacy and in social support predicted improvement in both dietary and PA outcomes. These findings highlight the importance of psychosocial factors for lifestyle change in women at risk for CHD.

CROSS-SECTIONAL AND LONGITUDINAL CORRELATES OF QUALITY OF LIFE IN OVERWEIGHT AND OBESE WOMEN

Pedro Jorge Teixeira, S. B. Goings, L. B. Houtkooper, C. J. Martin, L. L. Metcalfe, E. C. Cussler, N. R. Finkenthal, R. M. Blew and T. G. Lohman

Purpose: Psychological distress varies substantially among the obese. To analyse the source of this variability, we studied cross-sectional and longitudinal psychosocial correlates of an obesity-specific quality of life measure (IWOQL) in overweight and obese women.

Methods: Subjects were 161 women (age: 47.9 ± 4.5 yr; BMI: 31.1 ± 3.8 kg/m²) involved in a lifestyle weight management program. Quality of life, eating restraint, binge eating, body image, self-esteem, and exercise intrinsic motivation were assessed before and after the 16-week weight loss phase.

Results: At baseline, IWOQL was associated negatively with BMI, binge eating, and body shape concerns, and positively with self-esteem and exercise intrinsic motivation ($p < 0.001$), and it was not correlated with eating restraint ($p > 0.05$). In multiple regression analysis, self-esteem, body image, and exercise intrinsic motivation were significant ($p < 0.01$) and independent predictors of IWOQL, after BMI ($p < 0.01$) and eating behavior variables ($p > 0.05$) were controlled (adjusted $R^2 = 0.58$, $p < 0.001$). After 16 weeks, BMI and all psychosocial variables changed significantly ($p < 0.001$). In the longitudinal analysis, changes in BMI ($p < 0.05$), eating restraint ($p < 0.01$), and binge eating, body image, self-esteem, and exercise motivation ($p < 0.001$) were found to predict changes in IWOQL. Regression analysis showed that after accounting for changes in body image ($p < 0.001$), self-esteem ($p < 0.001$), and exercise intrinsic motivation ($p < 0.05$), changes in BMI and eating variables were no longer significantly associated with IWOQL changes ($p > 0.05$).

Conclusions: These results suggest that including strategies to increase self-concept, particularly body image, and exercise motivation would contribute to improve weight-related quality of life outcomes for subjects in weight loss programs, independent of changes in weight and eating behavior.

SLOWLY AVAILABLE GLUCOSE IMPROVES HUMAN MEMORY

David Benton and S. Nabb

Purpose: There is increasing evidence, in both animals and humans, that blood glucose levels influence memory. We have therefore contrasted breakfasts supplying slowly available (SAG) rather than rapidly available glucose (RAG). The RAG fraction is rapidly absorbed and largely determines the glycaemic index of a food. In contrast SAG is absorbed and released slowly and contributes little to the glycaemic response.

Methods: After fasting over-night 106 females were randomly allocated to one of three conditions: 1) Fasting; 2) Breakfast biscuits high in SAG; 3) Breakfast biscuits high in RAG. The breakfasts offered an identical weight of carbohydrate, 34 grams, but different amounts of RAG and SAG. Memory was assessed by recalling a list of words 30, 90, 150 and 210 minutes after breakfast.

Results: RAG produced a marked rise in blood glucose, whereas after SAG the increase in blood glucose was relatively small and returned to baseline values more rapidly. Although there was no difference after 30 and 90 minutes there was a significant difference in memory 150 and 210 minutes after breakfast; those eating the SAG meal had a better memory. In particular SAG improved the recall of the more difficult abstract rather than more easily recalled concrete words.

Conclusion: Although previous studies have reported that a glucose drink improves memory this is not a practical means of influencing memory. The novel finding is that a high-SAG food improved memory, a finding that offers a practical means of improving functioning.

Saturday, 5:30 PM
 Poster Session 2A
 Measurement issues
 Panorama Room

DOES THE DIET READINESS TEST CORRELATE WITH SUCCESS IN AN OUTPATIENT WEIGHT LOSS CLINIC?

Heather de Paulo, D. S. Kalman and D. Krieger

Currently, more than 60% of the American population is overweight or obese. Though many will seek to lose weight at least once during their lifetime, readiness to make the changes necessary is not always at the forefront. With this in mind, we evaluated if the Diet Readiness Test (DRT; LEARN® manual, American Health Publishing Company) was able to predict success for weight loss in an outpatient nutrition clinic. Fifty patients were recruited to participate in this study. DRT was scored at baseline and weight loss was evaluated after 4 sessions with the team. Data analysed using Pearson's correlation and independent t-test. Baseline characteristics: BMI = $33.10 \text{ kg/m}^2 \pm 9.17$, percent female=78%, percent male=22%, readiness score = 22.72 ± 2.98 and total weight loss = 8.04 ± 12.13 pounds. Results: 17 of 50 passed the DRT with a mean weight loss of 6.63 ± 14.06 pounds while 33 of 50 failed with a mean weight loss of 9.10 ± 10.90 pounds. There is a no correlation between DRT scores and weight loss for those who either failed or passed the DRT. There was also no significance ($P \geq 0.005$) of weight loss related to DRT score. Within the parameters studied, DRT is not a good predictor of success in a weight loss program. However, the DRT may be useful in evaluating motives for those seeking nutritional counselling and allow for more informed reinforcement during the treatment process. Future studies should examine larger sample sizes.

A COMPUTERIZED FOOD FREQUENCY QUESTIONNAIRE TO FACILITATE DIETARY MODIFICATION IN A UK POPULATION

Moira A. Geekie, Ian Kennedy, Monique Raats and Rury R. Holman

The prevalence of obesity in the UK population continues to rise despite efforts to introduce weight reduction programs. To assist with provision of individualised dietary advice at the population level we have designed a simple, self-administered, computerised food frequency questionnaire (CFFQ) program to provide instant dietary feedback. The program assesses consumption of total food energy, protein, fat, carbohydrate and non-starch polysaccharide (NSP). Subjects indicate from a list of 195 food types, portion size and frequency of consumption; photographs for each food and portion size aid selection. Once completed, total fat and carbohydrate intake is presented graphically in comparison to UK government guidelines. Over or under consumption of these nutrients is indicated and the program lists the chosen food items in descending order of both fat and carbohydrate content. Food items are identified as high, medium or low in saturated fat; advice concerning body weight is given. Screen-based and printed output of the information are available. All information is stored. It is anticipated that information on major sources of fat will assist food selection to reduce consumption of dietary fat.

Preliminary validation results for 34 subjects, comparing the CFFQ against a 7-Day Food Diary, identifies no significant differences for energy ($p=0.075$); fat ($p=0.65$); saturated fat ($p=0.16$); and carbohydrate ($p=0.41$). Limits of agreement and systematic difference (bias) are identified using Bland-Altman method for each nutrient. Subjects found the program simple to use, the information provided easy to understand and useful. Seventeen subjects chose the CFFQ as their preferred tool of diet assessment.

BEHAVIORAL CHANGE CONSORTIUM DIETARY VALIDATION STUDIES

Geoffery W. Greene, K. Peterson, D. Elliot, A. Domas, D. Toobert, K. Resnicow, P. Clark, R. Breger, S. Rossi, G. Williams, L. Nebeling

The NIH-funded Behavioral Change Consortium (BCC) provided an unique opportunity to validate NCI's newly developed self-report measures of dietary intake of fruit and vegetable servings (FV) and percent of energy from fat (% fat) among diverse samples participating in intervention trials to reduce risk of chronic diseases, including cancer. Seven of the 15 BCC sites are participating in this supplement which augments the original scope of work of the parent grants in order to assess the validity of dietary intake estimates based on short screeners compared with multiple 24-hour recalls and/or biochemical assays. Three sites, University of Rhode Island (URI), Oregon Health Sciences University (OHSU) and Oregon Research Institute (ORI) provided preliminary baseline data (N=950) on both instruments and selected biochemical assays. There were marked differences in mean daily intake between sites: URI=8.6 FV, 31 % fat, OHSU=5.6 FV, 40 % fat, ORI=6.0 FV, 35 % fat, $p<.001$. There were differences in intake pooled across the 3 sites for both FV and % fat by education, employment, age, and BMI as well as for % fat by gender and FV by ethnicity, $p<.05$. Correlations between instruments and biochemical variables (pooled across sites conducting the analyses) were weak with % fat (N=912) only correlated with cholesterol (.07) and LDL (.07) and FV (N=126) with alpha (.21) and beta carotene (.19), beta cryptoxanthin (.20) and alpha tocopherol (.18), $p<.05$. This ongoing study compares the relative validity of these instruments across diverse samples that vary by age, gender, educational level, race/ethnicity and health and reproductive status. It will provide a basis for interpreting results based on common measures both within and across projects.

Saturday, 5:30 PM
Poster Session 2B
Family influences
Panorama Room

SOCIO -ECONOMIC DIFFERENCES IN FAMILY ENVIRONMENTS AND THEIR RELATIONSHIP TO CHILDREN'S EATING

Karen Campbell and David Andrew Crawford

There is some evidence that children of lower socio-economic status (SES) consume diets higher in fat and energy than those in higher SES groups, yet few studies have considered those aspects of a child's environment that might explain these differences. The aim of this study was to describe family food environments and dietary intakes of 5-6 year old children across a range of SES. This involved the random selection of 28 schools across three distinct SES regions in metropolitan Melbourne. A total of 550 families provided detailed self-reports of their family environments and dietary intakes of their 5-6 year old child. The exposure to television and rules regarding its use in the home provide one example of the differences in family environment across SES. In this sample, children in lower SES environments consumed more energy, derived more energy as fat and watched more commercial television than did those in higher SES groups. Further, these dietary habits were associated with total television viewing. Parental attitudes to television use also differed, with those in lower SES reporting watching television more frequently more during evening meals, and more held more liberal views of commercial television viewing for children. An understanding of family environment differences across SES may provide useful levers for nutrition interventions and obesity prevention efforts.

PREDICTORS OF EATING MEALS TOGETHER AMONG FAMILIES ENROLLED IN THE HI5+ FAMILY NUTRITION INTERVENTION PROGRAM

Susan L. Davies, Frank A. Franklin, Maria Brown-Binns, Kathy F. Harrington, Richard M. Shewchuk

Purpose: The family context provides an important environmental setting for interventions that seek to increase fruit and vegetable intake. Studies have shown that families who eat meals together regularly tend to have healthier diets. The purpose of this study is to identify factors associated with eating meals together among families participating in Hi5+, a peer-led take-home nutrition intervention aimed at increasing fruit and vegetable (F&V) intake among 4th grade children and their families.

Methods: Parents of 4th graders participating in a school nutrition program completed a written survey at baseline (N=1560). Logistic regression was used to calculate adjusted odds ratios (AOR) for predictors of eating meals together.

Results/Findings: As the number of children in the family increases, families are less likely to eat together (p=0.007). Parents who report not pushing the issue of F&V consumption with their children are less likely to eat meals together (p<0.0001). Families who eat fewer meals at home are less likely to eat together (p=0.03). The less frequently families engage in other activities together, the less likely they are to eat meals together (p=0.04). African Americans (p=0.0005) and families earning more than \$70,000 (p=0.0001) are more likely to eat meals together.

Conclusions: Increased number of children, parents not pushing the issue of F&V consumption, not eating at home, and not engaging in shared family activities were associated with less family meals together. These findings could inform the development of effective interventions aimed at increasing F&V intake among children and their families.

FORMATIVE ASSESSMENT OF HEALTH BELIEFS OF CHINESE-AMERICAN PARENTS OF PRESCHOOL-AGED CHILDREN

Debby Demory-Luce, Theresa Nicklas, Adriana Linares; Mona Ip; Thien Vu, Eugenia Tsuei; Hui-Jeng Jennifer Feng

Forty-eight parents (90% mothers and 10% fathers) of pre-school Chinese-American children participated in 12 focus groups conducted in English (33%), Mandarin (58%), or Cantonese (9%). All focus groups, each averaging 1-1/2 hours, were audio-taped and transcribed. Four major themes emerged following qualitative analysis: (1) definition of "health," (2) perception of a "healthy young child," (3) use of "yin/yang" or "heating/cooling" foods, and (4) beliefs about traditional and western medicines. Participants defined health as "balance," "full of youthful vigor," and "good diet." Parents perceived a healthy child to be "happy and curious," "not too thin or too fat," "sleeps well," and "has a good appetite." Majority of participants followed the yin and yang philosophy of food combinations taught by their elders. They stated that children need a "balance" of yin (cooling) and yang (heating) to avoid getting sick. Eating too much fried food (yang) caused a rash or nosebleed and children needed cooling foods (watermelon or green bean soup) to eliminate the rash or nosebleed. Various herbal mixtures, such as honeysuckle and seven star teas, were utilized to balance their children's bodies in order to prevent illness or to treat illness, such as coughs and colds. Parents used a combination of western and traditional medical practices. Reasons for using traditional medicines included: "herbs are natural, from the earth; and traditional medicines were gentler and slower acting than western medicines." Efforts aimed at understanding the eating habits of young Chinese American children need to consider traditional health beliefs of the parents.

PREDICTORS OF COMPLETION OF AN AT-HOME FAMILY NUTRITION INTERVENTION PROGRAM

Kathy F. Harrington, Maria Brown-Binns, Richard M. Shewchuk, Susan L. Davies, Frank A. Franklin

Purpose: To identify factors influencing completion of an at-home Family Nutrition Program in order to maximize completion rates in future family interventions.

Methods: 522 families of 4th graders participating in a school nutrition program participated in a 7 session at-home family intervention, *Family Fun Nites*, tailored to family types based on previously provided information. Families were invited to a Kick-off Nite (KON) dinner and program presentation, including a demonstration of a program recipe and game, at the school prior to beginning the program. Parent Peers were hired to contact families, inviting them to the KON and arranging to get materials to them if they were unable to attend. Six Intervention Coordinators (IC) supervised discrete groups of Peers in both initial and follow-up contact monitoring families' progress with the program. A multivariable logistic regression was run with program completion status as the dependent variable and KON attendance, IC and Peer assignment, and family type as independent variables.

Results/Findings: Over half the families completed all sessions, another 31% completed at least 1 session. KON attendance, IC and Peer assignments were all significantly associated with program completion ($p < 0.001$). Families were 4 times more likely [CI: (2.4, 6.8)] to complete the program if they attended KON than if they received their materials via the school. Specific Peers and IC assignment significantly influenced program completion.

Conclusions: The initial presentation of the program and the program staff contacting families are important predictors of completion of this intervention. Future interventions might maximize completion rates by strengthening these aspects of their program.

WHAT PREDICTS PHYSICAL ACTIVITY BEHAVIORS IN EARLY ELEMENTARY SCHOOL CHILDREN?

Christina D. Economos, Aviva Must, and Jeanne Goldberg

Interventions designed to increase physical activity in children must consider associated factors and how they predict and can potentially modify outcomes. The "BONES" Project is a multi-faceted intervention among race-ethnically diverse children. At baseline, potential correlates were studied in 415 children (217 M & 198 F, mean [SD] age = 7.1[0.7] yrs) to examine their relationship to participation in moderate-to-high (MET value > 2), and low (MET value ≤ 2) intensity activities. Correlates included age, gender, race-ethnicity, BMI z-score, sports participation, TV in the child's bedroom, and family activities. Children reported sports participation, family activities, and activity participation (using a pictorial card sort game). Weight and height were measured. A primary caregiver reported the remaining variables. On average, children spent 19.9 [10.4] hours weekly in sedentary activities and 36% participated in no sports. Fifty percent of children had a TV in their bedroom, 18% were overweight, and 28% reported doing active things with their family "a lot". BMI z-scores were higher in children who had a TV in their bedroom ($p = 0.014$). Sports participation and family activities positively predicted participation in moderate-to-high intensity activities ($R = .275$, $P = 0.001$) after controlling for age, gender, and race-ethnicity. TV in the bedroom and Hispanic descent positively predicted participation in low intensity activities ($R = .224$, $P = 0.05$) when controlling for age, gender and BMI z-score. These results help in our understanding of physical activity behaviors in young children and suggest that targeting family activity time, sports participation and removal of TV from children's bedrooms represent reasonable behaviour change targets.

THE RELATIONSHIP OF PHYSICAL ACTIVITY BETWEEN PAIRS OF PRE-SCHOOL CHILDREN AND MOTHERS BASED ON ACTIWATCH MONITORING

Richard Shewchuk, Richard M. Shewchuk, Frank A. Franklin, Kathy F. Harrington, Barbara Gower

Purpose: To examine the relationship of patterns of physical activity in pairs of urban African American Head Start pre-schoolers and their mothers using an Actiwatch monitor. Both individual and dyadic information can be used to direct intervention development.

Methods: Eight pairs of children/mothers were recruited to wear an Actiwatch monitor (accelerometer recording body movement) for eight consecutive 24-hour periods. BMIs were calculated for observed heights and weights. Mean physical activity levels for both mothers and children were calculated for varying time periods based on Actiwatch data. A correlation analysis between mothers' and children's physical activity was conducted for each of the varying time periods.

Results/Findings: The mean BMI for the children was 17.0 (SD = 1.9). Based on CDC growth charts, 25% of these children were considered obese. The mean BMI for mothers was 29.5 (SD = 5.2). Using similar tables, 43% of mothers were considered obese. Overall, the children were almost 3 times as active as the mothers. For weekday evenings, mothers and children showed an inverse relationship in their physical activity levels ($r = -.36$), with mothers being less active. Mothers' least active day was Sunday, which was the child's most active day. Children were least active during the Head Start class periods, with Tuesday being the least active day.

Conclusions: The Head Start day and its environment offer potential for increasing physical activity in pre-school children. Opportunities exist to increase mother-child dyadic activity for a population who is at risk for obesity and its related health issues.

Saturday, 5:30 PM
Poster Session 2C
School-based interventions
Panorama Room

ONE YEAR OUTCOME FINDINGS FOR THE EL PASO COORDINATED APPROACH TO CHILD HEALTH (CATCH)

Karen J. Coleman, Claire Lola Tiller, Christie L. Zunker, Jesus Sanchez, Candace D. Rutt and Edward M. Heath

Purpose: This study presents results for a one year follow-up evaluation of the institutionalization of the El Paso CATCH. Study participants were third grade children followed into fourth grade.

Methods: Height, weight, skinfolds, and performance on a 9 minute run were assessed during the 1999/2000 and 2000/2001 school years. Measures followed the national CATCH procedures, however all schools (control and intervention) from the El Paso CATCH evaluation were provided with their results.

Results: Complete body composition for 812 children and aerobic fitness for 779 children were obtained (9 – 12% attrition rate). Children were 93% Hispanic. All children improved their age-adjusted aerobic fitness from third to fourth grade. However, control schools had a greater increase in fitness as compared to intervention schools. This effect was especially pronounced for girls. Experimental schools were meeting or exceeding the recommendations for physical activity during PE by the end of the third grade year. This was also true for control schools, although their change was not evident until the beginning of the fourth grade year. Overweight prevalence increased for all fourth grade children, except intervention girls. Almost 50% of all fourth grade boys were either at risk for overweight or overweight as compared to 33% one year earlier.

Conclusions: Our findings support the importance of including attention/information control groups in community intervention assessments. In addition, EL Paso CATCH seems to be impacting girls' health more so than boys'. Results will be discussed with respect to qualitative and quantitative data collected to assess the fidelity of the intervention.

THE FACTORS RELATED TO ORGANISED AND NON-ORGANISED PHYSICAL ACTIVITY IN PREADOLESCENTS AND ADOLESCENTS ARE NOT THE SAME

Maarike Harro

The hypothesis of the study was that the factors related to the participation in school physical education (PE), organised physical activities (OPA; ie regular sport club activities) and non-organised physical activities (NOPA; ie running, cycling outdoors during free time) are not exactly the same.

Two groups of participants (n=1176) were studied with a cross-sectional study. The mean age of preadolescents (n=583) was 9.6±0.5 years and adolescents (n=592) 15.5±0.6 years. Self-reports were used to study the participation in PE, OPA, NOPA, and the determinants of physical activity (PA) – the frequency of encouragement to be active given by the parents and teachers, living near to friends with whom to go out and play sports, liking PA and having good expectations about the results of PA, and having the best friend who participates in OPA. Logistic regression was used to analyse the data.

The strongest predictor for participation in OPA was having the best friend who is involved in sports (OR= 1.85 to 5.10; 95%CI 1.02...10.27). Participation in NOPA was predicted by living near to friends with whom to go out to play sports (OR= 1.21 to 1.45; 95%CI 1.05..1.80). None of the factors studied predicted participation in school PE, except liking PA and having good expectations in adolescent girls (OR=1.21; 95%CI 1.09..1.34).

It can be concluded that there are differences in the determinants of different forms of PA and addressing specific determinants will probably increase the effectiveness of intervention programmes aiming to increase PA.

DESIGN AND EVALUATION OF AN INTERVENTION TO PROMOTE PHYSICAL ACTIVITY AND HEALTHY DIET AMONG ADOLESCENTS IN MORELOS, MEXICO

Bernardo Hernández, C. Hernández, L. Campero, F. Nava, R. García, N. Figueroa, A. Cruz, E.Lazcano

Purpose: to design, develop and evaluate an intervention to increase physical activity, reduce inactivity and promote healthy diet among adolescents in the State of Morelos, Mexico.

Design: Random intervention study.

Participants: 1,500 children attending middle school in 3 public schools of Cuernavaca, Morelos, Mexico, received the intervention. 500 children from 3 intervention schools and 729 from 3 control schools participated in the evaluation.

Methods: Teachers were trained to administer the 13 sessions of the intervention to adolescents over the school year. We measured time dedicated to physical activity and inactivity, diet, height, weight and triceps skinfolds at the beginning of the intervention, at the end of it, and 3 months later in adolescents receiving the intervention and in a control group. We compared the change in obesity, physical activity, inactivity and diet between intervention and control groups using GEE.

Results: At baseline, mean age of participants was 13.6 years old; 28% were classified as obese; children dedicated on average 1.15 h/day to physical activity and 4.12 h/day to TV viewing. There was no difference in the change in prevalence of obesity, diet or time dedicated to physical activity in intervention and control groups. Adolescents in intervention schools decreased time dedicated to TV viewing by 0.31 h/d, vs. 0.26 h/day of control schools. There was a significant ($p < .05$) difference in the reduction of time of video games use (-0.19 h/day in intervention vs. +.07 h/day in control).

Conclusions: The evaluation has a limited impact on inactivity of adolescents.

A PILOT STUDY TO TEST THE EFFECTIVENESS OF A THEORY DRIVEN, GOAL FOCUSED NUTRITION AND PHYSICAL ACTIVITY INTERVENTION FOR MIDDLE SCHOOL ADOLESCENTS

Mical Kay Shilts, Marcel Horowitz and Marilyn Townsend

Purpose: The use of goal setting has been shown to promote dietary behaviour change among adults, but has not been investigated with middle school aged adolescents.

The purpose of this pilot study was to investigate usefulness of data collection instruments, determine the sample size and clarify a protocol for a randomized controlled trial.

Methods: EatFit, an intervention driven by the Social Cognitive Theory, assists middle school adolescents in self-assessment and "guided goal setting" for dietary and physical activity behaviour change. Fifty 6th grade students from a rural middle school in Northern California participated in the EatFit intervention co-taught by the intervention developers. The pilot study design was a one group pre-test post-test design.

Findings: The evaluation instruments were designed to assess physical activity and dietary self-efficacy and behaviours targeted in the intervention. The instruments were cognitively tested and evaluated for content and face validity.

Thirty-four participants completed both pre and posttests (69%). Positive dietary and/or physical activity changes were made by 29% to 56% of participants depending on the variable. On average, participants made a .24 day (NS) improvement in their targeted dietary behavior. Students on average reported a decrease in dietary self-efficacy by -.118 (on a scale of 1-4) [NS]. Students improved their physical activity levels by .88 day ($p < .02$) and physical activity self-efficacy by .03 (NS). Based on these results, sample size was determined.

Conclusion: The results from this pilot study were used to implement a randomized controlled trial (n=137) investigating the effectiveness of goal setting (April 2002).

BASELINE NUTRITION AND PHYSICAL ACTIVITY KNOWLEDGE AND BEHAVIORS IN A MIDDLE SCHOOL OSTEOPOROSIS PROGRAM FOR GIRLS

Deanna M. Hoelscher, R.S. McPherson, S.H. Kelder and A. Hergenroeder

Dietary and activity patterns developed during youth contribute to peak bone mass; thus programs promoting calcium consumption and weight bearing physical activity should improve bone health, leading to a decrease in osteoporosis later in life. The Incorporating More Physical Activity and Calcium in Teens (IMPACT) study is a 2-year school-based health education program for girls to increase mean calcaneal Stiffness Index by promoting consumption of calcium-containing foods and physical activity. IMPACT was developed using Social Cognitive Theory and consists of behaviorally-based classroom lessons with physical activity and cafeteria environmental components. A total of 719 girls from 12 middle schools in Texas with a mean age of 11.8 ± 0.4 years were enrolled in the study, with 71.8% non-Hispanic white, 11.6% Hispanic, and 5.4% African-American. A baseline questionnaire assessed behaviors, knowledge and attitudes about calcium, physical activity and osteoporosis. Most girls were knowledgeable about dairy-based sources of calcium in foods, but more than 85% could not correctly identify weight-bearing activities. 87% of the girls reported that milk was available "all of the time" in their homes. Almost 70% of the cohort reported drinking 2 or fewer glasses of milk/day, while 64% reported engaging in jumping type weight bearing activities for 3 days a week or less. From these data, it appears that programs to promote bone strength in adolescent girls should focus on knowledge about the role of weight-bearing activities in bone health, as well as behavioral strategies that encourage increased milk consumption and participation in regular weight bearing activities.

DETERMINANTS OF PHYSICAL ACTIVITY IN OVERWEIGHT BLACK AND WHITE HIGH SCHOOL GIRLS

Dianne S. Ward, R. S. Saunders, M. Dowda, G. Felton, R. Dishman, R. R. Pate

Physical activity (PA) declines dramatically in girls between the elementary and high school years, with greater risk for inactivity observed in overweight or African American (AA) girls. In order to combat these observed declines in PA, an understanding of the correlates of PA is required. 1015 ninth grade girls (44.6% AA) from 12 control schools, participating in a school-based intervention, served as subjects. PA was measured using the 3DPAR (3 day Physical Activity Recall). In addition, fitness was measured by the Physical Work Capacity 170 test (PWC₁₇₀). All girls completed several questionnaires designed to measure hypothesized determinants of PA. Girls were divided into three weight groups based on the CDC BMI growth charts: normal weight (=85th %tile), At Risk for Overweight (85th-94th %tile), and Overweight (=95th %tile). Girls were further divided into Inactive and Active based on an average of one or more 30 min blocks of PA = 6 METS. Of the total subjects, 422 or 41.2% were classified as Active. Data were analysed using two-way (Weight x Activity) Mixed Model ANOVA, controlled for school and stratified by race. No significant differences were noted among weight groups for either White or AA girls. However, Social Support (AA), and Enjoyment of PE, Home Equipment and Sport Teams (White) approached significance. Weight-activity interactions were detected only for the AA girls with differences observed for Self-Efficacy ($p = 0.02$), Family ($p = 0.03$), and Enjoyment of PE ($p = 0.08$). Girls do not appear to differ in the perceived factors that influence PA based simply on weight status. However, activity correlates in girls may depend upon race, body weight and PA level.

Saturday, 5:30 PM
Poster Session 2D
Physical activity
Panorama Room

PREDICTING FINNISH AND U.S. COLLEGE STUDENTS' LEISURE TIME EXERCISE BEHAVIOR USING TRANSLATED MEASURES FROM THE TRANSTHEORETICAL MODEL

Bradley J. Cardinal, Kaisa J. Tuominen and Pauli Rintala

Even though the benefits of exercise are well documented, an international problem of physical inactivity exists. More research is needed to determine the potential causes of inactivity and to assist in creating effective interventions. One promising approach is that offered by the Transtheoretical Model. This model, however, has received limited cross-cultural attention, and, within the physical activity domain, measurement instruments are only available in English. The purpose of this study was to assess the reliability and predictive validity of exercise-related measures of decisional balance, cognitive processes of change, behavioral processes of change, self-efficacy, and temptation among Finnish ($n=168$) and U.S. ($n=169$) college students. All measures were translated from English to Finnish following the procedures outlined by Banville et al. Exercise behavior was assessed using the Weekly Leisure-Time Exercise Questionnaire. Within both the Finnish and U.S. samples, internal consistencies range from .62 to .91 for the measures. In a stepwise multiple regression, self-efficacy and the behavioral processes of change explained 26% of the variance in the participants' exercise behavior, with no unique contributions added by the participants' gender, nationality, age, or any of the other psychological variables assessed. As the Transtheoretical Model has proven useful in physical activity interventions in the U.S., it may now be possible for those in Finland to consider its application to the study of exercise behavior in their country. To facilitate this work, the translated scales developed in this study should provide a useful starting point.

FITNESS AND PSYCHOSOCIAL CORRELATES OF PHYSICAL SYMPTOMS IN OLDER ADULTS

Gerald J. Jerome, Steriani Canaklisova, David Marquez, Suzanne Ramsey and Edward McAuley

The purpose of the present study reports was to examine the relationships among fitness indicators, psychosocial function, and self-perceptions of physical symptoms in older adults. Participants ($N=42$) were primarily Caucasian (94%), female (64%) with a mean age of 67 years. Upon entry into a randomized controlled trial, participants completed a maximal graded exercise test, (VO_{2max}), a functional fitness battery, the Geriatric Depressions Scale (GDS), perceived stress, the Physical Self-Presentational Confidence Scale, and Cohen and Hoberman Inventory of Physical symptoms (CHIPS). Correlational analyses indicated that only one aspect (arm/back flexibility) of the six-component functional fitness battery was significantly related to physical symptom reporting. This and the other independent variables were entered into a hierarchical regression analysis to determine their independent contribution to the presence of physical symptoms. The overall equation was significant, $F(5, 34) = 10.175$, $p < .001$, $R^2_{adj.} = .54$. Greater self-presentational confidence ($R^2 = .13$, $p < .005$) and back/arm flexibility ($R^2 = .19$, $p < .001$) and lower perceived stress ($R^2 = .03$, $p < .10$) were associated with reduced reporting of problematic physical symptoms. The data support other work that has suggested psychosocial variables are important contributors to symptom reporting (e.g., Leventhal et al. 1996). However, a simple physical function measure such as back/arm flexibility appears to be of particular importance in the overall relationship and is suggestive that relatively simple physical activity interventions designed to enhance flexibility and tone may be important in alleviating negative physical symptom reporting. Subsequent data from this trial will be well placed to test this proposition.

THE INFLUENCE OF SELF-PERCEPTIONS ON EXERCISE BEHAVIOR

Susan S. Levy and Vicki Ebbeck

The purpose of this study was to examine the influence of global self-esteem on exercise behavior. The exercise self-esteem model (Sonstroem & Morgan, 1989) proposes that exercise behaviors are associated with global self-esteem via perceptions of physical acceptance, physical competence, and self-efficacy. To date, research has primarily focused on the role of perceptions of competence in this relationship, however, the influence of physical acceptance may be particularly important. A community sample of 180 adults completed questionnaires measuring global self-esteem (Adult Self-Perception Profile), physical acceptance (Body Esteem Scale), exercise competence (Physical Self-Perception Profile), exercise self-efficacy (Exercise Self-Efficacy Questionnaire), and exercise behavior (Leisure-Time Exercise Questionnaire). A one-way MANOVA was conducted for individuals reporting higher and lower levels of global self-esteem ($n = 95$). Those with the higher levels reported significantly higher perceptions of physical acceptance, exercise competence, exercise self-efficacy, and exercise behavior. Multiple regression analyses conducted for both subgroups revealed that self-perceptions explained 21% of exercise behavior ($p < .05$) for those with lower levels of global self-esteem, with physical acceptance making the greatest contribution. For those with higher levels of global self-esteem, self-perceptions explained 25% of the variance in exercise behavior ($p < .05$), with exercise self-efficacy making the greatest contribution. Support was found for the motivational influence of general and specific self-perceptions on exercise behavior. Moreover, physical acceptance and exercise self-efficacy appear to be most salient in the prediction of exercise behavior for those with lower and higher levels of self-esteem, respectively.