International Society of
Behavioral Nutrition and Physical Activity

# Fourth Annual Conference of the International Society of Behavioral Nutrition and Physical Activity (ISBNPA)

June 16-18, 2005
Amsterdam
The Netherlands

Program and Abstracts

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*Disclaimer. The editors cannot be held responsible for any typing or grammatical errors in the abstract texts. The texts are copied from the original abstract submissions and are not edited.*

## Word of the president

Greetings, and welcome to the annual meeting of the International Society of Behavioral Nutrition and Physical Activity! As you might know, we are the only international society dedicated to the study of key behaviors, eating and activity, implicated in major health outcomes all over the world. The meeting and program coordinators have been hard at work to produce a stellar program, with relevant content and both research and practice/policy presentations that are relevant to changing chronic disease outcomes for all of us. I know that you will find interesting, stimulating presentations that will add to your own research directions. Please take part in the sessions, find new ideas and collaborators, and make connections with other ideas and methodologies. Also, please take the time to soak up the culture, charm, and ideas of the people of Amsterdam, the most open and diverse city in the world.

We have had a busy year with the ISBNPA, a relatively new organization. We have increased our membership, stabilized our financial situation, and elected a new slate of officers for next year. We have plans for continuing our international reach, with this meeting. The main sessions reflect a broad group of scientists, with new research projects and findings from multiple countries and settings. This is the largest group of attendees ever at an annual ISBNPA meeting, reflecting the growing and sustained excitement about our field. We hope that we have captured some of that excitement at ISBNPA, and if you are not a member, we invite you to join us via our website. Please meet colleagues, exchange ideas, and have fun. Welcome to the annual meeting!

*Deb Bowen*
*ISBNPA President 2004-2005*

## Local organizers address

*Welcome to the Netherlands, welcome to Amsterdam,*

The International Society of Behavioral Nutrition and Physical Activity has gone overseas for the first time. After three annual meetings in North America, ISBNPA was ready to go to Europe and Amsterdam, the Netherlands, was chosen to host ISBNPA 2005. We are proud to host ISBNPA's 2005 annual meeting and we believe that ISBNPA made the right choice to pick the Netherlands to further confirm its international focus.
We have participants from at least 35 different countries at this fourth ISBNPA annual meeting, and we were able to invite scientists from most of these countries to present their paper or poster at the conference.
The local organizing committee was very thrilled that, in close cooperation with the program committee of ISBNPA, we were able to come up with a program that covers

- a broad range of nutrition behaviors, including fat, fruit, vegetables, fiber, dairy, fluid, and energy intake, as well as physical activity behaviors, such as walking, cycling, and sport activities
- studies on social epidemiology, behavioral determinants, and interventions
- different special interest groups, including people from lower socio-economic position groups, children and elderly people

I do hope that you are as excited about the program as we are and that you will enjoy an inspiring academic meeting here in Amsterdam.

This welcome address is on behalf of the local organizing committee, which is a partnership of five academic research centers: the Erasmus University Medical Center in Rotterdam, the VU Medical Center in Amsterdam, the Vrije Universiteit in Amsterdam, the Academic Medical Center of the University of Amsterdam, and Maastricht University. I believe that this partnership represents the strong and growing scientific field of behavioral nutrition and physical activity research in the Netherlands.

While in Amsterdam and the Netherlands, please enjoy the science, but also the practice of behavioral nutrition and physical activity. Amsterdam, as most other Dutch cities, is very good to walk, the Netherlands offers some of the best cycling opportunities in the world, and although we do not have a strong Dutch culinary tradition, our history of international trade has resulted in a very broad range of international cuisine.

I hope to meet many of you personally during ISBNPA Amsterdam 2005 and I wish you a fruitful and pleasant stay,

*Johannes Brug*
*Chair of the local Organizing committee*

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## Note of Welcome/Introduction from the Chair of the Membership Committee, International Society of Behavioral Nutrition and Physical Activity

Dear colleagues,

It is my pleasure to welcome you to the fourth annual meeting of the International Society of Behavioral Nutrition and Physical Activity (ISBNPA). We hope that you enjoy what promises to be a varied, topical and stimulating scientific program, thanks to the organizing work of the Program Committee – and to your valuable contributions through the submission of many interesting abstracts!

The International Society of Behavioral Nutrition and Physical Activity was formed in 2000 to address the professional interests of researchers from multiple disciplines engaged in investigating behavioral issues in nutrition and physical activity. ISBNPA has a membership of almost 400 individuals from over 25 countries. Our members come from academic and medical institutions, government agencies, industry and professional organizations. Members share an interest in advancing knowledge of behavioral issues relating to nutrition and physical activity.

Poor diet and sedentary lifestyles comprise two largely preventable risk factors that account for a vast proportion of the world's disease burden. The Society is uniquely positioned to contribute to efforts to reduce the global burden of disease, through facilitating the sharing and dissemination of behavioral physical activity and nutrition research internationally.

However, the success of the Society depends on your active participation! Members bring to this organization a diversity of experience and expertise which is vital for the Society's continued achievements. If you are not a member, please consider joining today! You can apply online at www.isbnpa.org.

The benefits of ISBNPA membership include:

- Free access to the on-line **Journal of Behavioral Nutrition and Physical Activity** - the official journal of ISBNPA and the premiere peer-reviewed publication for cross-cutting behavioral research in nutrition and physical activity
- Listing in ISBNPA's membership directory of professionals
- Opportunities for professional networking
- Reduced registration fees for the annual meeting
- Eligibility to vote for ISBNPA officers, hold offices in ISBNPA, and to participate in ISBNPA professional committees
- Opportunities to leverage advocacy and education issues involving research on behavioral aspects of nutrition and physical activity

If you are a member, we encourage you to join us at the annual business meeting, to speak up and to work with us to continue strengthening the Society.

I wish all participants an enjoyable meeting and many stimulating discussions with international colleagues.
Best wishes,

*Dr Kylie Ball, Chair ISBNPA Membership Committee*

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## PRECONFERENCE

### Wednesday June 15

| When | What | Who | Where |
|---|---|---|---|
| 10.00-16.00 | Executive committee meeting | Executive committee | To be announced |
| 13.15-14.00 | Registration<br>Pre-conference workshops | Conference Office | Registration Desk |
| 14.00-18.00 | Pre-conference workshops<br>1. Multilevel analysis | Frank van Lenthe – Erasmus MC, University Medical Center Rotterdam (NL) & Jos Twisk – VU University Medical Center (NL) | Keizerzaal |
| | 2. Applying theory in intervention development | Tom Baranowski – Baylor College of Medicine (USA), Johannes Brug - Erasmus MC, University Medical Center Rotterdam (NL), Gaston Godin – Université Laval (CAN) & Ken Resnicow – University of Michigan (USA) | Kleine zaal |
| 16.00 – 17.30 | Pre-registration | Conference Office | Lobby Best Western Hotel |

## CONFERENCE PROGRAM

### Thursday June 16 – morning

| When | What | Who | Where |
|---|---|---|---|
| 8.30-17.30 | • Registration | Conference Office | Registration Desk |
| 9.00-10.00 | • Information-desk for financial and registration issues<br>• Coffee & Tea | ISBNPA contact | Registration Desk<br><br>Coffee corners |
| 10.00-11.00 | • Opening; evaluation of last year and opening meeting | Deb Bowen, ISBNPA President – Fred Hutchinson Cancer Research Center (USA) | Grote zaal |
| | • Local organizers' address | Johannes Brug, Chair Local Organizing Committee - Erasmus MC,<br>University Medical Center Rotterdam (NL) | |
| | • Key-note 1:<br>Understanding the epidemic of obesity: the strengths and limits of epidemiology | Jaap Seidell, Vrije Universiteit Amsterdam (NL) | |
| 11.00-11.30<br>11.00-14.00 | • Coffee & Tea<br>• Poster session 1<br>(numbers 338-430) | - | Coffee corners<br>2nd Balcony Grote zaal |
| 11.30-13.00<br>*Parallel Symposia* | • Symposium I:<br>The role of family in children's physical activity and nutrition behaviors | Chair: Frank Franklin – University of Alabama at Birmingham (USA)<br>*Jane Wardle, Karen Cullen, Kirsten Frank Franklin, Davison & Eva Roos* | Fontys Hogeschool, Keizersgracht 105 |
| | • Symposium II:<br>Food and nutrition policy: the role of evidence in policy and practice | Chair: Mark Lawrence – Deakin University (AUS)<br>*Mark Lawrence, Timothy Armstrong, Mike Rayner & Heather Yeatman* | Grote zaal |
| | • Symposium III:<br>Strength and limitations of the stages of change model as applied to diet and physical activity | Chair: Stuart Biddle - Loughborough University (UK)<br>*Jean Adams, Ken Resnicow & Emely De Vet* | Keizerzaal |

## CONFERENCE PROGRAM

### Thursday June 16 – afternoon

| When | What | Who | Where |
|---|---|---|---|
| 13.00-14.00 | • Lunch<br>• Poster session 1 continued (numbers 338-430)<br>• Information-desk for financial and registration issues | <br>-<br><br>ISBNPA contact | Coffee corners<br>2nd Balcony Grote zaal<br><br>Registration desk |
| 14.00-15.30<br>*Parallel Paper sessions* | • Paper sessions 1: Environmental influences on diet and physical activity | Chair: Ilse de Bourdeaudhuij – Ghent University (B)<br>*Ilse de Bourdeaudhuij, Judith Weber, Sylvia Titze, Clare Hume, Cora Craig, May Wang & Billie Giles-Corti* | Grote zaal |
| | • Paper sessions 2: Physical activity and disease prevention | Chair: Patricia van Assema – Maastricht University (NL)<br>*Sarah McNaughton, Diane King, Jean-Michel Oppert, Bente Wold, David Dunstan & Patricia van Assema* | Fontys Hogeschool, Keizersgracht 105 |
| | • Paper sessions 3:<br>a) The psychology of weight loss<br><br>b) Awareness of diet and physical activity | Chair 3a: Anita Jansen - Maastricht University (NL)<br>*Anita Jansen, Remco Havermans & Sandra Mulkens*<br>Chair 3b: Lillian Lechner – Netherlands Open University (NL)<br>*Lillian Lechner, Ingrid Steenhuis & Anke Oenema* | Keizerzaal |
| 15.30-16.30<br>15.30-18.00 | • Coffee & Tea<br>• Poster session 2 (numbers 433-518) | | Coffee corners<br>2nd Balcony Grote zaal |
| 16.30-17.30 | • Key-note 2 | Nico Pronk, HealthPartners Research Foundation (USA) | Grote zaal |
| 17.30-18.00 | • Poster session 2 continued (numbers 433-518) | - | 2nd Balcony Grote zaal |
| 17.45-18.00<br>18.00-19.00 | • Boarding<br>• Boat ride to City Hall | | In front of Rode Hoed<br>Amsterdam Canals |
| 19.00-20.00 | • Opening reception | | City Hall Amsterdam |

## CONFERENCE PROGRAM

### Friday June 17, morning

| When | What | Who | Where |
|---|---|---|---|
| 8.30-17.30 | • Registration | Conference Office | Registration Desk |
| 8.00-8.30 | • Coffee & Tea | | Coffee corners |
| 8.30-9.30 | • Key-note 3:<br>Applying theories to improve interventions | Gerjo Kok – Maastricht University (NL) | Grote zaal |
| 9.30-11.00<br>*Parallel Symposia* | • Symposium IV:<br>Measuring objective environmental characteristics of physical activity and nutrition: an international perspective | Chair: Frank van Lenthe - Erasmus MC, University Medical Center Rotterdam (NL)<br>*Sally MacIntyre, Katrina Giskes, Anna Ellaway, Paula Santana & Anna Timperio* | Grote zaal |
| | • Symposium V:<br>Intermediaries and settings for diet and physical activity | Chairs: Willem van Mechelen – VU University Medical Center (NL) & Gert-Jan Hiddink – Dutch Dairy Foundation (NL)<br>*Mireille van Poppel, Esther van Sluijs, Sonja van Dillen, Nico Pronk, Laura Bouwman & Michelle Fortier* | Fontys Hogeschool, Keizersgracht 105 |
| | • Symposium VI:<br>Hydration and fluid consumption related and influenced by biological, behavioral, cultural, and psychosocial factors. | Chair: Ann Grandjean – Center for Human Nutrition (USA)<br>*Ann Grandjean, Ron Maughan & Maxime Buyckx* | Keizerzaal |
| 11.00-11.30<br>11.00-14.00 | • Coffee & Tea<br>• Poster session 3<br>(numbers 520-596) | - | Coffee corners<br>2nd Balcony Grote zaal |
| 11.30-13.00<br>*Parallel Symposium and Paper sessions* | Symposium VII:<br>Physical activity in obesity management and prevention | Chair: Willem van Mechelen – VU University Medical Center (NL)<br>*Adrian Bauman, Jean-Michel Oppert, Philip James & Willem van Mechelen (Physical Activity Task Force)* | Grote zaal |
| | Paper session 4:<br>Community intervention to change diet and physical activity | Chair: Beverly McCabe-Sellers – United States Department of Agriculture (USA)<br>*Gitte Kloek, Bernestine McGee, Beverly McCabe-Sellers, Edith G. Hyman, Lisa Gibbs, Cristina Caperchione & Jeanne Goldberg* | Keizerzaal |
| | Paper session 5:<br>Nutrition in young people | Chair: Elling Bere – University of Oslo (N)<br>*Shawn Somerset, Michelle Share, Martha Kubik, Ronald Iannotti, Somchai Durongdej, Elling Bere & Michelle Markesteyn* | Fontys Hogeschool, Keizersgracht 105 |

## CONFERENCE PROGRAM

### Friday June 17, afternoon

| When | What | Who | Where |
|---|---|---|---|
| 13.00-14.00 | • Lunch<br>• Poster session 3 continued (numbers 520-596)<br>• Meeting Early Career Investigators (included lunch)<br>• Meeting Editorial Board ISBNPA Journal (included lunch) | - | Coffee corners<br>2nd Balcony Grote zaal<br><br>Kleine zaal<br><br>Banningzaal |
| | • Information-desk | ISBNPA contact for financial and registration issues | Registration desk |
| 14.00-15.30<br>*Parallel Symposia* | Symposium VIII:<br>Socio-economic differences in diet and physical activity | Chairs: Karien Stronks – Amsterdam Medical Center (NL) & Sally MacIntyre – Medical Research Council (UK)<br>*Kylie Ball, Frank van Lenthe & Martin Lindström* | Grote zaal |
| | Symposium IX:<br>The effects of computer-tailored interventions to promote healthy diets and PA | Chair: Anke Oenema - Erasmus MC, University Medical Center Rotterdam (NL)<br>*Marci Campbell, Ilse De Bourdeaudhuij, Alison Marshall, Anke Oenema & Jane Bradbury* | Fontys Hogeschool, Keizersgracht 105 |
| | Symposium X:<br>Prevention of overweight:<br>The NHF-NRG study | Chair: Stef Kremers – Maastricht University (NL)<br>*Stef Kremers, Astrid Nooyens, Gert-Jan de Bruijn, Lydia Kwak, Amika Singh & Tommy Visscher* | Keizerzaal |
| 15.30-16.30<br>15.30-18.00 | • Coffee & Tea<br>• Poster session 4 (numbers 597-694) | | Coffee corners<br>2nd Balcony Grote zaal |
| 16.30-17.00 | • Key note 4:<br>Food, nutrition, physical activity and the prevention of cancer: the second World Cancer Research Fund report | Martin Wiseman, World Cancer Research Fund (UK) | Grote zaal |
| 17.00-18.00 | • Poster session 4 continued (numbers 597-694) | | 2nd Balcony Grote zaal |
| 17.00-18.00 | • Business meeting | Chair: Deb Bowen - Fred Hutchinson Cancer Research Center (USA) | Grote zaal |
| 18.00-19.30 | • Invited WCRF reception | On invitation only | Reception area<br>Rode Hoed |

## CONFERENCE PROGRAM

### Saturday June 18 - morning

| When | What | Who | Where |
|---|---|---|---|
| 8.00-8.30 | • Coffee & Tea | | Coffee corners |
| 8.30-9.30 | • Key-note 5:<br>Sedentary behavior is not physical inactivity | Jo Salmon - Deakin University (AUS) & Stuart Biddle - Loughborough University (UK) | Grote zaal |
| 9.30-11.00<br>*Parallel Symposia* | • Symposium XI:<br>Habits and reasoned actions in diet and physical activity | Chair: Wendy Rodgers – University of Alberta (CAN)<br>*Bas Verplanken, Johannes Brug, Terra Muray, Stef Kremers & Mark Conner* | Kleine zaal |
| | • Symposium XII:<br>Diet, physical activity and the elderly | Chair: Willem van Mechelen – VU University Medical Center (NL)<br>*Abby King, Jonine Jancey, Jannique van Uffelen, Marijke Chin A Paw & Margaret Lumbers* | Keizerzaal |
| | • Symposium XIII:<br>Pro Children: a study across Europe to explain and promote fruit and vegetable intakes in primary school children | Chair: Knut Inge Klepp – University of Oslo (N)<br>*Ilse De Bourdeaudhuij, Pernille Due, Camilla Sandvik, Carmen Pérez - Rodrigo & Marianne Wind* | Grote zaal |
| 11.00-11.30<br>11.00-14.00 | • Coffee & Tea<br>• Poster session 5<br>(numbers 695-783) | - | Coffee corners<br>2nd Balcony Grote zaal |
| 11.30-13.00<br>*Parallel Paper sessions* | • Paper session 6:<br>Physical activity interventions in young people | Chair: Deanna Hoelscher – University of Texax, School of Public Health (USA)<br>*Carolyn Johnson, Salome Kruger, Lise Kjonniksen, Deanna Hoelscher, Anne Haase, Leen Haerens & Norimah Karim* | Grote zaal |
| | • Paper session 7:<br>Weight loss interventions | Chair: Pedro Teixeira - Technical University of Lisbon (P)<br>*Robert Jeffery, Caroline Horwath, Simone Lemieux, Pedro Teixeira, Marieke van Wier, Jennifer Linde & Birgitte Wammes* | Kleine zaal |
| | • Paper session 8:<br>Special interest groups | Chair: Katrina Giskes - Erasmus MC, University Medical Center Rotterdam (NL)<br>*Martin White, Karen Hosper, Victoria Inglis, Dawn Wilson, Stephanie Jilcott, Patrick Casey & Katrina Giskes* | Keizerzaal |

## CONFERENCE PROGRAM

### Saturday June 18 – afternoon

| When | What | Who | Where |
|---|---|---|---|
| 13.00-14.00 | • Lunch<br>• Poster session 5 continued (numbers 695-783) | | Coffee Corners<br>2nd Balcony Grote zaal |
| 14.00-15.00 | • Closing<br>o Price winners' ceremony<br>o Introduction new president<br>o Closing remarks<br>o Introducing next year's conference | Chair: Gaston Godin - Université Laval (CAN)<br><br><br><br>Ronald Kleinman - Harvard Medical School (USA) | Grote zaal |

## EXTRA

**Post-conference workshop 15.00 – 17.30 hours (max. 50 participants)**

| | | |
|---|---|---|
| • Meeting International Physical Activity and the Environment Network (IPEN) | Chairs: Nevil Owen – The University of Queensland (AUS) & Ilse DeBourdeaudhuij – Ghent University (B) | Kleine zaal |

# KEYNOTES

## Thursday, June 16

10.00-11.00 - Grote zaal

### K1 Understanding the epidemic of obesity: the strengths and limits of epidemiology

*Jaap Seidell - Vrije Universiteit Amsterdam, The Netherlands*

Cost-effective prevention strategies to prevent weight gain and the development of obesity should be based on appropriate knowledge on the determinants of weight gain. The body of evidence of dietary determinants of weight gain is, however, fragmentary at best partly because inappropriate research methods are used to study the determinants of obesity under normal circumstances. Evidence from results of studies using experimental diets have shortcomings because of their short duration, selection of highly motivated subjects and the outcomes can be easily influenced by the choice of foods to be used in the intervention. Of the observational studies many have severe methodological shortcomings such as ecological studies, cross-sectional surveys and classical cohort studies in which baseline diet is linked to subsequent weight development over long periods of time. Longitudinal studies with repeated measurements in which changes in diet and physical activity are linked to changes in weight are probably the most informative but these are relatively rare.
There is a great interest in interventions that are effective and efficient for the prevention of obesity. In many countries and research funding agencies there seems to be a strong tendency to develop these for children and adolescents exclusively. It can be easily shown, however, that intervention programmes are much more likely to be cost-effective in older adults than in children and this indicates that adults should not be neglected as target populations for obesity prevention. Obesity prevention should follow a life-course approach as currently recommended for noncommunicable diseases in general by the World Health Organization.

16.45-17.30 - Grote zaal

### K2 Cost-effectiveness of worksite interventions to promote healthy diets and PA

*Nico Pronk - HealthPartners Research Foundation, USA*

**Purpose:** The aim of this presentation is to describe the evidence of cost-effective interventions for diet and physical activity for the worksite setting.
**Background:** Many worksite health programs strive to improve employee health and productivity and, thereby, save the company money. Cost-effectiveness analyses (intervention A achieves the same outcome as intervention B but at lower cost) and cost-benefit analysis (more money is gained on the intervention than is spent) are two tools to determine if indeed money is saved.
**Method/key points:** Data will be presented from systematic reviews but will also include results from pre-post studies and other literature on this topic. Additional information will be presented that describes effectiveness of worksite interventions on return on investment data that is typically used by employers for investment decisions.
**Conclusions:** Despite an apparent lack of strong evidence, a growing body of consistent findings supports the notion that worksite-based interventions for diet and PA are a good value.

## Friday, June 17

8.30-9.30 - Grote zaal

### K3 Applying theories to improve interventions

*Gerjo Kok - Maastricht University, The Netherlands*

The practice of health promotion, for instance: promoting a healthier diet, involves three major program planning activities: conducting a needs assessment, developing and implementing a program, and evaluating the program's effectiveness. Over the last 25 years, significant enhancements have been made to the conceptual base and practice of health education and promotion, especially in needs assessment, program evaluation, adoption and implementation, and the use of theory. However, the health education community has been slow to specify the processes involved in applying theories to program design and development.
Intervention Mapping is presented in this presentation as an additional tool for the planning and development of health education and promotion programs. It serves as a way to map the path of intervention development from recognition of a need or problem to the identification and testing of potential solutions. The steps and tasks included

in Intervention Mapping provide a framework for making and documenting decisions about how to influence change in behavior and environmental conditions to promote health and to prevent or improve a health problem. This documentation provides a means to communicate to everyone involved in the process a logical and conceptual basis for how the intervention is intended to work to make change possible. The level of specificity included in each of the products of Intervention Mapping enhances the possibility that a planned program will be effective in accomplishing its goals and objectives. In addition, by making explicit the pathways and means by which change is expected to occur and by examining the assumptions and decisions made in each step and task of the Intervention Mapping process, program planners, users, and participants can better explain why a program succeeds or fails. Intervention Mapping will be demonstrated with examples on nutrition interventions

**16.30-17.00 - Grote zaal**

## K4 Food, nutrition, physical activity and the prevention of cancer: the second World Cancer Research Fund report

*Martin Wiseman – World Cancer Research Fund, UK*

Chronic non-communicable diseases are the leading causes of death and disability in high income countries, and increasingly so in middle and low income countries worldwide. Current recommendations for health, focus on increasing consumption of fruits and vegetables, and unrefined carbohydrates, reducing the proportion of energy from fat especially saturates, lowering salt, and increasing physical activity. Achieving these outcomes requires an understanding of effective means of generating and maintaining desirable behavioural changes. In 1997 the World Cancer Research Fund (WCRF) published its landmark report Food, nutrition and the prevention of cancer: a global perspective. This has become the most authoritative statement on the relationship between food and nutrition and the development of cancer. WCRF has now started the process of producing a second report, in view of the considerable evidence that has accrued over the intervening time, and of the recognition of the need for more robust techniques for reviewing and synthesising the literature. The second report, due for publication in 2007, will be based upon a series of systematic reviews of the relationship between food, nutrition and physical activity and cancers at several sites. These reviews will follow a new methodology developed by WCRF with expert advice specifically for this purpose, in the absence of other appropriate tools. A new feature of this report will be a formal review of the determinants of food, nutrition and physical activity patterns, at the individual, community and national/international level, as well as review of the effectiveness of interventions. These and other innovations will maintain the second WCRF Expert Report as the leading authority in this area.

# Saturday, June 18

**8.30-9.30 - Grote zaal**

## K5 Sedentary behavior is not physical inactivity

*Jo Salmon - Deakin University, Aus; Stuart Biddle - Loughborough University, UK*

**Purpose:** The terms physical inactivity and sedentary behavior are often used interchangeably. This Keynote Debate will consist of more than just semantics. The following questions will be debated: How can we conceptualise sedentary behavior? Is television viewing an important indicator of inactivity and health?
**Background:** With increases in overweight and obesity among children in developed and industrialised nations, and increases in the incidence of type 2 diabetes and other lifestyle diseases among adults, it is frequently argued that sedentary behavior plays a key role in these health conditions.
**Key points:** (1) To argue that physical inactivity and sedentary behavior are not the same thing; (2) to debate the importance of television viewing as a key sedentary behavior.
**Conclusions:** The speakers in this debate will support their arguments with examples from original research. We will examine whether those who are physically active can also be 'couch potatoes' and be at risk of chronic health conditions or disease risk factors such as overweight or obesity, impaired glucose tolerance and type 2 diabetes.

## Notes

## Notes

## Thursday, June 16 – 11.30-13.00 – Fontys Hogeschool

## Symposium I: The role of family in children's physical activity and nutrition behaviors

Chair: Frank Franklin

### I-1 The diets of mother-child dyads: analysis of aggregation and intervention efficacy

*Frank Franklin, Richard Shewchuk - University of Alabama at Birmingham (UAB)*

**Purpose:** To define determinants responsible for dyadic dietary aggregation and differences in these determinants between dyads and methods to develop and test targeted home-based interventions to improve dyadic diets
**Methods:** and results: Barriers and facilitators that related to family fruit and vegetable intake (FVI) and general family interactions (cohesion, monitoring and shared activities) defined four family groups differing on food competency (active vs. passive orientation toward FVI) and family interaction. Higher barriers and lower family interactions related to higher mother and child BMI and lower mother and child FVI. However, FVI did not directly influence BMI. At one-year follow-up, a combined school and home, minimally targeted intervention increased facilitators and child and parent FVI, but did not alter barriers or family interaction. Maternal intention to adopt a facilitator was partially responsible for the intervention effect suggesting a causal chain of facilitator-intentionality-FVI. Intentionality had an indirect effect on child FVI via mother FVI and maternal FVI had a direct effect on child FVI. The intervention had both a direct influence on child FVI and through mother FVI.
**Conclusions:** Analyzing dyadic relationships is important for developing, targeting, delivering and analyzing the efficacy and differential responsiveness to interventions. Targeted home-based interventions that enhance facilitators and family interactions and reduce barriers to FVI may improve dyadic FVI and BMI, may be cost effective and may have multiplicative benefits to reduce cancer, diabetes and cardiovascular disease.

### I-2 Parental feeding style and children's weight

*Jane Wardle - University College London*

**Background and purpose:** Parental control over children' s eating has been has been implicated both as a causal factor in weight gain and a protective factor against the 'obesogenic' environment. This paper examines the evidence that parental feeding styles are causally linked with obesity risk.
**Key points:** The evidence is mixed. Ecological studies indicate that greater parental control is associated with lower obesity rates. Behaviour genetic research estimates the impact of shared family environment without the need to assess family functioning directly. The results indicate little shared environmental effect on weight, except for one study in young twins, therefore, insofar as feeding style is a shared family phenomenon, its effects are likely to be limited. Cross-sectional community studies have produced varied outcomes, with some finding a negative association between parental control and BMI, some no association, and others positive. Our longitudinal data suggest a modest negative association between control and weight gain. The most informative research design is to modify feeding styles and assess the effect on weight. Behavioural treatments for childhood obesity provide a possible test, but none have directly assessed parental control. We have pilot data from a behavioural treatment program which shows increases in parental control and decreases in children's overeating in parallel with decreases in weight.
**Conclusions:** The evidence suggests the effects of parental control may be mixed, but at least some types of control are probably beneficial. Additional work is needed to distinguish types and intensities of control and to include experimental studies.

### I-3 Family environmental influences on children's eating behavior

*Karen Cullen - Children's Nutrition Research Center*

Parents can influence children's dietary behaviors within the home family environment. This presentation will review current research identifying family environmental influences on eating, and how these influences can be used in targeted interventions. For example, the foods available in both home and outside-the-home environments (e.g., restaurants) reflect family choices and can facilitate or inhibit consumption. Parents are the gatekeepers of the home food supply and if specific foods are not purchased and brought into the home (e.g., fruit and vegetables), children will not have access to them. The choice of a restaurant, and the guidance given about food selection in a restaurant (e.g., large portions, fried foods) also influence consumption. Parents prepare foods in the home and specific cooking or other food preparation practices can influence consumption. Children watch and mimic parental behaviors, including eating behaviors. Parents have an important responsibility as role models for their children, even in area of food. Parental influences begin with infant feeding experiences and children's first foods and continue throughout

the school years. During these years of growth and development, there are many opportunities for interventions to promote healthy eating behaviors.

## I-4 Fostering active lifestyles among children: what makes this role difficult for parents and are there ethnic differences in barriers experienced?

*Kirsten Davison, Glenn Deane - University at Albany (SUNY)*

**Purpose:** To identify barriers that parents experience in encouraging their children to be physically active and to examine ethnic differences in barriers reported.
**Methods:** 75 parents (38 White, 31 Black, 6 other) of elementary-aged children participated in qualitative interviews in groups of 5-8 people. Nominal Group Process was used to identify the key barriers experienced by parents. This information was used to develop the Parents Perceived Barriers Scale, which was mailed to all parents. Exploratory Factor Analysis, guided by Constraints Theory, was used to examine the factor structure of the scale.
**Results:** Consistent with Constraints Theory, three sources of constraint were identified including structural barriers (e.g., lack of facilities in neighborhood, affordability of activities, weather), interpersonal barriers (i.e., no children nearby to play with, conflicting family roles), and intrapersonal barriers (e.g., parent lack of energy, child preference for other activities). Ethnic differences in parents' perceived barriers were most notable for structural barriers. Black parents reported greater barriers due to lack of affordability and concerns about safety, whereas white parents reported greater barriers due to lack of accessibility to parks and playgrounds in their neighborhood. Key barriers experienced by black parents were no longer present after controlling for income. Barriers experienced white parents were independent of income.
**Conclusions:** Barriers experienced by black parents may reflect a lack of financial resources. In contrast, barriers experienced by white parents may reflect the neighborhood in which they live. Intervention programs should cater to the different needs of white and black parents.

## I-5 Does parenting style explain socioeconomic differences in vegetable consumption among male and female adolescents?

*Eva Roos - Folkhälsan Research center; Ossi Rahkonen - University of Helsinki; Sakari Karvonen - National Research and Development Centre for Welfare and Health*

New explanations are needed to understand the association between socioeconomic status and diet. The aim was to examine whether parenting style could explain socioeconomic differences in vegetable consumption among male and female adolescents.
The study was based on data from a school-based survey carried out in 1998 among 15-year old pupils in Helsinki (n=2388). Daily consumption of raw vegetables was examined. Socioeconomic status was indicated by father s educational level. Parenting style was estimated by an eight-item Parental Bonding instrument (PBI) and with a question about family meals. PBI includes two dimensions, parental care versus rejection and parental control versus autonomy. Family meal indicated whether the adolescent had a cooked dinner at home together with the family. Multivariate logistic regressions were used in the analyses.
A clear positive association between educational level of the household and daily consumption of raw vegetables was found among both males and females. A caring parenting style and family meal pattern explained a part of the association among males. Among females the association was strengthened when adjusted for parenting styles. Males who perceived having caring parents and who shared dinner with the family consumed more often daily vegetables than other males. Females who came from a household with higher educational level, who perceived higher autonomy and who shared dinner with the family consumed more often daily vegetables than other females. Parenting styles appears to contribute to the vegetable consumption among males, but both socioeconomic status and parenting style among females.

## Notes

## Notes

## Thursday, June 16 – 11.30-13.00 – Grote zaal

## Symposium II: Food and nutrition policy: the role of evidence in policy and practice

Chair: Mark Lawrence

### II-1 Analysing health claims policy in australia: a case study of evidence in food and nutrition policy-making

*Mark Lawrence, Anthony Worsley - Deakin University*

**Purpose:** Health claims generally describe an association between a food product and a health outcome. There is debate whether health claims promote or obstruct healthy food selection behaviour. This study investigates the role of evidence in food and nutrition policy-making. The research question is how and why was health claims policy made in Australia? The research is innovative in its critical analysis design and its focus on building theory to help improve food and nutrition policy-making processes and outcomes.
**Methods:** A case study design was adopted in which events, stakeholders and issues associated with the policy review were described from data generated from interviews and documentary sources. A content-analysis tool is being used to critically analyse textual data. Concepts in the text are being identified and relationships among the policy concepts, stakeholders and processes are being mapped.
**Findings:** The analysis of data associated with the policy review is revealing a pattern of relationships among stakeholders, processes and concepts around shared values, beliefs and interests towards food and health. Broader food regulation contexts have influenced the decision-making environment. The pattern of relationships shares common characteristics with Sabatier's 'Advocacy Coalition Framework' theoretical explanation of policy-making.
**Conclusions:** The study findings have implications for health claims policy and practice in Australia. As a case study of evidence in food and nutrition policy-making, this research highlights the role of competing interests, beliefs and values in evidence interpretation. Challenges are identified in undertaking food policy research.

### II-2 Developing food and nutrition policies: challenges associated with the policy making process

*Timothy Armstrong - World Health Organization; Amalia Waxman - formerly World Health Organization*

A few preventable risk factors account for a large proportion of the global disease burden. Significant changes in diets and physical activity are resulting in a transition in disease burden from infectious/communicable diseases to chronic/noncommunicable diseases.
This transition has led the World Health Organization (WHO) to intensify its efforts on prevention of chronic diseases and their risk factors over the past five years.
This culminated in the 2003 adoption of the Framework Convention on Tobacco Control and the 2004 adoption of the Global Strategy on Diet, Physical Activity and Health (DPAS). The development of these policy tools generated intense political debate that shaped the final outcome.
Development of DPAS involved intensive consultations with WHO Member States, UN agencies, the private sector and nongovernmental organizations. This multistakeholder input enriched DPAS, but also posed serious political challenges to its formulation and adoption. Evidence of the growing chronic disease burden was critical in showing the need for this work at the global level.
Still, the evidence base for setting upper limits for population nutrient intake goals was challenged by agriculture producers, food and drink manufacturers, and some government agencies. Interventions addressing environmental influences on individual dietary and physical activity patterns were also challenged.
In order to ensure the development of a comprehensive strategy for Member States, WHO was required to intensify it advocacy efforts, and address research questions traditionally outside its immediate competency.
The political spotlight illuminated the evidence of the global toll of chronic diseases, as well as the need for strong evidence and effective interventions as WHO moves forward to prevent and control chronic disease morbidity and mortality.

### II-3 Evidence and values in the good food/bad food debate

*Mike Rayner, Peter Scarborough - University of Oxford*

**Purpose:** The aims of this paper are to review the status of the 'good food/bad food' debate, to examine the role of evidence and values in this debate and to explore how a resolution to the debate might impact upon food and health policy.

**Background:** It has long been held axiomatic that there are no good or bad foods just good and bad diets. The truth or otherwise of this axiom depends on the meaning of 'good' and 'bad'. Both terms - when applied to foods or diets - have a variety of meanings. All these meanings incorporate value judgments to some degree.
**Methods/Key points:** Work in developing food based dietary guidelines has suggested that it might be possible to identify foods which are more or less likely to contribute to a diet that meats nutritional guidelines. Work we have recently carried out on behalf of the Food Standards Agency in the UK in relation to the promotion of foods to children indicates that it is possible to develop quantitative criteria for defining 'healthy' and 'unhealthy' foods as subjectively (qualitatively) perceived by nutrition professionals. These parallel strands of work will be reviewed and their implications explored.
**Conclusions:** There appears to be Kuhnian paradigm shift in thinking about good and bad foods driven partly by the needs of public healthy policy in relation to the advertising of food to children, the regulation health and nutrition claims for foods, the taxation/subsidization of foods for health reasons, etc.

## II-4 Food policy : translating research into practice

*Heather Yeatman - University of Wollongong*

**Purpose:** To provide behavioural scientists with some practical ideas for influencing the policy agenda which in turn will support their programs.
**Background:** Food policy research at local and national levels can provide useful guidance to practitioners about establishing, influencing and supporting healthy public policy.
**Methods / key points:** Food policy research will be reviewed from the local and national levels. Surveys, case studies, interviews and document analysis have all been applied to increase understanding of the policy development process. Locations for food policy have included organisations such as private companies and schools, local governments and national government departments and organisations. The range of issues addressed includes occupational lifestyle programs, institutional food services, initiatives that address access and equity issues, service provision and regulation. Research into the development and implementation of these policies identifies that a range of theoretical frameworks may be relevant, including organisational change, theories of agenda setting, policy coalitions, citizenship and the role of experts. This paper will outline these different theoretical frameworks with a view to assisting practitioners to understand the policy process and how they may influence it.
**Conclusions:** By examining food policy across levels, it is clear that public health practitioners can become skilful at influencing the process in a timely manner and at the appropriate level. Acting local may bring about short term benefits but injecting local into national and global policy achieves longer term health benefits.

## Notes

## Notes

## Thursday, June 16 – 11.30-13.00 – Keizerzaal

## Symposium III: Strength and limitations of stages of change models as applied to diet and PA

Chair: Stuart Biddle

### III-1 A stages of change approach to socio-economic variations in health and health related behaviours

*Jean Adams - University of Newcastle upon Tyne*

**Purpose:** To explore the association between socio-economic position (SEP) and stage of change for health related behaviours.
**Background:** There is evidence of socio-economic variations in response to non stage-based health promoting interventions with more affluent individuals responding better than more deprived individuals. As these interventions tend to take action-orientated approaches, this may be because more affluent individuals tend to be in more advanced stages of change than more deprived individuals.
**Methods/key points:** We performed an initial scoping review of published data of the relationship between SEP and pre-intervention stage of change. We found 21 relevant reports including data on 30 samples and 188 850 individuals on SEP and stage of change. Behaviours covered included physical activity, diet, adoption of screening and smoking cessation. Significant variations in the distribution of the stages of change were found according to markers of SEP in 16 (53%) reports representing 171 183 (91%) individuals. In all cases, these variations were in the expected direction.
**Conclusions:** Published data reveals that more affluent individuals tend to be in more advanced stages of change pre-intervention. This may explain reported socio-economic variations in uptake of health promotion interventions. The stages of change model has been criticised for its failure to take cultural and socio-economic factors into account. If stages of change for health related behaviours are consistently socio-economically distributed, interventions that are not only stage specific, but also SEP-specific, may be required to achieve sustained behavioural change.

### III-2 Strengths and limitations of the stages of change model as applied to diet and physical activity

*Ken Resnicow - University of Michigan*

This presentation will provide a conceptual and empirical examination of the validity and utility of the Transtheoretical Model (TTM) to understand and modify fruit and vegetable intake. Using data from two randomized trials conducted in the US, we examine the association between baseline stage of change and behavior change outcomes. Specifically, we examine among African American adults who participated in the Eat for Life and Healthy Body Trials, whether precontemplators responded differently over time than those in the preparation stage, a group assumed to be more likely to change their behavior. In both studies, stage of change, Fruit and vegetable (F &V) intake (by food frequency questionnaires) and psychosocial variables were assessed at baseline and 1-year followup. In both studies, individuals initially classified as precontemplators (PCs) reported an increase in F & V intake as large as those in the preparation stage and PCs= posttest intake was equivalent to those in preparation. PCs= change in psychosocial outcomes was also as large or larger than those in the preparation stage. At least with regard to fruits and vegetables, these findings raise questions regarding the validity of stage of change, one element of the Transtheoretical Model, as a predictor of future behavior and intervention response. For several reasons, TTM, and in particular stage of change, may not be as relevant to changing F & V intake compared to behaviors such as smoking.

### III-3 The validity of the transtheoretical model applied to fruit intake

*Emely De Vet, Jascha De Nooijer, Nanne K. De Vries - Universiteit Maastricht; Johannes Brug - Erasmus University Medical Center*

**Purpose:** Stages of change models are only valid and useful if stage specific transition determinants can be identified and when interventions can effectively be matched to stage of change. To test the validity of the Transtheoretical model (TTM) applied to fruit intake, a longitudinal cohort study and a randomized control trial were conducted.
**Methods:** To examine predictors of stage transitions for fruit intake, a cohort of 735 adults completed electronic questionnaires measuring fruit intake, stage of change, pros, cons, self-efficacy and processes of change three times with two 53-day intervals. To test whether a stage-matched intervention produced more stage progress and higher fruit intake than a stage-mismatched intervention, in a pretest-posttest design, 775 precontemplators and contemplators were randomly assigned to computer-tailored precontemplation-matched, contemplation-matched

or action-matched feedback targeting TTM components.
**Results:** Stage progress from precontemplation was predicted by more pros, higher self-efficacy, and more frequent use of experiential and behavioral processes of change. Stage progress from contemplation was associated with higher self-efficacy and more frequent use of behavioral processes. Cons did not predict stage transitions. Preliminary analyses of the match-mismatch test failed to show that stage-matching is superior.
**Conclusions:** The TTM incorporates valuable concepts in predicting fruit intake (e.g. processes of change), though indications were found that the TTM might not fulfill stage-model requirements. Predictors of stage transitions for fruit intake might not be stage-specific, which may make stage-matching of interventions difficult and redundant.

## Notes

## Notes

## Friday, June 17 – 9.30-11.00 – Grote zaal

## Symposium IV: Measuring objective environmental characteristics of physical activity and nutrition: an international perspective

Chair: Frank van Lenthe

### IV-1 Issues in cross national comparisons of environmental influences on physical activity and nutrition: overview

*Sally MacIntyre - MRC*

**Purpose:** this is an overview of some issues in the measurement and analysis of objective environmental characteristics of urban neigbourhoods which might influence physical activity and nutrition.
**Background:** researchers have become increasingly interested in the study of environmental features which might influence health and health behaviours. In an article published in 2002 we discussed issues about conceptualising, operationalising and measuring place effects on health. Since 2004 colleagues from four countries have been collaborating to explore issues in cross national comparisons of environmental influences.
**Key points:** we have divided ways in which environments might influence health into a number of domains reflecting human needs that need to be met in order to maintain or promote health (e.g. shelter, education, work, food, play). We have then explored how we might measure these, and at what spatial scale data are available, in different countries.
**Summary:** this presentation will provide an overview of this work, focusing here on physical activity and nutrition, and invite further collaboration.

### IV-2 Obtaining area-level data in four countries: examples for crime, transport and leisure and recreation facilities

*Katrina Giskes - Erasmus MC; Anne Ellaway - Medical Research Council; Paula Santana - University of Coimbra*

**Purpose:** To examine availability of area-level crime, transport and leisure and recreation facility data in four countries.
**Background:** Research in the UK and the USA has demonstrated that the crime, transport and leisure and recreation facilities characterizing an area may influence the weight-gain behaviours of its' residents. To date, there has been no international comparison examining whether this observation applies in other countries. This study examined practical considerations for obtaining such data in four countries differing in their sociodemographic, cultural and geographic characteristics.
**Methods/key points:** One major city in each country was selected: Glasgow (UK), Eindhoven (Netherlands), Lisbon (Portugal) and Brisbane (Australia). A list of defined crime, transport and leisure and recreation facility variables shown to influence weight-gain behaviours was generated. Established data sources (statistics offices, local councils, registered organisations) were approached in each country and the geographical units for which the data were accessible determined. In all countries, some indicators of crime, transport and leisure and recreation facilities were available, however in Portugal and Australia, data were not obtainable for a large number of variables. Geographic units differed between variables and between countries. Variables also had different social meanings between the countries.
**Conclusions:** There was large variation between countries in the availability of data, their measurement, the geographic units and their different social meanings. These complex issues need to be taken into account in the design and interpretation of international comparisons of environmental determinants of behaviour.

### IV-3 Objective measurement of environmental attributes related to nutrition and physical activity - Key methodological issues

*Anna Timperio, Kylie Ball, David Crawford, Jo Salmon - Deakin University*

**Purpose:** This paper will outline methodological issues associated with the collection of objective data on environmental attributes related to nutrition and physical activity.
**Background:** Researchers have recently become interested in the influence of environmental attributes on nutrition and physical activity. Common methods of obtaining objective data include the use of Geographical Information Systems (GIS), physical auditing and the collation of existing area-level records. This presentation highlights selected methodological issues involved in measuring environmental characteristics using a GIS and physical auditing.
**Methods/key points:** A literature search was conducted to identify methodological issues arising from studies of

nutrition and physical activity in which environmental attributes were objectively assessed. Methodological issues identified include, but are not limited to: the need to define geographic boundaries for the collection of objective data and the implications of various boundaries (i.e., what is a neighbourhood); limitations of using GIS (e.g., different data capture dates between datasets, accuracy); limitations of using area-level indicators to match to individuals; potential collinearity between measures; completeness of data; and the importance of assessing quality rather than simply 'counting' attributes. These issues will be illustrated using examples from current research projects.

**Conclusions:** There are many ways in which objective data on environmental attributes can be collected, each associated with unique methodological issues. These issues should be considered when designing and interpreting studies examining the contribution of the environment to nutrition and physical activity.

## Notes

## Notes

## Friday, June 17 – 9.30-11.00 – Fontys Hogeschool

## Symposium V: Intermediaries and settings for diet and physical activity

Chairs: Willem van Mechelen & Gert-Jan Hiddink

### V-1 Stage-based interventions in primary care: the case of Dutch general practice and of midwife practice

*Mireille van Poppel, Esther van Sluijs, Willem van Mechelen - VU University Medical Center*

**Background:** Primary care health professionals often have the benefit of seeing their patients frequently. Furthermore, they have the option of relating lifestyle advice to a relevant health problem. This makes them ideal counselors on changes in lifestyle.
**Methods:** The study was an RCT with randomization at the GP-level. A total of 717 patients were recruited from 29 participating GP's. The intervention consisted of 2 visits with the GP and 2 booster calls by a physical activity counselor. A process evaluation was conducted among participating GP's and their practice assistants to assess the feasibility of the PACE program.
**Results:** The overall impression of the PACE program was positive: 82% evaluated the program as (very) good. The majority of the GP's thought the PACE program stimulated patients to become more physically active (59%). In the first visit, 71% if the GP's spent 10 minutes or more on counseling, in the second visit this dropped to 24%. The most important barriers in the counseling were that patients were unaware of their own physical inactivity. The majority of the GP's (82%) thought PACE was suitable for implementation in Dutch general practice. Participating GP's showed an increase in knowledge and physical activity counseling, both in the control and the intervention group.
**Conclusion:** The PACE program seemed to be an acceptable and feasible instrument for promoting physical activity in Dutch general practice.

### V-2 The effect of a PACE-intervention in Dutch general practice on physical activity and body composition

*Esther van Sluijs, Mireille van Poppel, Willem van Mechelen - VU University Medical Center*

**Purpose:** To evaluate the effectiveness of an individualized minimal intervention strategy, PACE (Physician-based Assessment and Counseling for Exercise), applied by Dutch general practitioners (GP) against standard physical activity advice from the GP, on patients level of physical activity (PA) and body composition.
**Methods:** The study was an RCT with randomization at GP-level. The main inclusion criteria for patients were: aged between 18 and 70 years, diagnosed with hypertension, hypercholesterolemia and/or NIDDM, and not in maintenance-stage. The intervention consisted of two 10-minute visits with the GP and two telephone booster calls by a PA counselor, spread over 12 weeks. Outcome measures were assessed at baseline and at two, six and 12 months. The results were analyzed with longitudinal multilevel regression analyses with correction for baseline values.
**Results:** A total of 29 general practices participated in the study, including 358 patients (mean age: 56 years, 55% male). No significant intervention effect over time was observed for self-reported and objectively measured level of PA, BMI and weight, and an inverse intervention effect was observed for waist circumference. At 1-year follow-up, however, the total study population showed a significant 62-minute increase in PA and a borderline significant 0.5-kilogram decrease in body weight
**Conslusions:** Overall, positive effects on PA and body weight were observed, but PACE was not able to produce an additional effect. Possible reasons for this are measurement effects, the standard GP-advice in the control condition, and a Hawthorne-effect.

### V-3 The role of Dutch general practitioners in nutrition communication

*Sonja van Dillen, Gerrit Jan Hiddink, Maria A Koelen, Cees de Graaf, Cees M J van Woerkum - Wageningen University*

**Purpose:** The primary purpose of our study is to assess the current role of Dutch general practitioners (GPs) in nutrition communication. GPs' perceptions of nutrition communication and actual nutrition communication behaviour were measured. To our knowledge, nutrition communication styles were not studied before.
**Methods:** On the basis of focus group interviews with 81 GPs, we developed a questionnaire. Questionnaires were sent to 600 GPs; 267 GPs completed the questionnaire (response rate 45%). The questionnaire contained questions about perceptions of lifestyle, perceptions about nutrition communication, perceptions of nutrition information, patient complaints, office features, co-operation with other health professionals, nutrition communication styles, frequency of nutrition communication and actual nutrition communication behaviour. Data were analysed with

SPSS, using univariate variance analysis tests and multiple linear regression.
**Results/Findings:** In the past month, nutrition was discussed in 14% of the consultations. Fifty-six percent of the GPs mentioned that they generally took the initiative themselves to communicate about nutrition. Nutrition was most often discussed in patient complaints, like overweight/obesity (73% always), diabetes mellitus (72%) and hypercholesterolaemia (68%). GPs' perceptions of nutrition communication were predictive for the 5 different nutrition communication styles (total explained variances up to 57%). The motivational nutrition communication style was the best predictor for actual nutrition communication behaviour (explained variance 35%).
**Conclusions:** We conclude that GPs play an important role in nutrition communication. Our study suggests that GPs combined multiple nutrition communication styles, dependent of the specific circumstances. Attention to nutrition communication styles in vocational training programs of GPs' trainees might be useful.

## V-4 Addressing PA and nutrition at the worksite

*Nico Pronk - HealthPartners Research Foundation*

**Purpose:** The aim of this presentation is to describe approaches to addressing diet, PA, and nutrition at the worksite.
**Background:** the worksite is an important setting where the target audience for health behavior interventions is present for an extended period of time on a daily basis. Gaining access to employees via the worksite may allow for successful interventions to be implemented either at the worksite itself or via remote methods or technologies, such as the telephone or the world-wide web.
**Method/key points:** This presentation will provide an overview of worksite health promotion programs designed to address PA and nutrition. Additionally, specific program examples will be presented that describe both process and outcomes and recognize the importance of outreach, engagement, and participation.
**Conclusions:** The worksite setting represents an ideal setting for outreach and engagement of individuals in health behavior programs that address PA and healthy nutrition.

## V-5 Towards personalized nutrition; stakeholders perspectives on chances and barriers

*Laura Bouwman, Maria Koelen, Gerrit J Hiddink, Cees van Woerkum - Wageningen University*

**Purpose:** The MyFood program at Wageningen University is targeted at Personalized Nutrition as an innovative strategy to improve consumer health. The research-scope includes all steps towards increasing personalization. From current face-to-face and computer mediated tailoring to near future wireless applications. Also, personalization based on insights on the relationship of what we eat with the way our genes function is included. Personalized Nutrition is based on innovative technology and has an impact on individuals and society in new and partly unforeseen ways. Therefore, insight into perspectives of stakeholders, including consumers, on chances and barriers is necessary for a legitimate and successful introduction of Personalized Nutrition. The results of the first research stage, a literature study and individual interviews with stakeholders in science, business and government, will be presented.
**Methods:** Theory of Everett Rogers on diffusions of innovations is used to define three research area's that influence the rate of adoption of Personalized Nutrition: product orientation, social-ethical issues and preconditions for collaboration. Data for qualitative analyses is gathered through individual interviews with stakeholders in science, government and business.
**Findings:** In literature, user-friendly and cost-effective are identified as chances of computer mediated personalized advice. Barriers are related to security of privacy and complexity of new technology. Chances of insights into gene-nutrient interaction relate to the contribution to more effective health prevention. Many barriers focus on bio-ethical issues like informed consent and intellectual property. The stakeholder interviews are currently processed.
**Conclusion:** Perspectives of stakeholders and consumers on Personalized Nutrition will contribute to the development of interventions targeted at individuals.

## V-6 Physical activity counseling in primary care: a new interdisciplinary model

*Michelle Fortier, Heather Tulloch, William Hogg - University of Ottawa*

The purpose of this presentation is to propose a new model of collaborative interdisciplinary physical activity care (Fortier, Tulloch & Hogg, 2004). This model is based on a combination of high quality evidence-based primary care health behavior change approaches, namely the As clinical counseling approach (U.S. Public Health Service, 2000; Whitlock et al., 2002), Self-determination theory (Sheldon, Williams & Joiner, 2003; Williams et al. 2002) and Motivational interviewing (Miller & Rollnick, 1991). It involves the integration of a physical activity counselor (PAC) into the primary health care team and assigns different tasks (As) to health care providers (HCPs) and PACs. HCPs are responsible for brief physical activity counseling (3-4 minutes), whereas PACs are responsible for longer term intensive counseling. Counseling is done in an autonomy supportive manner. This model is being tested using a randomized controlled trial in the PAC project (Fortier, Hogg et al.).

## Notes

## Notes

## Friday, June 17 – 9.30-11.00 – Keizerzaal

## Symposium VI: Hydration and fluid consumption related and influenced by biological, behavioral, cultural, and psychosocial factors

Sponsored by ILSI North America and ILSI Europe

Chair: Ann Grandjean

### VI-1 Cultural factors that influence fluid consumption

*Ann Grandjean - Center for Human Nutrition*

Culture is the most basic cause of our wants and behavior. We often incorporate dictums into our belief system. For example, an apple a day keeps the doctor away, or the recommendation of drinking eight glasses of water a day. Fluid consumption is as much, if not more, of a behavior as it is a physiological response to thirst. While the need for water is biological, beverage selection is influenced by several factors.

Dietary consumption data support the observation of a cultural influence on drinking behavior. Culture is known to be a major determinant of food and beverage preferences. Other factors, however, also influence beverage selection. Sensory attributes determine the palatability of a beverage. Appearance and temperature also effect consumption as does availability.

The Institute of Medicine released the Dietary Reference Intakes (DRIs) for water and electrolytes in January 2004 and established a quantitative recommendation for water. While the recommended intakes are a guideline, it is important to be aware of situations where the recommendations may not meet requirements. A requirement is the lowest amount needed to result in a predetermined physiologic endpoint, e.g., hydration. Therefore, the amount of water needed to replace losses is the absolute requirement. Although the two words are often used interchangeably, recommendations are not necessarily requirements.

Dehydration is the most common fluid and electrolyte disorder among the elderly and frail older adults living in the community. Problems of dehydration in physically active people are well known. While little is known about the general hydration status of healthy children, evidence exists to indicate that the hydration status of children may not be ideal.

### VI-2 Dietary factors that influence fluid balance

*Ron Maughan - Loughborough University*

Fluid balance is achieved when water intake from all sources equals the amount of water lost by all routes. This can be achieved at high rates of water turnover, as in the physically active individual living in a warm environment, or at low levels, as in the sedentary individual who lives in a cool climate. Fluid intake is generally in excess of requirements, with the excess excreted as urine.

Variations in the amount and type of food eaten have some effect on water requirements because of the resulting demand for renal excretion of excess electrolytes and the products of metabolism. The water content of food ingested will also be influenced greatly by the nature of the diet, and water associated with food may make a major contribution to the total fluid intake. Water is obtained from the oxidation of nutrients, the amounts varying from 0.4 ml/g for protein to 1.17 ml/g for alcohol. If we assume an energy expenditure of 3000 kcal/d, composed of 50% carbohydrate, 35% fat and 15% protein, this will give about 400 ml of water per day.

Alcohol and caffeine are both diuretic agents stimulating urine formation, and both are commonly consumed by a large part of the population. However, this effect is generally mild and when these are consumed in dilute solution, the contribution of the ingested water generally outweighs any diuretic effect.

### VI-3 Hydration: knowledge, myths, and science

*Maxime Buyckx - The Coca-Cola Company*

Water is essential for life. The recent wave of heat in Europe was a powerful reminder of how hydration plays a role in sustaining life and good health. Historically, there has been a lot of confusion on the role and importance of hydration. Beliefs and myths have driven recommendations and some of these same myths still persist today. There are some areas of good hydration knowledge mainly on an experimental basis, based on observations on healthy adults during times of water deprivation or limitation, such as soldiers, sailors or astronauts. In the past forty years a great deal of knowledge on hydration has been accumulated around athletes and military personnel under thermal and physical stress. Little research so far has been conducted on the hydration issues of healthy adults and youngsters living under normal conditions. The presentation will review hydration through history and present how different information

and beliefs have influenced behavior in respect to hydration. It will also outline how new hydration research, taking into account the recent publication of the Dietary Reference Intakes for Water, Potassium, Chloride, and Sulfate (Food and Nutrition Board, 2004) may take us in the future, influence public health and shape appropriated healthy behaviors in the population at large.

## Notes

## Notes

## Friday, June 17 – 11.30-13.00 – Grote zaal

## Symposium VII: Physical activity in obesity management and prevention

Chair: Willem van Mechelen

### VII-1 Global measurement and surveillance of physical activity - its relevance for obesity prevention

*Adrian Bauman - University of Sydney*

A key component of understanding global trends in obesity is to consider the energy expenditure side of the energy balance equation. In order to do this, reliable population-level measures of physical activity (PA) are required. This paper focuses on the development of inter-country comparable PA measures, and the recent history of their use in national health and sport surveys.
Two main measures have been carefully developed for international use and their measurement properties tested cross culturally. The first is IPAQ, the International Physical Activity Questionnaire, that has been developed by a group of researchers since 1998, and is now used in several European surveillance systems, and in other international surveys. It is a short form generic physical activity instrument which measures all domains of PA, and hence is suitable for obesity-related research. This paper explores the challenges in carrying out the IPS [IPAQ international prevalence study] which occurred 2002-2004 in 19 countries using IPAQ short form. Population rates of 'sufficiently active' ranged from 30-67% across countries. Other instruments, such as GPAQ (global physical activity questionnaire) are also increasingly used as part of national cardiovascular surveillance STEPS surveys through the World Health Organisation. These surveys may support obesity research by estimating energy expended, and this may provide some clues as to why some countries show different rates of increasing obesity increase over time.

### VII-2 Assessment of physical activity in obese subjects

*Jean-Michel Oppert - University Paris VI*

**Purpose:** The presentation will provide an overview of current methods to assess habitual physical activity levels with a focus on their use in obese individuals. Background: An improvement in the assessment of habitual physical activity in obese subjects is needed 1) to document actual levels of physical activity in obese populations, 2) to understand the role of physical activity in obesity-related diseases, and 3) to assess concurrent changes in weight and physical activity, documenting the effectiveness of intervention programmes.
**Key points:** Obese individuals are generally less active than normal-weight subjects and assessing activity at the lower end of the physical activity spectrum is a major challenge. The ideal assessment method would be accurate, easy to use, low cost, and unobtrusive. Among the numerous methods available, including self-report instruments (questionnaires, diaries), motion sensors (pedometers, accelerometers), or physiologic response measurements such as heart rate recording, few have been specifically tested in obese subjects. The issue of physical activity over reporting with self-report instruments is of particular concern in obese subjects. Pedometers are interesting motivational tools but do not assess intensity; equivalences between steps taken per day and duration of daily moderate activity also need clarification. Cost is a limitation to widespread use of current accelerometer devices. Combination of assessment methods, such as accelerometry and heart rate recording, appear promising.
**Conclusions:** Further work appears warranted to improve assessment of physical activity in obese subjects with a differentiation between instruments of interest for research purposes and those simple tools needed for management of patients.

### VII-3 Possible approaches to promoting physical activity: the IOTF approach

*W Philip T James & Neville Rigby - International Obesity TaskForce and*
*London School of Hygiene and Tropical Medicine*

The IOTF is constantly cited for its success in putting obesity on the global map despite its neglect by the medical profession and the general public assumption that obese individuals have only themselves to blame.
Our approach relied on establishing a global IOTF Council of leaders of many disciplines without regard to rivalries. Collating and interpreting comprehensive data, close links with WHO and a secretariat that did 90% of the work ensured the validity of our IOTF draft for the first ever WHO consultation (financed by IOTF). Six working groups then dealt with major needs e.g. defining childhood obesity, novel approaches to prevention and communication strategies. The Asian susceptibility to co-morbidities, our constant help for WHO, the EU and Ministers of Health and stringently focussed media strategies maintain our profile. We established a new obesity prevention goal for

physical activity (PA). This now requires new valid analyses of the impact of PA, coherent global data, a discerning analysis of the underlying causes and a decisive move away from assuming an individualised approach to exercise - this benefits the affluent, educated and motivated but neglects the real issues and needs of the poorer communities globally. The biggest gains require novel work with transport, urban planners, public and private sector work places and architects together with novel economic modelling, the recruitment of environmentalists to the cause and with focused communication, primarily to the decision makers governing environmental policies.

## VII-4 Can we affect physical activity behaviour of children?

*Willem van Mechelen - VU University Medical Centre*

Prevalence rates of overweight and obesity are increasing rapidly. Not only in the westernised world, but worldwide, and not only in adults but also in children, thereby becoming one of the major Public Health problems of this century. Overweight and obesity are the result of a disturbed energy balance in which both eating habits (i.e. energy intake) and physical activity (i.e. energy output) play an important role. There are indications in the literature that the emphasis in this disturbed energy balance lies in decreased physical activity and increased sedentariness, rather then in an increase in energy intake. Consequently, in combating the overweight and obesity Public Health problem the emphasis should be placed at increasing levels of physical activity in our population. In order to do so, we need to have knowledge about the factors associated with physical inactivity and sedentariness, and about ways to effectively influence physical activity behaviour. From a Public Health perspective it makes sense to start interventions aimed at increasing levels of activity and decreasing sedentariness already at a young age, because in the youngest of our generation most health gain is to be achieved.
In this presentation an overview will be given about current prevalence rates of overweight and obesity in children, as well as an overview of factors associated with physical inactivity and sedentariness. Finally, methods to effectively change physical activity behaviour in children will be discussed.

## Notes

## Notes

## Friday, June 17 – 14.00-15.30 – Grote zaal

## Symposium VIII: Socio-economic differences in diet and physical activity

Chair: Karien Stronks & Sally McIntyre

### VIII-1 Socio-economic differences in diet and physical activity: the role of individual mediators

*Kylie Ball, David Crawford, Jo Salmon, Anna Timperio - Deakin University*

**Purpose:** The aim of this presentation is to consider the evidence that socioeconomic inequalities in diet and physical activity are mediated by individual cognitive factors.
**Background:** Individuals of low socioeconomic status (SES) are less likely than those of higher SES to achieve recommendations for healthy eating and leisure-time physical activity. These SES differences have often been attributed by researchers and policy-makers to differences in cognitive factors, such as poorer knowledge or motivation among those of low SES. This presentation provides an overview of empirical evidence examining the contribution of cognitive determinants to SES variations in diet and physical activity.
**Methods and key points:** Drawing on our own work over the past decade, as well as the international empirical literature, we argue that there is some, albeit limited, evidence supporting the role of cognitive factors in explaining SES differences in diet and physical activity. However, significant methodological issues and gaps in the literature limit the conclusions that can be made about the relative importance of cognitive factors.
**Conclusions:** While cognitive factors may contribute to explaining SES inequalities in diet and physical activity, they do not operate in isolation. Further research is required to clarify the relative importance of cognitive factors, in conjunction with social and environmental factors, in explaining these inequalities. In addition, research examining the origins of relevant cognitions is needed. Implications for intervention strategies are considered.

### VIII-2 Socioeconomic inequalities in diet and physical activity

*Frank Van Lenthe - Erasmus Medical Centre Rotterdam*

**Purpose:** The aim of the presentation is to provide a state of the art overview of a) environmental determinants of diet (fruit and vegetable intake and fat intake) and physical activity (in leisure time, sport and for transport) and b) the contribution of these determinants to socioeconomic inequalities in diet and physical activity.
**Background:** Studies have reported socioeconomic inequalities in diet and physical activity. The explanation of these inequalities however, remains to be further explored. According to an important mechanism, determinants of physical activity and diet are unevenly distributed across socioeconomic groups. There is growing evidence that environmental factors determine diet and physical activity to some extent, and these factors may therefore contribute to socioeconomic inequalities in diet and physical activity.
**Methods:** Data are used from systematic reviews on the role of environmental determinants of health-related behavior. The emphasis of the presentation will be on the role of elements of the physical environment.
**Conclusions:** In order to understand socio-economic inequalities in diet and physical activity, studies need to include environmental determinants in addition to already included individual-level determinants.

### VIII-3 Social class, social capital and psychosocial work conditions as determinants of leisure time physical activity

*Martin Lindström, Malmö University Hospital, Lund University, Sweden*

**Aim:** To provide a summary of how social structures such as social class and social capital and psychosocial work conditions may affect levels of leisure time physical activity and how they may interact with each other.
**Background:** Social capital concerns how social participation/networks influence collective action for mutual benefit. It has been analysed at the macro (countries, regions), meso (neighbourhoods), micro (participation/networks) and psychological (trust) levels. Social capital may affect physical activity through norms and values within social networks. Psychosocial work conditions (Karasek-Theorell) concerns demands as well as the control over the work situation. Jobstrain (high demands/low control) leads to high psychosocial stress and passive work conditions (low demands/low control) may lead to psychological atrophy, in both cases resulting in lower physical activity. In contrast, the active (high demands/high control) and relaxed (low demands/high control) may lead to high physical activity.
**Methods:** Results from the Malmö Diet and Cancer Study, Malmö Shoulder Neck Study and surveys in Sweden are discussed compared with other international results.
**Conclusions:** In Sweden, there are socioeconomic differences in physical activity. Social capital is related to physical

activity mainly at the social network (micro) level. Multilevel studies including the neighbourhood (meso) level show almost no contextual effects on physical activity. Micro level social capital seems to interact with social class: within each social class category there is a difference between physical activity between individuals with low versus high social participation. Contextual effects may be more important in other countries. Psychosocial work conditions mainly affect activities requiring initiative, appointments and resources even after adjustment for socioeconomic status.

## Notes

## Notes

## Friday, June 17 – 14.00-15.30 – Fontys Hogeschool

## Symposium IX: The effects of computer-tailored interventions to promote healthy diets and PA

Chair: Anke Oenema

### IX-1 Tailored health communications in nutrition and physical activity promotion: overview and application to community interventions

*Marci Campbell - University of North Carolina*

**Purpose:** This presentation presents an overview of tailoring research as applied to diet and physical activity and presents examples from community interventions.
**Background:** Individualized computer-tailored health communication messages are becoming widely used in nutrition and physical activity promotion. A number of studies have shown efficacy of such messages compared to generic or control conditions. Evidence varies when tailoring is compared to other intervention modalities.
**Methods/key points:** Typical tailored health communications are assessment based and utilize information such as demographics, health behaviors, and theory-derived psychosocial variables to drive the tailoring algorithms (decision rules) and content. In public health settings, contextual factors such as cultural beliefs, organizational characteristics, and environmental resources may also be used to tailor and target messages. Studies of tailoring vary widely in terms of the purpose, methods, content, and delivery of feedback as well as the media and interactivity involved. In addition, studies may test variances of tailoring at the individual level, or the relevance of tailoring in the context of multi-component intervention strategies based on a socio-ecological framework. Examples from our recent research include testing print or web-based computer-tailored feedback alone or contrasted with other strategies to promote healthy eating and physical activity in several randomized trials conducted with diverse populations. A recently completed study showed that combining tailored print newsletters with motivational interviewing was more effective and cost effective for promoting fruit and vegetable consumption than either intervention alone.
**Conclusions:** Tailored communications hold promise for nutrition and physical activity interventions to promote public health. Research directions include understanding the role of tailoring in multi-level and multi-component interventions.

### IX-2 Differences in impact between a family versus an individual based tailored intervention to reduce fat intake

*Ilse De Bourdeaudhuij - Ghent University; Johannes Brug - Erasmus University Medical Centrum; Corneel Vandelanotte - Ghent University*

**Purpose:** The present study investigates the impact of a tailored nutrition intervention on the reduction of fat intake and on psychosocial determinants of fat intake. Furthermore, differences in impact between a family based intervention (tailoring two family members, one adult and one child, simultaneously) and an individual based intervention (tailoring one family member; one adult or one child) were studied.
**Methods:** Analyses were conducted among 180 respondents, comparing 44 adolescents in the family condition with 50 adolescents in the individual condition, and 44 parents in the family condition with 40 parents in the individual condition.
**Results:** Respondents in both conditions reported positive reactions towards the tailored fat feedback letters. Tailored fat feedback resulted in significantly more positive psychosocial determinants of fat intake and, among respondents with high fat intake at baseline, in a significant decrease in percent energy from fat. Parents in the family-based intervention group reported higher social support scores at posttest. No differences in posttest fat intake were found between the two study conditions.
**Conclusion:** It is concluded that the results further illustrate the potential of tailored fat feedback but the results do not provide evidence for superiority of family-based tailoring above individual-based tailored interventions for fat. Further research may be aimed at investigating the impact of comprehensive tailored family interventions, in which more than two family members participate.

### IX-3 The evolution of print-based to Internet-delivered physical activity programs in Australia: where to now?

*Alison Marshall - The University of Queensland*

Early trials of mailed self-help print-based programs based on the Transtheoretical model of behaviour change have been effective in prompting short-term increases in physical activity (PA). There is the potential of Internet technology

to deliver effective, interactive, targeted advice to large numbers of participants at low cost. First-generation Internet-delivered programs have been developed based on previous print programs. This presentation will explore the evolution self-help, mailed print-based PA programs, through to their delivery via the Internet.
Data from two large community-based RCTs that investigated the effects of stage-targeted print programs on PA levels of non-volunteer participants will be reviewed. Participants in study one (n=462) were selected from a regional community while participants in study two were selected from the state of NSW (n=719). A third RCT (n=655) conducted in a worksite compared the efficacy of print versus Internet- delivered programs. The primary outcome measure in all trials was change in self-reported PA (assessed at baseline and at short- and medium-term follow-ups). All studies reported high response rates and recognition of the program materials. However, program efficacy differed.
Research to guide the evolution from print-based to Internet-delivered PA programs shows early promise, but to date has produced mixed findings. Problems with participant engagement and retention have emerged. Future research should aim to maximise Internet technology capacities and to move beyond models of health behaviour change that are primarily individually-focussed and motivational, to a focus on the broader social and environmental influences on behaviour identified in social-ecological models.

## IX-4 Efficacy of web-based computer-tailored nutrition and physical activity interventions

*Anke Oenema, Johannes Brug - Erasmus MC, University Medical Center*

An important quality of computer tailoring is that large groups of people can be provided with individually tailored information. The Internet is a suitable channel for providing computer-tailored interventions and has the potential to reach larger groups of people with tailored information than is possible with other communication channels. Because of the potential high reach and because it incorporates many possibilities for interactive communication, the Internet is an attractive medium for delivering computer-tailored interventions.
Potential high reach has only value when an intervention is effective. The potential efficacy of web-based computer tailored interventions targeting dietary intake and physical activity will be illustrated with two studies. The first study (RCT; N = 782) evaluated the effect of a web-based computer-tailored nutrition intervention on saturated fat, fruit and vegetable intake and compared the intervention with generic and no information. The second study (RCT; N = 2159) evaluated the effects of an Internet-delivered intervention targeting saturated fat intake and physical activity and compared the intervention with no information. The first study found short-term (1 month) effects on behavioral determinants, but not on behavior. The second study found short-term (1 month) effects for saturated fat intake, but non-significant effects for physical activity.
The findings indicate that web-based computer-tailored interventions can have a short-term effect on determinants and behavior. Further research should be directed at improving the effects of Internet delivered computer-tailored interventions. Insight is needed in how to more optimally use the interactive quality of the Internet and to effectively apply behavior change strategies in Internet delivered computer-tailored interventions.

## IX-5 An online diet assessment tool for use in a web-based lifestyle counselling programme to reduce cardiovascular disease risk

*Jane Bradbury, Mark Livermore, Jane Wardle, Andrew Steptoe - University College London*

**Purpose:** To develop and test an online dietary assessment tool as part of a web-based lifestyle counselling program, designed to modify cardiovascular risk by changing diet and physical activity.
**Background:** Our group is funded by the British Heart Foundation to develop an internet programme based on successful methods of face-to-face counselling to modify diet and increase physical activity. To provide appropriate advice it is necessary to have valid and reliable methods of assessment.
**Methods:** An online dietary assessment tool was created, based on a validated paper version. Eight pages present lists of items by food group and the participant selects the number of days per week items are consumed. Portion size descriptions have been replaced with photographs of average small, medium and large portions. Feedback on dietary intake is presented in the context of the participant's BMI. Recommendations as to the most appropriate dietary intervention route to follow (Fruit & Vegetables or Fat) are based on intake. The tool was piloted with a focus group of health experts, refined, and piloted again. Initial indications are that participants find the tool engaging and interesting.
**Conclusions:** This tool will be used to guide tailored internet counselling. A validation study using food records is planned. However, all dietary assessment methods have their limitations and it is unlikely that this method will prove the exception.

## Notes

## Notes

## Friday, June 17 – 14.00-15.30 – Keizerzaal

## Symposium X: Prevention of overweight: The NHF-NRG study

Chair: Stef Kremers

### X-1 Netherlands research program weight gain prevention (NHF-NRG): rationale and objectives

*Stef PJ Kremers - Maastricht University; Tommy LS Visscher, Astrid CJ Nooyens - Free University; Gert-Jan de Bruijn -Maastricht University; Amika S Singh - VU University Medical Center; Lydia N Kwak - Maastricht University; Andrea Werkman – Wageningen University*

**Purpose:** To outline the rationale and objectives used in a systematically designed research program to study specific weight gain inducing behaviors, their social-psychological as well as environmental determinants, and the effects of interventions aimed at the prevention of weight gain.
**Methods:** The project is designed according to the Intervention Mapping protocol. Two studies are aimed at identifying (1) main behavioral determinants of weight gain and (2) key environmental and psychosocial determinants of these behaviors. Three interventions are designed in order to prevent weight gain in three target groups: (a) adolescents (12-16 years) in secondary school, (b) young adults (20-40 years) at the workplace, and (c) recently retired people (55-65 years) at home. Each intervention includes an individual component, in which computer tailored information is provided. Additionally, interventions are aimed at changing environmental components.
**Results:** Guidelines for nationwide weight gain prevention, based on this research program, will become available in 2007. In this symposium, the first short-term results from the interventions will be presented as well as the first results from the determinant studies.
**Conclusion:** The systematic and multidisciplinary design of the NHF-NRG program enables the identification of potentially effective methods and strategies for the prevention of weight gain.

### X-2 Trends in and determinants of body weight gain in dutch adults: epidemiological studies within the NHF-NRG research program

*Astrid Nooyens, Tommy Visscher - Free University; Jantine Schuit - National Institute for Public Health and the Environment; Willem van Mechelen - VU University Medical Center; Jaap Seidell - Free University*

**Purpose:** To describe trends in body weight throughout adult life, and to identify lifestyle determinants of weight gain.
**Methods:** The Doetinchem Cohort Study with an 11-y follow-up period with measurements in 1987-1991, 1993-1997 and 1998-2002. Trends in body weight are studied in 4065 subjects aged 20-59 y at baseline. Determinants of weight gain are studied in 508 young adults aged 26-35 y, and of weight gain along with occupational retirement in 288 men aged 50-65 y. Body weight and height are measured. Diet, physical activity and demographic data are assessed using self-administered questionnaires.
**Results/Findings:** Older subjects and younger cohorts had higher body weight. Highest increase in body weight was observed in young adults, aged 20-29 y at baseline (7.0 kg gain during the 11-y follow-up). In young adults, a decrease in biking in men, and an increase in sweet snack consumption in women, were related to weight gain. Increase in body weight was also observed in subjects aged 50-59 y at baseline (2.5 kg gain during follow-up). Recently retired men with former active jobs gained more weight (0.42 kg/year) than men with former sedentary jobs (0.08 kg/year).
**Conclusion:** Cross-sectional surveys underestimate the actual increase in body weight with ageing, because of cohort effects. Identified lifestyle determinants of weight gain in young adults and recently retired men may provide useful tools for weight gain prevention programs.

### X-3 Proximal and distal determinants of energy balance related behaviors

*Gert-Jan de Bruijn, Stef Kremers - Maastricht University; Willem van Mechelen - VU University Medical Center; Johannes Brug - Erasmus Medical Center*

**Purpose:** The current obesity epidemic has been attributed largely to a changing environment which facilitates unhealthy behaviors, such as the consumption of an energy dense diet and a sedentary lifestyle. When studying determinants of (un)healthy behaviors, most research to date has been done using theories that focus on social cognitions. In three Dutch adolescent samples, we investigated the role of social cognitions, but also of physical, social and personality as potential distal influences on behaviors related to the energy balance.

**Methods:** Data was gathered through self administered questionnaires in three Dutch adolescent samples (age range 12-18 years), assessing active transport (study 1), fruit and vegetable consumption, and PA (study 2) and soft drink consumption (study 3). We assessed attitude, subjective norm and perceived behavioral control in study 1 and 3. Distal influences included degree of urbanization (study 1), parental house rules (study 3) and personality (study 2 +3). Data was analyzed using stepwise multiple linear and logistic regression analyses.
**Results:** Degree of urbanization, parental house rules and personality were associated with the investigated energy balance-related behaviors, even in those studies controlling for social cognitive variables. Notably, in the multivariate models, the influence of some distal variables was stronger than the influence of social cognitions.
**Conclusion:** The direct association found between physical, social, psychological variables and behavioral outcomes should be taken into account when developing interventions to prevent weight gain.

## X-4 NHF-NRG Interventions: prevention of weight gain in adolescents, young adults and recently retired

*Lydia Kwak - Maastricht University; Amika Singh - VU University Medical Center; Andrea Werkman - Wageningen University; Stef Kremers - Maastricht University; Tommy Visscher - Free University*

**Purpose:** Three projects within NHF-NRG are aimed at the development, implementation and evaluation of interventions directed at the prevention of excessive weight gain in adolescents (DOiT), prevention of weight gain in young adults (In Balans) and prevention of accumulation of abdominal fat mass in recently retired (WAAG-Study). The interventions have been developed according to the Intervention Mapping Protocol and are directed at physical activity and food intake. Both individual (e.g. awareness-box, computer tailoring, websites and course material) and environmental interventions (e.g. walking groups and extra gym classes) have been developed to reach set goals. Implementation of the interventions started in 2003 and ended in 2004.
**Methods:** Participants were recruited through respectively 18 schools (n=1108), 12 worksites (n=570) and 83 pre-retirement workshops (n=415) and assigned per unit to either control or intervention groups. For all participants anthropometric (e.g. weight, skinfold thickness, waist/hip circumference), behavioural (physical activity and diet), cognitive and environmental factors are measured on baseline, and after 1 and 2 years. Subgroups underwent more specific measurements on body composition and fitness.
**Results:** All interventions have successfully been developed and implemented. Preliminary results of baseline and one-year follow up data will be presented.
**Conclusions:** Interventions directed at the prevention of weight gain seem to have promising results, when they are individually and environmentally orientated and focus on both physical activity and food intake.

## X-5 Short-term effects of a school-based obesity prevention program on body composition and aerobic fitness

*Amika Singh, Marijke Chin A Paw - VU University Medical Center; Johannes Brug - Erasmus Medical Center; Willem van Mechelen - VU University Medical Center*

**Purpose:** We evaluated the effectiveness of DOiT - a school-based multi-component intervention program that aimed at preventing excessive weight gain among Dutch adolescents, addressing behavioural and environmental components.
**Method:** Eighteen secondary schools were randomised to either the experimental or control group. Data were collected at the start of the first school year and after eight months intervention, including height, weight, skin folds, hip and waist circumference. Physical fitness was assessed with the 20-meter shuttle run test. A specific educational program was developed and implemented in the biology and physical education lessons. These lessons aimed at increasing awareness and behavioural changes concerning energy intake, consumption of sugar-sweetened drinks and energy-dense snacks in particular; and energy output, i.e. physical activity and sedentary behaviours. Furthermore, school canteens were modified and additional physical education classes were offered in order to facilitate behavioural change. Linear regression was used to study the effects of the intervention program.
**Results:** Mean age of the 1020 participants was 12.7 (± .5) years. Linear regression analyses showed that at the intervention schools the increase in aerobic fitness was significantly higher (beta: 0.19 laps, 95% CI: .014 - .361), the increase in waist circumference (beta: -.69 cm, 95% CI: 1.045 - -.344), and in suprailiacal skin fold thickness (beta: -0.63 mm, CI: - 1.186 - - .082) significantly lower.
**Conclusion:** The results show that our intervention, tailored to the specific needs of the adolescents, was effective in positively influencing measures of body composition and physical fitness.

## X-6 Conclusions from NHF-NRG: Netherlands research program on weight gain prevention

*Tommy Visscher - Free University; Stef Kremers - Maastricht University; Astrid Nooyens - Free University; Gert-Jan de Bruijn - Maastricht University; Amika Singh - VU University Medical Center; Lydia Kwak - Maastricht University*

**Purpose:** Purpose of the NHF-NRG is to develop guidelines for nation-wide weight gain prevention programs.
**Methods:** Two descriptive and three intervention studies are being carried out, as described in this NHF-NRG symposium.
**Results/Findings:** 1) Young adults have been detected as important age-category for weight gain prevention besides the age-category of adolescents. And, although there may have been disagreement in the past, weight gain prevention is even urged around age 60 years, as became clear from a longitudinal epidemiological study. 2) Determinants of weight can be detected if research is focussed on changes in behaviour, rather that baseline behaviour alone. 3) Results indicate that existing social-cognitive models benefit from the inclusion of models that have a more prominent focus on distal variables, e.g. ecological models. 4) It is possible to recruit subjects and continuously motivate through schools, work-sites and retirement health courses, although recruiting was especially hard at work-sites. 5) First results of the NHF-DO-iT intervention program on adolescents at school shows that a multi-component intervention program focussing on distal and proximal determinants of both energy-intake and expenditure, including intervention components varying from individually tailored communication to environmental changes is effective on important markers for excessive weight gain and improved physical fitness.
**Conclusions:** Results from the (ongoing) NHF-NRG research program can be taken as promising for researchers and prevention-workers in the field of weight gain prevention.

## Notes

## Saturday, June 18 – 9.30-11.00 – Kleine zaal

## Symposium XI: Habits and reasoned actions in diet and physical activity

Chair: Wendy Rodgers

### XI-1 Beyond behavioral frequency: habit as psychological construct

*Bas Verplanken - University of Tromsø*

**Purpose:** This paper focuses on the importance of habit for health behaviors, argues for a re-conceptualisation of the habit concept, and presents a new instrument to measure habit.
**Background:** Habituation is an important aspect of nutrition behavior. This not only holds for explaining health behavior, but also for considering and planning interventions. Habit has traditionally been conceptualised as frequency of behavior and measured by indicators of past behavioral frequency. However, although repetition of behavior is a necessary condition to develop a habit, it does not necessarily lead to habituation. The conceptualisation of habit as behavioral frequency and, consequently, the measurement of habit as frequency of past behavior, is therefore problematic, and has stalled the development of habit theory.
**Key points:** Habit is conceptualised as repeated behavior that has become automatic. Key features of automaticity are lack of awareness, difficulty to control, and mental efficiency. These features, in addition to the experience of repetition, should be included in the habit concept. A measure is presented that captures this conceptualisation. The availability of such an instrument provides opportunities to test new hypotheses (e.g., monitoring habit strength), as well as to gain more insight in old problems (e.g., the residual variance problem).
**Conclusions:** Habit is more than repeated behavior. Progress in habit theory can be made by considering habit as a psychological construct rather than mere behavioral frequency, and to measure it as such. This perspective provides new opportunities to study the role of habit in health-related behaviors.

### XI-2 The importance of habit strength in dietary behaviors

*Johannes Brug, Willemieke Kroeze, Marianne Wind, Klazine van der Horst, Isabel Ferreira - Erasmus MC*

**Purpose:** To test the association of habit strength with different dietary behaviors (i.e. fruit, soft drink and fat intake) in adults, adolescents and children.
**Methods:** Four data sets from three cross-sectional surveys and one longitudinal study were analysed. Two studies were conducted in adult samples, focussing on fat and fruit intake, one study was conducted among 11 year-olds (fruit intakes) and one study among 12-17 year olds (soft drink use). In all studies theory of planned behavior (TPB) constructs and habit strength were measured as well as a variety of possible additional determinants of intakes, such as perceived availability and accessibility of foods. Stepwise multiple regression analyses were used to test the impact of habit strength on self-reported fruit, soft drink and fat intentions and intakes after adjustment for socio-demographic variables, TPB constructs and other potential determinants.
**Results:** In all four studies, habit strength contributed substantially to explained variance and habit strength proved to be the strongest correlate or predictor of the different dietary behaviors.
**Conclusion:** Our studies indicate that habit strength is an important determinant of different dietary behaviors across different age groups.

### XI-3 Can habit account for past behavior-future behavior relations? Testing mediation and moderation effects for exercise behavior

*Terra Murray - University of Alberta; Paul Norman - University of Sheffield; Wendy Rodgers - University of Alberta*

**Purpose:** Social cognitive theories adhere to the notion of conscious control of goal directed behaviors (e.g., Ajzen, 2002). Oullette and Wood (1998) suggest that with repeated execution of a behavior the influence of conscious processes declines whereas the role of habitual processes increases. Two studies are reported that consider the impact of intention, past behavior and habit on exercise behavior. Two hypotheses are examined: (i) whether habit mediates the impact of past behavior on future behavior, and (ii) whether the strength of the habit-future behavior relationship increases along with the frequency of past behavior.
**Methods:** Students attending UK (Study 1, N = 76) and Canadian (Study 2, N = 52) universities completed questionnaires containing measures of intention, past exercise behavior, habit. Participants reported their future exercise behavior after one week (Study 1) and four weeks (Study 2).
**Results:** Intention (Study 1) and past behavior (both studies) were predictive of future exercise behavior ($R2s = .67, .40$, $ps < .001$). Habit did not mediate the impact of past behavior on future behavior. However, significant interactions between past behavior and habit were found in both studies indicating that the strength of the relationship between

habit and future behavior increased with increasing frequency of past behavior.
**Conclusions:** The results are discussed in relation to theoretical accounts of the interplay of conscious and habitual processes in determining future behavior.

## XI-4 Habit strength of energy balance-related behaviors among children and adolescents

*Stef PJ Kremers - Universiteit Maastricht; Johannes Brug - Erasmus Medical Centre*

**Purpose:** The reliability and convergent validity of the Self Reported Habit Index (SRHI) were tested with respect to four energy balance-related behaviors among children and adolescents: playing outside, exercising, sedentary behavior and soft drink consumption.
**Methods:** We investigated internal reliabilities and psychometric characteristics of the SRHI regarding each behavior. Correlations with frequency measures as well as with attitude and intention scores were computed. In addition, potential intention * habit and attitude * habit interactions were investigated.
**Results:** Internal reliabilities of the SRHI were high for each behavior. The SRHI correlated significantly with behavioral frequency measures, as well as with known cognitive associates of these behaviors. Moreover, the SRHI proved to be useful in testing potentially moderating influences of habit on the attitude - intention and intention - behavior relationships.
**Conclusions:** Because of its theoretical foundation and practical advantages, the SRHI might encourage research acknowledging the importance of automatic, unplanned or unreasoned determinants of these behaviors.

## XI-5 Alcohol consumption and the theory of planned behavior: an examination of the cognitive mediation of past behavior

*Mark Conner - University of Leeds; Paul Sparks - University of Sussex*

**Purpose:** This presentation reports on the predictive power of the Theory of Planned Behavior (TPB) in explaining alcohol consumption.
**Methods:** Three prospective samples of students (N s = 178, 176 and 159).
**Results:** Generally, the TPB performed well, with attitudes, subjective norms and perceived behavioral control (PBC) explaining between 28 and 40% of the variability in intentions. Intentions and PBC explained between 12 and 50% of the variability in behavior. Measures of self-identity as a 'drinker', and past behavior contributed to predictions of intentions over and above the contribution of attitudes, subjective norms and PBC. Measures of past behavior but not self-identity consistently contributed to predictions of behavior over and above the contributions from intentions and PBC.
**Conclusions:** The direct relationship between past behavior and intention and between past behavior and behavior (independent of the TPB variables or self-identity) was shown to be not attributable to common method variance.

## Notes

## Notes

## Saturday, June 18 – 9.30-11.00 – Keizerzaal

## Symposium XII: Diet, physical activity and the elderly

Chair: Willem van Mechelen

### XII-1 Interventions to promote regular physical activity among older adults

*Abby King - Stanford Medical School*

**Purpose:** The aim of this paper is to highlight promising interventions for promoting regular physical activity among older populations, and to discuss areas for future study.
**Background:** In a number of countries around the world, older adults are among the most inactive segments of the population. The substantial prevalence of inactivity among this age group calls for multi-level intervention approaches that are sensitive to factors of particular relevance for older populations. This is particularly the case in light of the substantial heterogeneity of the older population, and the relative dearth of research aimed at understanding both the personal and environmental factors that may interact to enhance or limit regular physical activity among this age group.
**Key Points:** Using a social ecological framework, strategies and approaches with particular promise for reaching large segments of the older adult population will be discussed, along with their strengths and limitations. Such strategies include mediated interventions (telephone, print, computer), peer-based interventions, and approaches that evaluate the influences of the built and social environments on older adults' physical activity patterns. As part of this discussion, potentially important correlates of physical activity among older adults (e.g., health issues, perceived safety, transportation issues, cultural factors, gender-related factors) will be discussed.
**Conclusions:** The particular relevance of multi-level approaches for understanding and promoting physical activity among older adults will be discussed, along with suggested future directions.

### XII-2 The need for nutritional education to be combined with physical activity programs: lessons learnt from insufficiently active older persons

*Jonine Jancey - Curtin Universtiy; Trevor Shilton - National Heart Foundation; Peter Howat, Ann Clarke, Andy Lee, Kui Wang - Curtin University*

**Purpose:** The energy intake of older Australians' often far exceeds their energy expenditure, with half being insufficiently active and almost two-thirds overweight or obese. We investigated the relationship between BMI, physical activity and various health indices, and the impact of a walking program on these variables.
**Method:** In a randomized trial 600, insufficiently active 65 to 75 year olds were recruited and assigned to either a walking group or control group. There were 30 walking groups containing on average 10 particpants. The 26 week prescriptive graduated program was led by a trained walk leader and incorporated regular health education. The groups met twice per week in the walkers local suburb, optimising access, minimizing travel, enhancing a sense of community and increasing sustainability. Self-reported BMIs were calculated and compared to a range of health indices.
**Results:** Significant differences were found between the obese and healthy weight subjects at pre-program assessment. Obese subjects did less walking for recreation and for transport, less gardening and scored worse on the UCLA loneliness scale. Healthy weight people scored better on satisfaction with relationships, walking/exercise efficacy, and the SF12 PCS. There was significant post program improvement in physical activity levels for both the obese and healthy weight subjects; however there was no reported changes in BMI.
**Conclusion:** These finding indicate that as physically activity increased so did energy intake. This has serious implications for health promotion, reinforcing the need for nutritional education to be included in physical activity programs for older people.

### XII-3 The folate activity cognition trial(FACT) study: design and preliminary results

*Marijke Hopman-Rock, Jannique van Uffelen, Marijke Chin A Paw, Willem van Mechelen - BodyatWork Research Center TNO VUmc*

The main objective is to study the effect of physical activity and vitamin supplementation on cognitive functioning and psychosocial health of older people with mild cognitive impairment (MCI).
**Methods:** Hundred eighty five older people with MCI are included in the study. Participants were recruited from the city of Alkmaar following a three-step-procedure: questionnaire sent to all independent living elderly between 70 and 80 years old, telephone interview with those who reported memory complaints, personal interview

with those with objective memory complaints according tot a word learning test during telephone interview. After inclusion, participants were randomly assigned to one of the following groups 1) exercise program and vitamin supplementation; 2) walking programme and vitamin supplementation; 3) exercise program; 4) walking program. Non-supplement groups receive a placebo supplement. The intervention takes one year. The physical activity programs are group-based, the frequency is twice a week. Most important difference between the two programs is the intensity, very light for the exercise programme and moderate for the walking programme. Main outcome measures are cognitive functioning and psychosocial health status, measured during a personal interview at baseline, after 6 months, 12 months and 18 months. Blood samples will be taken to determine blood vitamin levels at baseline and after 6 and 12 months.
**Results:** At baseline, women perform slightly better than men on measures of memory (direct and delayed recall of the 15 wlt). Further results will be given during the symposium

## XII-4 Effectiveness of physical activity programs for the frail elderly

*Marijke Chin A Paw, Mireille van Poppel, Jos Twisk, Willem van Mechelen - VU University Medical Center*

**Purpose:** To examine the effectiveness of three different moderate-intensity exercise protocols on physical fitness, functional performance and physical disability of older adults living in long-term care facilities.
**Method:** In total 224 inhabitants of long-term care facilities (aged 64 to 94 yr) were randomly allocated to 60 min/wk of 1) resistance training; 2) functional training; 3) a combination of both; or 4) an educational control condition. The main outcome measures were physical fitness (e.g. muscle strength, balance), functional performance (e.g. walking speed, chair stands), and self-reported physical disability, and have been measured at baseline and after 24 weeks intervention.
**Results:** Complete data were available for 127 women and 32 men. Median attendance to the strength training was 76%, to the skills training 70% and to the combined training 73%. Compliance to the exercise protocols appeared difficult. There were no between group differences for changes in either of the outcome measures. In a more compliant subgroup the skills training improved reaction time (difference: -19.2 msec, 95%CI: -40.7;-2.4), and the combined training improved eye-hand-coordination (-6.0 sec, 95%CI: -11.6;-0.5), and chair rise performance (difference: -7.6 sec, 95%CI: -13.3;-1.9) compared to the control group.
**Conclusion:** Compliance to moderate-intensity exercise protocols appeared difficult. When compliance is adequate, functional training or a combination of resistance and functional training seems to be of benefit to some fitness and performance measures.

## XII-5 The role of food in sustaining independence and quality of life in later life: comparing European experiences

*Margaret Lumbers, Monique Raats - University of Surrey*

Many studies have shown that inadequate nutritional intakes are more common in the older people, but few studies have tried to identify the barriers to the effective procurement and preparation of food. Through a series of five mainly qualitative studies this project aims to better understand the specific food procurement and consumption requirements of older men and women living alone as compared to those living with others in eight European countries. Repertory grid interviews were used to study perceptions of convenience and functional foods. Observations and interviews whilst shopping together with a problem-centred interview at home were used to study the interaction between shopping, food selection, economic constraints and meal preparation skills. User and provider perceptions of food-related were compared using the critical incident technique. In-depth qualitative interviews were used to determine the role of formal and informal networks in enhancing health-promoting food provisioning and consumption among older people; and to determine the differential role that meals, snacks and beverages play in enhancing health in later life. Our findings suggest that cooking skills, living circumstances, health status, attitudes, preferences, economic situation and support systems influence the ways in which older people deal with age-dependent shopping and meal preparation problems. Gender and older people's living arrangements are important factors in patterns of food consumption and the meaning of food in later life. Social networks influence quality of food consumption, particularly among older people living alone, but in gender differentiated ways. The findings will be verified in a quantitative study (n=1600).

## Notes

## Notes

## Saturday, June 18 – 9.30-11.00 – Grote zaal

## Symposium XIII: Pro Children: a study across Europe to explain and promote fruit and vegetable intakes in primary school children

Chair: Knut-Inge Klepp

### XIII-1 Promoting increased fruit and vegetable consumption among European school children: the Pro Children project

*Knut-Inge Klepp - University of Oslo*

**Purpose:** The Pro Children study is designed to assess vegetable and fruit consumption and determinants of the consumption patterns among European school children. A second objective is to develop and test strategies for promoting increased consumption of vegetables and fruits among school children.
**Methods:** Surveys of national, representative samples of 11-year-old school children and their parents were conducted in nine countries, i.e. in Austria, Belgium, Denmark, Iceland, The Netherlands, Norway, Portugal, Spain and Sweden. Comprehensive school-based educational programmes were developed and tested in three settings, i.e. in Spain, The Netherlands and in Norway. A 24-h recall format and frequency items assessing regular intake were used to assess vegetable and fruit consumption. Determinants were assessed employing a comprehensive theoretical framework, including cognitive factors, normative influences, skills and environmental barriers related to vegetable and fruit consumption. The intervention programmes were tested employing a group-randomized trial design where schools were randomly allocated to an intervention arm and a delayed intervention arm.
**Results:** Preliminary data from the project indicate that girls eat vegetables and fruit significantly more often than do boys across all participating countries. Similar differences were not seen with respect to perceived availability of vegetables and fruit at home and outside the home setting.
**Conclusion:** Experience so far indicates that the Pro Children Project has succeeded in producing valid and reliable research instruments for assessing vegetable and fruit consumption, and that comprehensive intervention programmes can be implemented across geographic and cultural settings within Europe.

### XIII-2 Development, reliability and validity of a questionnaire to measure fruit and vegetable intake and personal, social and environmental correlates in 10-11 year old European children

*Ilse De Bourdeaudhuij - Ghent University; Johanna Haraldsdóttir - Royal Veterinary and Agricultural University; Carmen Perez Rodrigo - Unidad de Nutricion Comunitaria; Maria Daniel Vaz de Almeida - Universidade do Porto; Inga Thórsdóttir - Landspitali University Hospital; Pernille Due - University of Copenhagen; Camilla Sadvik - University of Oslo; Johannes Brug - Erasmus Medical Center Rotterdam*

**Purpose:** The aim is to investigate reliability and validity of a questionnaire to measure (1) fruit and vegetable (F&V) intake and (2) personal, social and environmental correlates of F&V intake in European school children.
**Method:** The questionnaire was developed based on an inventory of existing questionnaires, behaviour determinant models and focus group interviews. Validity of the F&V intake measure was tested in four countries (Denmark, Iceland, Norway and Portugal), using a 7 day food record as the reference method. Test-retest reliability of the F&V intake measure as well as test-retest reliability, internal consistency and predictive validity of the measures of potential determinants of F&V intakes were tested in five countries (Belgium, Denmark, Norway, Portugal, Spain) using a one-week interval (total n=326).
**Results:** Correlations between F&V intake according to the food frequency part of the questionnaire and the 7day food records ranged between 0.40 and 0.53. The test-retest reliability of the F&V frequency measure ranged between 0.47 and 0.81, with averages of 0.66. For the measures of potential determinants of F&V, the test-retest reliability was good to very good (ICC > .60) for 12 out of the 15 fruit and vegetable constructs. Acceptable ICCs were found for the remaining constructs ranging between .50 and .59. Test-retest reliability was comparable across countries. Compared to other studies predictive validity can be considered moderate to good.
**Conclusions:** The questionnaire provides a sufficiently reliable, valid and easy-to-administer tool for assessing F&V intake and its correlates in 10-11 year olds.

## XIII-3 Predictors of fruit and vegetable consumption among children and adolescents: a review of the literature

*Pernille Due, Mette Rasmussen, Rikke Krølner - University of Copenhagen; Leslie Lytle - University of Minnesota; Johannes Brug - Erasmus Medical Center Rotterdam; Knut-Inge Klepp - University of Oslo*

**Purpose:** The aim is to provide a systematic review of potential determinants of fruit and vegetable intake in children and adolescents.
**Background:** To date nutrition education campaigns have generally been only moderately successful in improving a lasting consumption of adequate amounts of fruits and vegetables. Interventions to improve health-related behaviours should be tailored to the most important determinants or mediators of these behaviours. A systematic comprehensive review of the literature specifically studying determinants of children s fruit and vegetable intake is therefore needed.
**Methods/keypoints:** Studies identified by searching Medline and Psychinfo. Search was conducted using all combinations of the search terms: fruit(s) or vegetable(s) and children or adolescent. Inclusion criteria: (all should were met): a) Primary focus. f&v intake b) F&v consumption should be identifiable differentiated from other outcomes c) Studies should be based on populations within an identifiable age-range of 6 to 18 years. d) Population: representative or school-based. e) Human studies Exclusion criteria: a) Languages other than English b) Review studies c) Methodological papers d) Evaluation studies.
**Conclusion:** Seventy papers met the criteria for being included in this review, most published since year 2000, the vast majority from the US, others from Great Britain, Nordic countries and Australia. Most studies were cross-sectional and based on the Social Cognitive Theory. All used self-administered questionnaires to measure predictors. Most studies used food frequency measures obtained by self-administered questionnaires. The studies included variables on socio-demographic aspects, personal factors, health related factors, family related factors, other health behaviours and school related factors.

## XIII-4 Psychosocial factors regarding fruit and vegetable intake in 9 European countries - results from the Pro Children study

*Camilla Sandvik - University of Oslo; Ilse De Bourdeaudhuij - Ghent University; Johannes Brug - Erasmus Medical Center Rotterdam; Knut-Inge Klepp - University of Oslo*

**Purpose:** Children in Europe are consuming less fruit and vegetables than recommended. Knowledge about the potential determinants of fruit and vegetable intake is vital to understand a variation in intake and to guide interventions. Therefore, a cross-national study was undertaken, assessing fruit and vegetable consumption and potential determinants of intake among children in 9 European countries. Differences by country and gender will be presented.
**Methods:** Surveys were carried out on nationally representative samples with a total of 13.305 children (mean age 11.4). A self-administered questionnaire measuring fruit and vegetable intake and personal, social and environmental factors was completed by pupils in the classroom during one school-lesson. Age-adjusted co-variance analyses were carried out by gender for the full sample and for each country separately. Proportions responding positively to the constructs are presented.
**Results:** Although we find rather large differences between countries, overall, European children hold a positive attitude towards fruit and vegetable consumption. Girls are more positive than boys, and children are more positive towards fruit than vegetables. They report to experience the social environment as supportive towards fruit and vegetable intake. They perceive the availability of fruit and vegetables at home to be good. However, availability at school and leisure time activities seems to be low, both for fruit and for vegetables.
**Conclusions:** There are large between-country differences both in personal, social and environmental factors. Further research is needed to investigate the relationship between scores on these factors and fruit and vegetable intake.

## XIII-5 Applying intervention mapping in the development of Pro Children intervention

*Carmen Pérez-Rodrigo - Local Department of Public Health; Marianne Wind - Erasmus University Medical Center; Christina Hildonen - University of Oslo; Mona Bjelland - University of Oslo; Javier Aranceta - University of Navarra; Knut-Inge Klepp - University of Oslo; Johannes Brug - Erasmus University Medical Center*

**Purpose:** To describe the application of Intervention Mapping protocol to develop the Pro Children intervention, a project aimed to promote adequate consumption levels of fruit and vegetables among 10-13 year-old school children.
**Methods:** A needs assessment led to identify key behaviours to be modified by the intervention, which were further specified into performance objectives and related personal, social and environmental determinants. A matrix of learning and change objectives was built by crossing performance objectives by related and changable determinants.

Based on theory and evidence, a matrix of appropriate teaching strategies was developed.
**Results:** Program activities included guided classroom activities, computer tailored messages for children, activities to be completed at home with the family and family targeted specific actions. A set of optional components for community reinforcement was designed as well: mass media, school health services participation and/or implication of grocery stores. The provision of fruit and vegetables in the school was an outstanding element. Participation of school members was encouraged by stimulating school project committees. All activities and strategies were arranged into three main program components: classroom, family and community.
**Conclusions:** The Pro Children intervention was carefully developed based on the IM protocol that resulted in a comprehensive school-based F&V promotion program. Theoretically similar but culturally relevant interventions were designed to be implemented and evaluated during two school years in Norway, The Netherlands and Spain.

## XIII-6 Effect of Pro Children: an international multi-component school-based intervention to promote fruits and vegetables in school children

*Marianne Wind - Erasmus MC, University Medical Center Roterdam; Knut-Inge Klepp - University of Oslo, Faculty of Medicine; Carmen Perez-Rodrigo - Unidad de Nutricion Comunitaria; Johannes Brug - Erasmus MC, University Medical Center Rotterdam*

**Purpose:** To evaluate the effects of a multi-component intervention designed to increase 10-12 year-old school children's fruit and vegetable (F&V) intake and possible personal, social and environmental determinants.
**Methods:** The effects of a school-based intervention were examined among 1646 school children from 62 schools in Norway, the Netherlands and Spain. In each country the schools were randomly assigned to an intervention or control group. Effects on F&V intake and potential determinants were assessed by means of validated self-administered school-based written questionnaires. Surveys among children were conducted prior to the intervention (September 2003), immediately after the intervention (May 2004) and at the end of the subsequent school year (May 2005). Analyses of covariance were conducted to detect intervention effects on frequency of F&V intake, intention to eat F&V every day, knowledge of recommended intake levels, attitudes towards the eating of F&V, and habit strength, at first follow-up.
**Results/Findings:** Preliminary analyses indicated a significant increase in frequency of fruit $F(2,1682)=22.01$, $p=0.000$) and vegetable intake $F(2,1682)=14.2$, $p=0.000$). The intervention group showed a 22.7% higher intake at post-test for fruit and 8.7% for vegetables than the control group. Knowledge of recommended levels for both fruit ($p=0.030$) and vegetables ($p=0.000$) increased as well. For fruit significant differences were found for habit strength ($p=0.030$) and attitudes ($p=0.037$).
**Conclusions:** The Pro Children intervention was effective in increasing the frequency of school children's fruit and vegetable intake.

## Notes

## Thursday June 16, 14.00-15.30 – Grote zaal

## Paper session 1: Environmental influences on diet and physical activity

Chair: Ilse De Bourdeaudhuij

### 1.1 Are associations between physical environment characteristics and walking moderated by gender, age and education in older adults

*Ilse De Bourdeaudhuij - Ghent University; Johan Lefevre - K.U.Leuven; William Duquet - Free University of Brussels; Katrien Wyndaele - Ghent University; Lynn Matton - K.U.Leuven; Nathalie Duvigneaud - Free University of Brussels; Martine Thomis - K.U.Leuven; Renaat Philippaerts - Ghent University*

**Purpose:** The purpose is to investigate whether associations between environment characteristics and walking are moderated by gender, age group and education level.
**Methods:** A random country sample of retired older adults was drawn. The respondents filled in validated questionnaires to measure physical activity and environmental characteristics. Of the 840 respondents, 57% was male, aged between 50 and 80. Four education groups were determined by years of education. Anovas were used to study main and interaction effects on minutes of walking.
**Results:** Significant main effects showed more walking with higher residential density (p=0.014), higher land use mix diversity (p<0.001), availability of sidewalks (p=0.003), better access to local shopping (p<0.001) and higher street connectivity (p=0.003). Gender was found to be a moderator for the first four variables: the effect of living in a 'higher walkable neighbourhood' was much stronger in women than in men. A gender by education interaction revealed that more walking was especially related to higher residential density and street connectivity in lower educated men and higher educated women, whereas the opposite was true for sidewalk availability. A gender by age interaction showed that the availability of sidewalks is stronger related to walking in the oldest women. No associations with walking were found for safety from crime or traffic, or neighbourhood aesthetics.
**Conclusions:** Physical environment characteristics are related to walking in retired older adults with gender, age and education as moderators for some variables.

### 1.2 Economic evaluation of a pricing strategy to alter vending machine selections of employees in a rural worksite

*Judith Weber, John Tilford, Kitty Szeto, Gary Wheeler - University of Arkansas for Medical Sciences*

**Purpose:** To alter vending machine selections at a rural worksite by testing a pricing strategy to increase sales of low-fat, low-sugar (healthier) foods and decrease sales of high-fat, high-sugar (undesirable) foods in the workplace.
**Methods:** We used invoices and inventories to track vending sales at baseline and for the following 3 months. The 5 lowest sales, yet highest fat/sugar, items were replaced by 5 healthier foods (<30% kcals from total fat; < 10% kcals from saturated fat; <35% sugar by weight). A subsidy to the company permitted the introduction of healthy alternatives without loss of profit. Announcements about the healthy alternatives were posted for one month, and then price was dropped by 10¢ in each subsequent month. We calculated substitution elasticities for the healthy alternatives across four food categories scored from least healthy to the healthiest.
**Results:** Both the introductory period of the healthier foods, and the period of the first price reduction, decreased sales in all other vending food categories. Following the second price reduction, sales of healthy alternatives continued to increase, and sales of undesirable foods increased between 6-15%. Overall, substitution elasticities ranged from -0.06 to -0.36 with the largest substitution elasticities found for the healthiest alternatives.
**Conclusions:** Provision of healthy alternatives in vending machines reduced sales of undesirable foods. Large price cuts for healthy alternatives may lead to an income effect that can mitigate substitution of undesirable foods. Future research needs to address optimal subsidies to alter vending machine selections.

### 1.3 Perceived environmental, social, and personal correlates of cycling for transportation: a cross-sectional study among a student population

*Sylvia Titze - Institute of Sport Science; Willibald Stronegger - Institute of Social Medicine and Epidemiology; Susanne Janschitz - Institute of Geography and Regional Science; Pekka Oja - UKK-Institute*

**Background:** Public health recommendations emphasize the need to accumulate physical activity of at least moderate intensity on most days of the week such as walking and cycling for transportation. The purpose of the study was to identify how environmental, social, and personal attributes for transport cycling are perceived and how these multilevel variables are associated with bicycle use in university students.

**Methods:** In a cross-sectional sample of university students in Graz, Austria (n= 538; mean age 23.8 years SD = 3.5; female 43.9%) we conducted focus groups and developed a questionnaire to assess self-reported environmental, social, and personal attributes and cycling behaviour from home to university. Respondents were classified as non-cyclists, irregular cyclists (1-3 times per week) and regular cyclists (>3 times per week). After a factor analysis to develop clustered independent variables a multi-nominal regression analysis was conducted to identify associations between independent variables and cycling behaviour.
**Results:** Forty one percent of the students were regular and 15% irregular cyclists. Environmental attractiveness and low physiological effort were significantly related with irregular cycling. The perception of low traffic density, high safety from bicycle theft, many friends cycling to university, emotional satisfaction, little physiological effort, and high mobility were significantly associated with regular cycling.
**Conclusions:** The results suggest that among university students there are multilevel associations between environmental, social, and personal attributes and cycling for transportation. The identified variables should serve as useful basis for further studies on the determinants of transport cycling.

## 1.4 The moderating effect of the environment on change in children's physical activity over time

*Clare Hume, Jo Salmon, Kylie Ball - Deakin University*

**Purpose:** Environmental factors have only recently emerged as potential influences on physical activity (PA); however, the moderating effect of the physical and social environments, at home and in the neighbourhood on change in PA among children has not previously been examined.
**Methods:** Participants in this study were 184 children aged 10 years (46% boys). Children reported their perceptions of the physical and social environments, at home and in the neighbourhood. On three occasions over 18-months, children reported their usual walking frequency/wk, and 7 days PA was assessed using accelerometry. Repeated measures analyses of covariance were used to examine the moderating effect of the environment on change in children's walking frequency and overall PA over time.
**Results:** At home, opportunities for physical activity (pd.05) and for sedentary behaviour (pd.01) were significant moderators of change, as was support for PA from family members (pd.05). There were also neighbourhood safety (pd.01), aesthetic (pd.01) and social variables (pd.05) that showed significant moderating effects on change in walking frequency and overall PA.
**Conclusions:** Findings suggest that studies, and particularly interventions, that incorporate environmental influences into their design may be more likely to succeed at promoting children's PA; however future research with a larger sample and objective measures of the environment is required to confirm these findings.

## 1.5 The relationship between perceived improvements in the environmnet and sufficient walking for health

*Cora Craig - Canadian Fitness and Lifestyle Research Institute*

**Purpose:** To examine the relationship between perceived environmental improvements and sufficient walking.
**Methods:** In total, 1725 Canadians aged 30 years and older who participated in the 1981-1988 Canada Fitness Survey/ Campbell Survey on Well Being were interviewed November 2002-April 2004. Physical activity over the previous 12 months was estimated using a modified Minnesota Leisure-Time Physicl Activity Questionnaire. Sufficient walking was defined as walking an average of 30 minutes on 5 days per week. Participants rated (strongly disagree, disagree, agree, strongly agree) aspects of their current environment (e.g. safe to walk alone after dark) and the one where they lived in 1981. Changes were categorized as: strongly disagree/disagree and worse than 1981; agree but worse; same; improved; or consistently strongly agree. The odds of sufficient walking relative to environmental changes were estimated using logistic regression controlling for age and sex.
**Results:** Overall, 8.0% of participants walked sufficiently. Sufficient walking was associated with improved or consistently high ratings of 'lots of places to go within 10 minutes of home' (AOR=2.70 improved, 95% CI 1.50-5.05; AOR=2.30 consistently high, 95% CI 1.04-5.01) and with improved or equivalent ratings of 'places to walk safe from traffic' (AOR ranging from 1.96, 95% CI 1.01-3.83 to 2.71 95% CI 1.21-6.11).
**Conclusion:** Improvements and consistently high ratings of both the number of local destinations and safe places to walk predict sufficient walking for health.

## 1.6 Relationships between social and physical aspects of the neighborhood environment and BMI

*May C. Wang - University of California; Soowon Kim - Stanford University; Marilyn Winkleby - Stanford University*

**Purpose:** This study examines the contributions of the neighborhood environment to overweight risk.
**Methods:** We used survey and medical examination data from 8,085 adults aged 18-74 who had participated in five cross-sectional surveys as part of the Stanford Heart Disease Prevention Program, 1979-1990. These data were linked to U.S. census variables and historical data on retail food stores in the 82 neighborhoods of residence of the participants during the study years. Multilevel analytic techniques were used to estimate the relationships of neighborhood food environment and social indicators to body mass index (BMI). Indicators of the food environment included counts of various types of food stores in a neighborhood. Neighborhood social indicators such as the poverty rate were derived from census data.
**Results:** A higher number of small 'corner' markets in a neighborhood was positively associated with higher BMI in neighborhoods of low socioeconomic level ($p<.001$), after adjusting for participant's age, ethnicity, education, income, and neighborhood social indicators. This association was specific to women, and not observed in neighborhoods of high or moderate socioeconomic level. None of the social indicators was associated with BMI in neighborhoods of high and low socioeconomic level. In neighborhoods of moderate socioeconomic level, the percent of residents who were Hispanic and the poverty rate were positively associated with BMI ($p<.05$).
**Conclusion:** Both social and physical characteristics of the neighborhood are related to BMI, independent of individual sociodemographic factors; these relationships vary by the socioeconomic level of the neighborhood.

## 1.7 Do people choose neighborhoods that match their behaviour, or do neighbourhoods shape behaviour? Preliminary results from RESIDE

*Billie Giles-Corti, Matthew Knuiman - The University of Western Australia; Fiona Bull - Loughborough University; Anna Timperio - Deakin University; Terri Pikora, Kimberly Van Neil - The University of Western Australia; Trevor Shilton - National Heart Foundation; Max Bulsara - The University of Western Australia*

**Purpose:** The RESIDential Environment (RESIDE) project is an ecological longitudinal study designed to evaluate the impact of a new state government sub-division design code ('Liveable Neighbourhoods (LN) Guidelines') on walking. This natural experiment appears to be the first specifically designed to study self selection.
**Methods:** People building new homes in over 70 housing estates, including 24 LN estates, are invited to participate. Data will be collected before subjects move into their new homes, then one and three years after they move in. Recreational and transport-related walking (and cycling) undertaken inside and outside the neighbourhood and pedometer measures are being collected plus factors that influence choice of neighbourhood.
**Findings:** Preliminary baseline analyses ($n=784$) found no significant differences between LN residents and others: 60% were female, mean age 40 years (SD 12), mean minutes/week of recreational walking inside the neighbourhood 67 minutes (SD 109) and transport-related walking 25 (SD 54), and mean steps/day 8,253 (SD 3,541). Significantly more LN residents claimed that their choice of neighbourhood was influenced by factors that encourage more walking and cycling e.g., nearby shops and services (adjusted $p<0.013$), footpaths present ($p=0.006$), streets designed to be safer for pedestrians and cyclists ($p<0.080$), and ease of cycling ($p=0.030$).
**Conclusions:** LN residents appeared more likely to select their neighborhood based on its walkability. The extent to which this translates into increased walking will be determined at follow-up. Methodological issues will be discussed.

## Notes

## Thursday June 16, 14.00-15.30 – Fontys Hogeschool

## Paper session 2: Physical activity and disease prevention

Chair: Patricia van Assema

### 2.1 Dietary pattern trajectories throughout adult life and cardiovascular disease risk factors in women

*Sarah McNaughton - MRC Human Nutrition Research; Gita Mishra - MRC National Survey of Health and Development; Alison Stephen - MRC Human Nutrition Research; Mike Wadsworth - MRC National Survey of Health and Development*

**Purpose:** Despite increasing interest in dietary patterns and chronic disease, there are few longitudinal investigations. The objective of this study was to assess change in dietary patterns over time and relationships with cardiovascular disease risk.
**Methods:** Female participants of the MRC National Survey of Health and Development (1946 British Birth Cohort) completed a five-day food diary at three time-points during adult life (age 36 years in 1982, 43 in 1989, and 53 in 1999; n=696). Food and beverage items were categorised into food groups and respondents were dichotomised as consumers or non-consumers. Factor analysis for binary variables revealed three dietary patterns: cosmopolitan, healthy and traditional. A pattern score was calculated from the consumption of the food items in each dietary pattern. Means and 95% confidence intervals for dietary pattern scores were calculated for each cardiovascular disease risk category using random effects models adjusted for socio-demographic and health-related behaviours.
**Results/Findings:** Pattern scores for the cosmopolitan and healthy patterns increased over the 17 years while traditional pattern scores decreased over time. BMI was associated with healthy pattern scores. Blood pressure was inversely associated with cosmopolitan pattern scores and red blood cell folate concentrations were positively associated with the cosmopolitan and healthy patterns.
**Conclusions:** Dietary patterns varied throughout adult life and were associated with BMI, blood pressure and red cell folate. These dietary patterns reflect actual behavioural patterns, may represent what can actually be achieved by the population and can contribute to effective public health messages.

### 2.2 Outcomes of a multi-faceted physical activity regimen as part of a diabetes self-management intervention

*Diane King, Paul Estabrooks - Kaiser Permanente; Lisa Strycker, Deborah Toobert - Oregon Research Institute; Sheana Bull - University of Colorado Health Sciences Center; Russell Glasgow - Kaiser Permanente*

**Purpose:** In a randomized trial of diabetes self-management support, we evaluated the effectiveness of a multifaceted physical activity (PA) intervention that emphasized participant choice in activity selection. We also examined whether baseline activity patterns predicted changes in PA over 2 months regardless of treatment condition.
**Methods:** Participants (N=334) were randomized to experience a computer-assisted, tailored self-management (TSM) or health risk appraisal (HRA) program. The TSM CD-ROM helped participants create action plans via interactive selection of diet and PA goals (for both aerobic and strengthening activities), benefits, barriers, and success strategies. Between-visit support was provided via telephone calls and newsletters. HRA participants received general health advice with no between-visit support. All participants completed PA, diet, and psychosocial assessments at baseline and 2 months.
**Results:** For N=308 participants completing 2-month follow-up, TSM participants significantly increased expended calories/week in all PA ($p < .01$) and moderate PA (METs > 3.0; $p < .01$) relative to HRA participants. Baseline cluster analyses grouped participant activity patterns into four categories reflecting mostly rote exercise, mostly purposeful lifestyle activity (e.g., gardening), mixed rote/lifestyle, and mixed sport/lifestyle activity. Cluster assignment predicted change in calories expended in moderate, rote, purposeful sport, and purposeful lifestyle activity over 2 months for both treatment groups.
**Conclusions:** A computer-assisted, multifaceted approach to PA demonstrated successful improvement after 2 months. Results suggest that individuals are capable of adjusting activity patterns to maximize PA.

## 2.3 Walking behavior and metabolic syndrome in a community (the Fleurbaix Laventie Ville Sante Study II)

*Jean-Michel Oppert - Hotel-Dieu Hospital (University Paris VI); Muriel Tafflet, Adrien Kettaneh - INSERM U 258; Jean-Michel Borys, Agnes Lommez - FLVS ASSOCIATION; Marie-Aline Charles - INSERM U 258*

**Purpose:** Relationships of objectively assessed walking behavior with health outcomes need further clarification. We investigated the cross-sectional associations of pedometer recordings with metabolic syndrome (MetS) in a population-based study.
**Methods:** In 221 men and 268 women aged 25-65 y living in two towns in Northern France, we assessed: pedometer recordings (Yamax DW 450) for 7 days, waist circumference, blood pressure, and fasting plasma glucose, triglycerides and HDL-cholesterol. MetS was defined according to National Cholesterol Education Program criteria. Sex-specific relationships of average number of steps/day (in quartiles) with MetS frequency were analysed using chi-square tests and logistic regression models.
**Results:** Median [interquartile range] of number of steps/day was 8100 [6000-9850] in men and 7250 [5770-9130] in women. The most frequent MetS abnormality was increased blood pressure, the least frequent increased blood glucose. MetS frequency was 10.9% in men and 11.6% in women. MetS frequency significantly decreased from 1st to 4th quartile of number of steps/day in men (4.5%, 3.2%, 2.7%, and 0.5%, respectively, $p<0.05$) but not in women (4.1%, 2.6%, 3.0%, 1.9% respectively, NS). In men, the relationship remained significant when adjusted for age by logistic regression.
**Conclusions:** Although cross-sectional, the data suggest a favorable association of pedometer recordings with MetS, at least in men. This may be of importance in health promotion programs designed to increase walking behavior in the population.

## 2.4 Depression and physical activity: a 10 year longitudinal study from 13 to 23 years of age

*Bente Wold, Marianne Skogbrott, Torbjoern Torsheim - University of Bergen*

**Purpose:** To examine the direction of causality between participation in leisure-time physical activity and depressed mood during adolescence and young adulthood in a normal sample of adolescents.
**Mehods:** Data are from the Norwegian Longitudinal Health Behaviour Study. The respondents were surveyed between 1990 (at age 13) and 2000 (age 23) at 8 measurement points. 924 students participated in 1990 and 627 in 2000. The study is based on self report measures. Analyses of variance and growth curve analysis were applied to the data.
**Results:** Depressed mood at an early stage in adolescence seems to predict physical inactivity, while participation in leisure-time physical activity was not found to be predictive of depressive mood.
**Conclusions:** As depressive mood is indicated by a lack of motivation and initiative in general, it is likely that feeling depressed may also affect the motivation for taking part in physical activity during leisure time. Thus, the findings imply that there may be a need for targeting interventions to promote physical activity among depressed adolescents.

## 2.5 Effects of high-intensity progressive resistance training on self-reported health status in older persons with type 2 diabetes

*David Dunstan - International Diabetes Institute; Robin Daly - Deakin University; Neville Owen - The University of Queensland; Jonathan Shaw - International Diabetes Institute; Damien Jolley - Monash Institute of Health Services Research; Elena Vulikh, Paul Zimmet - International Diabetes Institute*

**Purpose:** To evaluate the influence of high-intensity progressive resistance training (PRT) on self-reported physical and mental health in older persons with type 2 diabetes.
**Methods:** We performed a 12-month RCT with 36 overweight men and women with type 2 diabetes (aged 60-80 years) who were randomly assigned to a moderate weight-loss diet plus PRT (PRT&WL) or a moderate weight-loss diet plus a control (stretching) program (WL). Gymnasium-based training for 6 months was followed by an additional 6 months of home-based training. The SF-36 (v1) questionnaire was used to obtain physical (PCS) and mental (MCS) health component summary scores at baseline, 6 and 12 months.
**Results:** Subject retention was 81% and 72% after 6 and 12 months respectively. Exercise adherence during gymnasium- and home-based training was 88% and 73% for the PRT&WL group, and 85% and 78.1% for the WL group respectively. In a regression model adjusted for age and sex, PCS improved in the PRT&WL group compared to the WL group after 6 months of gymnasium-based training (2.3 versus -2.0, $p = 0.05$), which persisted after 12 months training (0.7 versus -4.1, $p = 0.03$). There were no between-group differences at 6 or 12 months for the MCS.
**Conclusion:** High-intensity PRT was effective in improving self-reported physical health, but not mental health. PRT provides an effective exercise alternative in lifestyle management for older adults with type 2 diabetes.

## 2.6 Adherence to a diet and physical activity intervention among people with impaired glucose tolerance

*Patricia van Assema, Cheryl Roumen, Jascha de Nooijer, Ellen Blaak - University Maastricht*

**Purpose:** The Study on Lifestyle intervention and Impaired glucose tolerance Maastricht (SLIM) aims to reverse the worsening of impaired glucose tolerance by offering participants individual advice by a dietician about dietary habits and physical activity, and the opportunity to participate in a tailored physical activity program. The purpose of the present study was to assess long-term adherence to the SLIM intervention and factors that determine adherence.
**Methods:** In a cross-sectional design, participants that were randomized into the intervention of SLIM at least two years ago were asked to complete a questionnaire. The questionnaire included a self-estimate of adherence to the dietary and physical activity advises, and also assessed concepts from several theoretical models as potential influential factors. Regression analyses were used to analyze the data.
**Results:** Half of the 58 participants indicated to adhere to both the physical activity and dietary advises at least most of the time, 18% to the dietary advises only, 16% to the physical activity advises only, and 16% to none of the advises. Preliminary analyses of the social psychological variables only, revealed significant negative association between adherence to the physical activity advises and self-efficacy (beta=0.67), and between adherence to the dietary advises and self-efficacy (beta=0.46) and subjective norm of family members (beta=0.28).
**Conclusions:** Adherence did not differ for the dietary versus physical activity advises. The discussion will focus on the social psychological factors that could be enhanced in order to increase adherence.

## Notes

## Thursday June 16, 14.00-15.30 – Keizerzaal

## Paper session 3a: The psychology of weight loss

Chair: Anita Jansen

### 3.1 Is overeating a paradoxical effect of dieting in the obese?

*Anita Jansen, Chantal Nederkoorn, Anne Roefs - Maastricht University*

**Purpose:** One of the leading theories in the field, the dietary restraint theory, states that dieting increases the risk of overeating. If this widely accepted theory is true, the dieting obese might easily be hindered by overeating. The theory states that stimuli like a sad mood and cue-elicited craving are easily able to induce overeating in the dieter. There have however been few experimental tests of the dietary restraint theory. After a brief sketch of the empirical support for a paradoxical overeating effect of dieting, data of an experimental study into some triggers of overeating in obese vs. non-obese participants will be presented.
**Method:** A sad mood was induced and craving was manipulated in two experimental conditions (between subjects design). The sad mood was induced by listening to a half-speed version of Prokofievs Russia under the Mongolian Yoke and at the same time concentrating on a very bad memory. Craving was induced during 10 minutes exposure to the sight and smell of chocolate, nuts and cookies. After the experimental and control manipulations food intake during a bogus taste test was measured.
**Findings & discussion:** the data analysis is underway now. The data will show whether overeating is a paradoxical effect of dieting in the obese. They will also illustrate the effects of respectively a sad mood and confrontation with external food cues on the food consumption of obese vs. non-obese people. The implications of the findings for restraint theory as well as diet management in the obese will be discussed.

### 3.2 Learning to (dis)like tastes

*Remco Havermans, Anita Jansen - Maastricht University*

**Purpose:** Study 1: to determine the role of sensory-specific satiety in the development of obesity. Study 2: to determine the role of nutrients in the development of taste preferences.
**Methods:** Study 1: The development of SSS was compared between 41 normal-weight and 48 obese women. Participants repeatedly had to taste a specific drink. It was hypothesized that the palatability of this drink would decrease as compared to the palatability of another drink, which is indicative of SSS, and that this effect would be particularly strong in the obese participants. Study 2: A within-subject design was used to investigate the question whether carbohydrates and fat differ in their potential to condition a flavor preference. This was studied in a group of 18 normal-weight women. During 12 conditioning sessions 3 flavors were paired with either a low-energy yoghurt, a carbohydrate-rich yoghurt, or a fat-rich yoghurt.
**Results:** Study 1: All participants demonstrated a decrease in the palatability of the test drink, but only the obese women demonstrated clear SSS. Study 2: It was found that preference and liking of the carbohydrate-rich yoghurt had increased, as opposed to the fat-rich and low-energy yoghurt.
**Conclusions:** Study 1: Obese women are more sensitive to specific sensory characteristics of tastes than normal-weight women. Study 2: Carbohydrates are more reinforcing than dietary fat in conditioning flavor preferences in humans.

### 3.3 Prevention of obesity: short term and 6 months follow-up effects of behavioural versus cognitive behavioural therapy for obese children

*Sandra Mulkens, Esther Jansen, Anita Jansen - Maastricht University*

The prevalence of overweight Dutch children, aged 5-16, is about 13%, whereas obesity occurs in about 7% of this group (Fredriks et al., 2000, Archives of Disease in Childhood, 82, 107-112).
Behaviour therapy (BT), focusing on changing bad eating and exercise habits, and involving the parents as well, is the treatment of choice for childhood obesity, but there is still much room for improvement (Epstein et al., 1994, Health Psychology, 13, 373-383). Experts argue that the disturbed body image and the low self-esteem of people with obesity should be treated.
In this treatment study, it is investigated whether children profit more from a long behaviour therapy (16 weekly sessions) than from a short one (8 weekly sessions) and whether cognitive therapy has an additional value in the treatment of obesity.
120 children (aged 8-12) have been randomly assigned to either behaviour (short or long) or cognitive-behaviour

therapy, including parental sessions. Treatment is provided within groups of 6 children and carried out by trained and supervised (cognitive) behaviour therapists. Before and after treatment, at 1/2, 1 and 2 year-follow-up, the children are assessed with respect to weight, length, eating and exercise behaviours, eating pathology, self-esteem, and mood. Since the treatment study is now ending after five years and the half-year follow-ups of the last participating children will soon be collected, the short term and half-year follow-up results of this study will be presented at the ISBNPA meeting.

## Paper session 3b: Awareness of diet and physical activity

Chair: Lilian Lechner

### 3.4 Factors related to misperception of physical activity: social comparison, BMI, and other reference frameworks

*Lilian Lechner, Catherine Bolman, Marius van Dijke - Netherlands Open University*

**Purpose:** With respect to health risk behaviours, many people are unaware of their own risk behaviour and regard it as healthier than it really is. This paper studied the prevalence of lack of awareness of peoples' insufficient physical activity, and the differences between people with and without misperception.
**Methods:** In the study subjects' actual physical activity (SQUASH) was compared with their subjective physical activity estimation. The differences between people with and without misperception were studied with respect to their social comparison style (upward, equal, downward), their BMI and self-rated weight, and linkages of physical activity with different reference frameworks (appearance, weight, feeling fit, relaxation, stress relief) (n=516, response 52%).
**Results:** There were large differences between subjects' actual physical activity behaviour, and their own perceptions of their behaviour. Subjects who wrongly think their physical activity is ok (overestimators), more often rate their physical activity behaviour in comparison to others. Furthermore, overestimators and people who correctly think they exercise enough more often use downward comparison, while underestimators and subject who know they exercise too little mostly use upward comparison. People who, rightly or not, think their weight is ok or who have a lower BMI, more often assume that their physical activity is sufficient or high. People who, rightly or not, think that their physical activity is ok, more often score higher on other reasons to be physically active besides health.
**Conclusions:** In order to change peoples' awareness, their social comparison structure and reference frameworks need to be addressed.

### 3.5 (Mis)interpretation of body weight in adult women and men

*Ingrid Steenhuis - Erasmus University; Arjan Bos - Open University; Birgit Mayer - Erasmus University*

**Purpose:** A lack of awareness of own body weight might be a barrier for healthy eating and weight loss behaviors. This study examines what strategies people use to determine and interpret their body weight, and what factors are associated with either an underestimation of overweight or an overestimation of a healthy body weight.
**Methods:** Data were collected by means of questionnaires (n=722). Socio-demographic variables, BMI, self-rated body weight, methods to determine body weight, weight loss behaviors in the past, physical activity, knowledge of BMI and health weight ranges, media influence and body comparison were measured. Chi-square statistics and logistic regression analyses were used to analyse the data.
**Results:** In comparison to unaware overweight individuals, aware overweight respondents did score significantly lower on comparing their body to that of others and on listening to remarks from others as strategies to determine and interpret their body weight. The same was true for respondents with a correct perception of their healthy body weight compared to respondents who overestimated their healthy body weight. Underestimation of overweight was significantly associated with BMI, intense physical activity, knowledge of a healthy weight range and body comparison; overestimation of healthy body weight was significantly associated with gender, BMI, weight loss history and media influences.
**Conclusions:** The study gave more insight in the way people estimate and judge their body weight, which can be used in prevention programs regarding overweight and eating disorders.

## 3.6 Exploring the occurrence and nature of comparison of one's own dietary fat intake to that of self-selected others, in the context of misperception of personal dietary fat intake

*Anke Oenema, Johannes Brug - Erasmus MC, University Medical Center*

Lack of awareness, or misperception, of personal dietary fat intake, has been identified as a barrier for the motivation to lower dietary fat intake. Comparison of one's own dietary fat intake to that of others has been associated with this lack of awareness. Little is known, however, about how or when interpersonal comparison related to dietary intake occurs. Insight in the occurrence of such interpersonal comparisons may be helpful in choosing appropriate strategies for motivational nutrition interventions. We conducted a study to gain insight in 1) how and with whom people compare themselves related to dietary fat intake and 2) what characteristics determine a higher inclination to compare with others.

Structured telephone interviews were conducted among 198 Dutch adults. Fat intake, behavioral determinants and aspects of interpersonal comparison were assessed. Logistic regression and descriptive statistics were used for data analysis.

Respondents reported to use comparison with others as a means to evaluate their fat intake and to use various types of comparison information, such as observing what others eat (81%) or buy (71%). Close relatives (43%) and friends (34%) were the most common comparison persons. Respondents who intended to change (OR = 2.27) and those of younger age (OR = 1.03) were more inclined to compare with others.

The study demonstrates that interpersonal comparison related to dietary fat intake does occur and provides basic insight into how this occurs. Respondents with an intention to change were more inclined to compare with others, not those who misperceived their fat intake.

## Notes

## Friday June 17, 11.30-13.00 – Keizerzaal

## Paper session 4: Community intervention to change diet and physical activity

Chair: Beverly McCabe-Sellers

### 4.1 Process evaluation of a Dutch community intervention to improve health related behavior in deprived neighborhoods

*Gitte Kloek, Frank van Lenthe - Erasmus MC; Yvonne Meertens - Municipal Health Services; Johan Mackenbach - Erasmus MC*

This paper reports on the objectives, methods and results of the process evaluation of the Dutch Community Intervention 'Wijkgezondheidswerk', which was aimed at improving (intermediate) outcomes of health related behavior in deprived neighborhoods. Major objectives of the process evaluation were to assess the extent of exposure to the intervention and fidelity of intervention implementation. Data were gathered throughout the intervention period using minutes of meetings, registration forms and a postal questionnaire among residents in intervention and comparison neighborhoods. The results indicate that the neighborhood coalitions organized more than 50 health related activities in the neighborhoods over a two-year period. Two thirds of the implemented activities were directed at increasing attention, information, awareness and knowledge, and one third was directed at behavioral change. Awareness of the program 'Wijkgezondheidswerk' was 23% and participation in intervention activities was 3% among the general population of the intervention neighborhoods. The intervention was in broad outlines delivered according to the key principles of a 'community approach', although perhaps the community participation and the use of an ecological perspective can be improved. There was a strained relationship between the key principles of the 'community approach' and the a priori defined intervention goals. The included single intervention components satisfied the need of the neighborhood coalitions but not the researchers need for effective intervention components. This suggests that behavior change or change in intermediate outcomes may become more likely if there is a possibility to include evidence-based intervention components in community interventions.

### 4.2 Alternate approach to training and quality control for community-based participatory research in rural communities

*Bernestine McGee, Glenda Johnson, Crystal Johnson, Alma Thornton, Valerie Richardson, Kim Bardell - Southern University and A&M College; David Harsha - Pennington Biomedical Research Center; Margeret Bogle - USDA ARS Delta NIRI*

**Purpose:** To describe the approach used by The Lower Mississippi Delta Nutrition Intervention Research Initiative to train in the data collection components of the community-based participatory research. Background: Community members have a voice in choosing research topics, developing protocols, collecting data, and interpreting results. Standardization of training and quality assurance procedures are critical for comparability of findings.
**Methods:** Comprehensive training includes basic interviewing techniques, study procedures, data management, ethics and confidentiality. Using common job descriptions, data collectors are selected by individual state research committees. Training time ranges from approximately 4-20 hours of didactic presentations and practice. Data collectors may include community and Delta NIRI interviewers; biomedical and anthropometric technicians, and data reviewers. Didactic sessions explain how to use the data collection instruments and equipment, emphasize the importance of confidentiality and describe personal qualities needed to conduct interviews. Practice interviews are conducted and videotaped. Data collectors are certified in two phases. The first phase includes a demonstration of data collection techniques by each data collector with 'test' individuals not involved in the specific study. This certification phase includes supplemental training; whereby necessary aspects of the training will be repeated. The second phase includes a demonstration of data collection techniques during the feasibility studies conducted by each state prior to main study implementation. At this time final certification will be awarded.
**Conclusion:** Community involvement in the research process is of value as a means for diffusing the participatory approach to implementing sustainable interventions.

### 4.3 Capacity building of communities and academia in the research process in the lower Mississippi delta nutrition intervention research initiative (NIRI)

*Beverly J. McCabe-Sellers - United States Department of Agriculture; T. Elaine Prewitt - University of Arkansas for Medical Sciences; Earline Strickland - United States Department of Agriculture; Bernestine B. McGee - Southern University and A&M College; Edith G. Hyman - University of Arkansas at Pine Bluff; Margaret L. Bogle - United States Department of Agriculture*

**Purpose:** The purpose is to outline the process by which community based participatory research (CBPR) builds capacity of rural communities and academicians to promote full participation of all partners in research interventions

and activities. Background: While full participation of community members in all aspects of CBPR is considered ideal, literature provides little practical details and guidance about preparation of community members or academicians new to CBPR for these critical roles.

**Methods/Key Words:** Original community participation was begun through a key informant survey (KIS), followed by comprehensive participation and planning evaluation (CPPE) that identified three major problems and their root causes amenable to nutrition intervention. Local NIRI groups were formed to begin designing interventions to address one or more of these causes. Intervention subcommittees and working groups were formed within the local NIRI to plan and develop specific interventions. Specific questions and concerns of community members began to appear and these highlighted the need for developing definitions, guidelines, criteria, and training in the research process for both community and university partners. Need for a new type of umbrella" Institutional Review Board entity began to arise to meet the community's sense of urgency in intervention implementation.

**Conclusions:** Questions and concerns that arose in this process illustrate the need for research capacity building. Experience in community participation is needed for both community residents and academicians new to CBPR. Tailored training in the research process including designing, training, implementation, evaluation, and dissemination procedures is needed to fully implement CBPR.

## 4.4 Community readiness for nutrition and physical activity intervention research

*Edith G. Hyman - University of Arkansas at Pine Bluff; Beverly J. McCabe-Sellers - United States Department of Agriculture; Earline Strickland - United States Department of Agriculture; T. Elaine Prewitt - University of Arkansas for Medical Sciences; Catherine G. Staggs - United States Department of Agriculture; Margaret L. Bogle - United States Department of Agriculture*

**Purpose:** To present findings from an assessing of community readiness for nutrition and physical activities in three rural Delta communities.

**Methods:** The Tri-Ethnic Community Readiness Survey, an instrument that translates qualitative interviews into six dimensions of readiness, was adapted for assessing readiness for nutrition and physical activity interventions. Interviews of key informants from eight sectors in the community were conducted and scored. After independent scoring by two researchers, a consensus on a single score for each of the six dimensions was built. An overall stage of readiness score was assigned by summing the six dimension scores and dividing by six.

**Results:** An overall community readiness score for each of the three communities was determined for both nutrition and physical activity readiness. The three overall community scores out of a maximum of 10 were: Community A: 3.45 and 3.52 for nutrition and physical activity readiness, respectively; Community B: 2.85 and 2.83, respectively, and Community C: 3.71 and 3.86, respectively.

**Conclusions:** These results suggest the communities were not as ready for the interventions as some of the local leaders thought, that more effort and new strategies need to be implemented to increase readiness, and the survey provides an objective assessment outside the local NIRIs. Specific strategies are given for varying levels of readiness. Closeness of the two issues in all three communities suggest that addressing only one of the two issues would have yielded the same degree of information and taken less respondent time.

## 4.5 Child obesity prevention community interventions: employing principles of knowledge transfer and decision making in the context of evidence and need for innovation

*Lisa Gibbs, Elizabeth Waters - Deakin University; Liz Moore, Veronika Pradel - Moreland Community Health Service*

**Purpose:** This paper will report on the decision-making process being utilized in partnership with schools to develop interventions when evidence is present or absent.

**Background:** The evidence base on effective interventions for prevention of child overweight and obesity is limited and is often based on short term studies in specific school contexts, measuring some but not all of the variables associated with unhealthy weight gain. This makes it difficult to develop an informed comprehensive intervention.

**Methods/key points:** A systematic review of published and unpublished evidence on community decision-making, knowledge transfer and promotion of healthy weight was conducted. The knowledge transfer and decision-making process was then developed as part of a trial study of a school community based intervention promoting healthy eating, increased physical activity and improved social health and well-being for children and families. Twenty-four primary schools are participating. The community context for the study is an inner-urban, lower socio-economic, culturally diverse community in Melbourne, Australia. Key criteria for decision making include:

- Capacity and commitment of school communities
- Children driven planning and delivery
- Supportive environmental measures
- Long term/sustainable management plan
- Evidence of harms and benefits drawn from rigorous evaluations

**Conclusions:** Effective nutrition and physical activity community interventions rely on knowledge transfer between researchers, school and community contacts and families, and the appropriate, considered use of innovative strategies to address gaps in the evidence and to adapt to the different needs and resources of diverse school communities.

## 4.6 The effects of an enhanced group cohesion intervention on the physical activity behaviours of older adults

*Cristina Caperchione, Kerry Mummery - Central Queensland University*

**Purpose:** The development of a group-oriented environment that promotes cohesion has been identified as a successful approach to increasing physical activity levels amongst older adults (Estabrooks 1999; Conn, Valentine et al. 2002). Thus, the purpose of this study was to examine the effectiveness an intervention aimed at enhancing group cohesion and physical activity in a sample of older adults. A unique aspect of this study is the use of group development and group process theory to drive the intervention.
**Method:** Older adults (N=90) took part in a 12-week intervention with repeated post-intervention follow-up. One arm of the intervention received an enhanced program aimed at increasing group cohesion. Physical activity and perceptions of group cohesion were assessed by the Community Health Activities Model for Seniors and the Physical Activity Group Environment Questionnaire.
**Results:** Post-intervention measures showed significant increases in physical activity in both arms of the intervention. No significant differences were observed between groups in terms of group cohesion or physical activity behaviour. Further analysis revealed a decrease in group cohesion at 6 and 12month follow-up, although participants retained moderate to high levels of cohesion throughout the 12month period.
**Conclusions:** Although the intervention was successful in increasing physical activity, there was no apparent effect shown by the theory-based approach aimed at enhancing group cohesion. Further research is needed to understand the mechanism that fosters group cohesion in order to develop future interventions aimed at increasing physical activity behavior and adherence in older adults.

## 4.7 Shape up Somerville: a community-based participatory research intervention

*Jeanne Goldberg, Christina Economos - Tufts University*

**Purpose:** Shape Up Somerville: Eat Smart, Play Hard is an evaluation-based obesity prevention initiative targeting 6-9 year olds in Somerville, MA to stem the rise in obesity in this group. The intervention, designed in collaboration with community members, provides opportunities for small, sustainable changes throughout the day that will bring the caloric equation into balance.
**Methods:** Two school components insure equal exposure for all children. The curriculum, developed for the intervention with input from classroom teachers, includes physical activities that can be conducted within the constraints of classroom space and a 30-minute weekly interactive nutrition or activity lesson. In addition to modified menu options developed with the Food Service Manager and personnel, food service offers regular taste tests to encourage children to try new fruits, vegetables, and fiber-rich foods. These are then added to the menus. Changes in relative weight, measured by body mass index, in the intervention community will be compared to two control communities.
**Results:** Feedback indicates that these changes have been easy to implement and well received. In addition, many school policy changes have been implemented to assure sustainability. Numerous other innovations, including an after-school curriculum, have been developed with widespread community input. Designed as a one-year intervention, community demand has led to an extension of the program. Well-developed components are being transferred to the community for sustainability.
**Conclusions:** Applying the principles of community-based participatory research offers promise as an approach to design and implementation of childhood obesity interventions.

## Notes

## Friday June 17, 11.30-13.00 – Fontys Hogeschool

## Paper session 5: Nutrition in young people

Chair: Elling Bere

### 5.1 Prevalence and usage of school vegetable gardens in north-eastern Australia

*Antoine Bossard – INSFA; Shawn Somerset - Griffith University*

**Purpose:** To determine the prevalence and usage of vegetable gardens in Queensland primary schools.
**Methods:** State primary schools in three distinct geographic regions (metropolitan n=117, tropical n=47 and arid n=17) of Queensland were investigated. Teachers from each school were interviewed by telephone to determine how gardens were used and possible barriers to the establishment of gardens in schools.
**Results:** Of the 71% of schools agreeing to participate in this study, 20% had functioning vegetable gardens. Climate was a major factor affecting variations in prevalence between regions. In particular, only 6% of schools in the western arid region had a functioning vegetable garden, but 23.5% reported having had one previously (compared to an average across all schools of 20% and 6.1%, respectively). Gardens were often integrated into curricula related to science, environmental sustainability and social skills. The potential positive impacts of gardening on student nutrition, physical activity and social interaction were consistently identified by interviewees. The main issues for schools and teachers in establishing gardens were the time required and the lack of personnel to coordinate garden activities, despite 92% of schools with a vegetable garden indicating that their garden was a success. Better communication and resource sharing were identified as specific needs to facilitate this activity.
**Conclusion:** This study showed that school-based vegetable gardens are a common occurrence, despite very low coordination between schools in this activity. Interschool coordination and climate-specific strategies will facilitate broader adoption of this health promoting activity.

### 5.2 Do young people think about food in terms of risk to health? Towards an understanding of young people, food and risk in the context of school

*Michelle Share - University of Ulster*

**Purpose:** This paper considers risk, food and young people in the context of the secondary school environment in Ireland. It outlines dominant theoretical discourses on risk and considers their relevance to an understanding of issues of food risk and young people in the teaching and learning environment.
**Background:** Research has explored how adults perceive food risk, largely within a psychometric paradigm that focuses on issues such as BSE, GM foods and microbiological hazards. Few researchers have examined how young people see food risk. At the same time there has been an explosion of interest in childhood obesity. Consumption data suggests that most young people fail to follow 'healthy eating' guidelines. This may have serious implications for their long-term health; but the social processes involved are complex. This occurs against a backdrop of health promotion messages on healthy eating and pressures on schools to be health-promoting environments.
**Methods/key points:** Issues of food risk and young people are outlined through an exploration of literature in cognitive psychology, the risk society thesis and Foucault's governmentality perspective. The paper outlines how the social and cultural construction of food risk issues for young people will be explored empirically in order to allow for an examination of real issues of food consumption and food safety whilst examining questions of responsibilisation, choice and control in the school environment.
**Conclusions:** The paper reveals how an interdisciplinary approach across theoretical perspectives may contribute to understanding food risk issues in the context of the school environment.

### 5.3 School-level food practices are associated with young adolescents' body mass index

*Martha Kubik, Leslie Lytle, Mary Story - University of Minnesota*

**Purpose:** The school environment is recognized as having a powerful influence on students' dietary practices and school environmental factors that promote less-than-healthy eating practices have been implicated in the rising rates of childhood obesity. While the pervasiveness of school a la carte and vending programs is well documented, studies assessing other prevalent food practices, such as foods used in school fundraising and in the classroom as student incentives/rewards are few. The present study was undertaken to examine the association between certain prevalent school-level food practices and young adolescents body mass index (BMI).
**Methods:** A cross-sectional study design was used. We collected self-report data from administrators from 16 middle schools in the St.Paul/Minneapolis metropolitan area and created a 7-item school-level food practices scale (Cronbach

alpha=0.83). Grade 8 students (n=3088) provided self-reported heights and weights.
**Results:** The average food practices score was 3 (range: 0-7). There was a positive association between the school food practices scale and students' BMI, with BMI increasing 10% for every additional food practice permitted (P=.03; 95% CI=.010-.191).
**Conclusions:** This is the first study to demonstrate an adverse association between certain prevalent school food practices and students' BMI. Our results support the notion that schools are influential environments and school-level factors require targeted attention from researchers and the school community. School nutrition policies that consistently promote and support healthy dietary practices among school-aged youths are urgently needed.

## 5.4 Prospective analyses of relationships between mothers' and children's diet

*Ronald Iannotti - National Institute of Child Health and Human Development; Rusan Chen - Georgetown University; Shelia Broyles, Philip Nader - University of California, San Diego*

**Purpose:** This study examines longitudinal patterns in the development of selected dietary indicators and potential causal relationships between mother and child on these indicators for children ages 4 to 17.
**Methods:** Latent Growth Curve and Autoregressive models were used to examine developmental trends and bi-directional prospective paths between parent and child dietary indicators in a longitudinal sample of 351 Anglo- and Mexican-American families. Parent and child fat avoidance was assessed over the 13-year period starting at 4 years of age. Indices of parent and child fat intake and fruit and fiber intake were assessed when children were 16 to 17 years old.
**Results:** Fat avoidance increased in mothers, younger children, and older girls. Fat intake and fruit and fiber intake decreased in adolescents. There was evidence for significant prospective paths with mothers' indices at one wave predicting children's indices at the next wave; however, evidence for children's prospective influence on mothers' fat avoidance was also present. Significant prospective paths from child to mother were even more evident when models were examined for each ethnic subsample.
**Conclusions:** The influence of family members on dietary behaviors may be bi-directional. Mothers have some influence over the dietary intake of their children; however, children may influence the fat avoidance behavior of their mothers. This suggests possible mechanisms for intervention, e.g., school-based interventions to change the dietary behavior of families and modification of mothers' dietary behavior to change diets of their children.

## 5.5 Consumption of fruit and vegetables among school adolescents in Thailand

*Somchai Durongdej - Mahidol Faculty of Public Health*

This study was conducted by Mahidol Faculty of Public Health with financial support from World Health Organization. The project conducted in 2003 aims at determination of vegetables and fruit consumption among the adolescents aged 9-14 years.
Data was collected by interviewing 710 adolescents and discussing with their parents, resided in 10 provinces both rural and urban areas where vegetables and fruit are locally produced and available all year round in the southern Thailand. Data included knowledge, perception, belief and practices at the household level, 24-hr dietary recall and factors related to their vegetables and fruit consumption were conducted.
The findings showed that daily vegetables and fruit consumption among adolescents were lower than 400 grams. Amounts of daily vegetables and fruit consumption were 105.97+ 67.14 gm and 149.40+ 157.53 gm respectively. Green vegetable consumption was 79.66+54.24 gm/day. The total vegetables and fruit consumption was 255+172.95 gm/day. Parents want to introduce fruit but not vegetables to their diets due to the fact that adolescents do not like it. 50% make fruit available for consumption at home. It is easier to increase fruit than vegetables as it is more convenient and easy to prepare when compare with other convenient food. Moreover, parents did not see the benefits association with the prevention of chronic diseases.
The following factors are associated with low level of consumption, BMI (P=0.023), Low parental education (P=0.018), and being male (P=0.023).

## 5.6 Effect of two randomized school-based fruit and vegetable intervention studies: a cognitive approach and a cognitive + an ecological approach

*Elling Bere, Knut-Inge Klepp - University of Oslo*

**Purpose:** To report the effect of two intervention studies: (1) a classroom curriculum for 6th grade home-economics classes, (2) the same curriculum + free participation in the Norwegian School Fruit Programme.
**Methods:** Nine intervention and 10 control schools were included in each study. The interventions were delivered

during the school year 2001/02. In study 1, 369 (69%) 6th graders completed questionnaires in September 2001 (Baseline), May 2002 (Follow-up 1) and May 2003 (Follow-up 2). In study 2, 517 (84%) pupils completed all three questionnaires. Fruit and vegetable intake was measured by a 24-h recall. The effect of the interventions was analysed by mixed model regression on follow-up scores, adjusted for baseline scores, gender and school (random, nested within condition).
**Results:** No effect on fruit and vegetable intake was seen in study 1 (p=0.77). In study 2, significant effects of the intervention were observed at both follow-up surveys. At follow-up 1, intervention pupils ate 0.6 portions/day more than control pupils (2.5 vs. 1.9, p=0.02). At follow-up 2, intervention pupils ate 0.5 portions/day more than control pupils (2.1 vs. 1.6, p=0.03).
**Conclusion:** The combined cognitive and ecological approach was superior compared to the cognitive approach alone. It is reasonable to believe that the effect was due to the School Fruit Programme only, and it is very promising that the effect was maintained one year after the pupils participated for free.

## 5.7 Garden-based learning experiences increase adolescents' frequency of vegetable consumption and variety of vegetables consumed

*Michelle Markesteyn, Jeanne Goldberg, Beatrice Rogers, Kathleen Merrigan - Tufts Universtiy*

While garden-based nutrition education in schools is a growing phenomenon, the potential for school gardens programs to improve adolescent health outcomes remains largely unstudied. The current research sought to compare the vegetable consumption patterns of middle school aged students who participated in hands-on garden-based learning experiences as part of their regular classes with those of students who were exposed to similar curriculum content but without the gardening experience. As part of a pre-post panel study, 236 sixth-grade students completed the Garden Vegetable Frequency Questionnaire. Students at two schools sites were taught science and health lessons utilizing the school garden, including planting, tending, harvesting, consuming garden-grown produce, and participation in community-wide garden related events, for an average of one hour a week for 4 months. The control school did not participate in gardening activities. Descriptive statistics and independent samples T-tests on the mean change in vegetables consumed revealed that after participation in a hands-on garden experience, students increased their frequency and variety of 24 vegetables consumed (p=<.05), including both vegetables they did and did not grow as part of the garden program (p=<.05). Results of this study indicate that hands-on garden-based learning experiences are a successful pedagogy for increasing adolescents frequency of vegetable consumption and variety of vegetables consumed. School-site nutrition education interventions for adolescents could benefit from inclusion of garden pedagogy that is integrated, theoretically driven and behaviorally based. Future research should examine whether the effects of garden-based learning experiences persist over time.

## Notes

## Saturday June 18, 11.30-13.00 – Grote zaal

## Paper session 6: Physical activity interventions in young people

Chair: Deanna Hoelscher

### 6.1 An overview of formative research in the trial of activity for adolescent girls (TAAG): a multisite study of physical activity in middle-school girls

*Carolyn C. Johnson - Tulane University School of Public Health & Tropical Medicine; Stacey Moe - University of Minnesota School of Public Health; Lisa K. Staten - University of Arizona College of Public Health; Allan Steckler - University of North Carolina, Chapel Hill, School of Public Health; Charlotte A. Pratt - National Heart, Lung & Blood Institute, NIH; Joel Gittelsohn - Johns Hopkins University School of Hygiene & Public Health; Deborah Rohm-Young - University of Maryland*

**Purpose:** To present an overview of TAAG formative research conducted with students, schools and community agencies to provide information for intervention programming.
**Methods:** Multiple quantitative and qualitative methods over six study sites were used: 13 girl focus groups (n=100), 12 boy focus groups (n=77), 80 girl in-depth interviews, 64 middle-school principal and 36 PE instructor interviews, 130 physical activity checklists and 138 community agency surveys. Random selection, convenience or total sampling was used.
**Results:** Girls characterized physically active girls as being in shape, but boys regarded them as too athletic. Both boys and girls perceived physically active girls as tomboys or too aggressive. Girls reported boys were influential barriers or motivators for girls physical activity. Chores, running/jogging, dance and some team sports (e.g. basketball) were girls common and/or favored activities. Preferences did not differ by ethnicity. School interviews indicated that PE was co-educational in >80% of schools. PE time requirements ranged from 36 to 200 days annually, with class length ranging from 40 to 75 minutes across sites; Girls lack of interest in PE was cited most commonly as a barrier to implementing quality PE. Community agencies reported being open after-school, having adequate facilities and offering a variety of programs for girls.
**Conclusions:** Formative data were used to develop flexible and standardized multi-component interventions that included various in-school and after-school physical activity choices for girls and to accommodate multi-site environments.

### 6.2 Significant difference in percentage body fat after a physical activity intervention in township girls of the North-West province: the play project

*Salome Kruger, Magda Matyasik, Anita Pienaar, Colette Underhay, Cilas Wilders - North-West University*

The purpose of the study was to assess differences in percentage body fat (%BF) after a physical activity intervention of 12-18y-old African children. A case-control study was done in an intervention school (n=252) and a control school (n=66). Anthropometry and body composition by air displacement plethysmography were measured. Habitual physical activity was assessed using the Previous Day Physical Activity Recall. Children were classified according to WHO PAL-standards: light (1.40-1.69), moderately 1.70-1.99,or vigorously active (2.00-2.39). Children from the intervention school participated in a physical activity programme for 19 weeks. Baseline and end measurements of %BF were done and the groups were compared using ANCOVA, with age, Tanner stage, habitual physical activity, height-for-age z-score and baseline %BF as covariates.
Before the intervention 80% of girls and 36% of boys were inactive, whereas only 23% of the boys and 3% of the girls were vigorously active. About one-third of the girls (36.8%) and 11.1% of the boys were overfat (%BF>30% in girls, >25% in boys). The girls in the intervention group had a significantly lower %BF than girls in the control group after the physical activity programme (P=0.045). There was also a tendency of lower %BF in the intervention group boys after the programme (P=0.078). Our findings indicate that a physical activity programme was associated with lower %BF in children with low habitual physical activity level.

### 6.3 The influence of organised physical activities in childhood: a 10 year longitudinal study from 13 to 23 years of age

*Lise Kjonniksen, Bente Wold, Torbjoern Torsheim - Research Centre for Health Promoting*

**Purpose:** To examine how organised physical activity during childhood and adolescence relates to participation in general physical activity in young adulthood.
**Methods:** Data are from the Norwegian Longitudinal Health Behaviour Study. The respondents were surveyed between 1990 (at age 13 ) and 2000 (age 23) at 8 measurement points. 927 students participated in 1990 and 627 in

2000. The study is based on self report measures. Analyses of variance and growth curve analysis were applied to the data.

**Results:** Participation in organised activities during adolescence was found to predict general physical activity in young adulthood, and those who reported that they were organised at an early age (6 years old) seem to be more physical active in general as young adults, compared to those who were organised in physical activity at a later stage (16 years).

**Conclusions:** Organised physical activity during childhood apparently plays an important socialising role with regard to involvement in adult physical activity, indicating the need for promoting the availability of such types of leisure activities.

## 6.4 Dissemination of a coordinated elementary school nutrition and physical activity program in Texas, USA: the coordinated approach to child health (CATCH) experience

*Deanna Hoelscher, Steven Kelder, Christine McCullum, Peter Cribb, Cristina Barroso, Joey Walker, Nancy Murray - University of Texas School of Public Health*

**Purpose:** The purpose of this study was to evaluate the adoption and subsequent implementation of the CATCH Program from 1996 to 2003, using a community-based case study approach.

**Methods:** Evaluation consisted of: (1) number of elementary schools (Kindergarten through 5th grade, children ages 5-10) adopting CATCH; (2) direct observation of physical education (PE) conducted on a subset of trained schools (n = 14), and (3) self-administered mail questionnaires with physical education (PE) teachers and school foodservice staff. Adoption was defined as schools that had purchased CATCH materials or school staff that had attended training sessions.

**Results/Findings:** Adoption of CATCH increased from 6 schools in 1996-1997 (0.17% of Texas schools) to 1241 schools in 2002-2003 (30.4% of Texas schools). Minutes of moderate to vigorous physical activity (MVPA) in PE classrooms increased from 33.6% before CATCH to 45.7% and 55.3% after one and two years of implementation, respectively. Response rates for the PE questionnaire ranged from 21% to 59% for 2000-2002; response rates for the foodservice questionnaire were 40% for 2001 & 2002. The highest rated barrier to implementation of CATCH PE was lack of resources; for implementation of the school foodservice component, it was lack of support.

**Conclusions:** Results indicate that elements of CATCH are being widely and effectively disseminated among elementary schools in Texas, reaching innovator and early adopter schools. Future challenges include increasing adoption of CATCH by early majority and late majority schools.

## 6.5 Adolescent girls' experiences of an inclusive physical education: an exploration study from user perspectives

*Anne Haase, Victoria Chan - University of Bristol*

As adolescence is a crucial period when regular habits emerge and consolidate, it is important to nurture active lifestyle behaviours. Girls are consistently less active than boys, frequently withdrawing from activity in early adolescence. This study investigated the experience of Physical Education (PE) in non-participating adolescent girls in order to identify key factors for creating a more inclusive PE experience.

Two secondary schools from lower socioeconomic areas provided the female participant sample for the focus groups (n=91) and for the questionnaire (n=186). Focus group discussions took place with low-level PE participants, exploring their PE experiences, suggestions and ways of implementing change. Transcribed data were reduced based on grounded theory with themes validated through triangulation from independent researchers. Eleven themes emerged from the discussions; variation/choice, enjoyment/comfort, participation, interest, clothing & changing, teachers, boys, recognition/achievement, suggestions/changes, environment and distraction. Further analysis of theses themes allowed for consolidation into three higher-order factors; Environment (physical and created); Negative attitudes and experiences; Enjoyment and motivation. A 45-item questionnaire was developed to consolidate themes into a coherent framework, with factor analysis confirming the presence of the three higher-order factors. These factors combined influenced girls' willingness to participate in PE programmes.

Results suggest increasing girls' contributions to creating a PE programme unique to each school would nurture an intrinsic desire to participate. In doing so, PE will become a more efficient primary prevention for sedentary lifestyles and the accompanying risks.

## 6.6 Effectiveness of a school-based physical activity intervention in 11 to 15 year olds

*Leen Haerens, Ilse De Bourdeaudhuij, Greet Cardon, Benedicte Deforche, Lea Maes - Ghent University; Veerle Stevens - Flemish Institution for Health Promotion*

**Purpose:** To evaluate the effect of a middle-school physical activity intervention and to look at the effect of involving parents. Methods: A random sample of 15 schools was randomly assigned to three conditions: intervention with additional parental support, intervention without parental support and control condition. A total sample of 2268 7th and 8th graders was enrolled in this study. The intervention was implemented over 1 school year and included environmental and personal modifications for physical activity behaviour. Measures were assessed in September 2003 and in June 2004. Physical activity level was assessed using a self-report physical activity questionnaire. Repeated measures ANOVAS were used to analyse intervention effects. Results: In boys the intervention resulted in a significant increase in time spent in school physical activity and active transportation to school. Involvement of the parents lead to significant greater effectiveness of the intervention on total time spent in physical activities at school and additional effectiveness on time spent in active transportation and extracurricular physical activities at school. In girls the intervention significantly increased total amount of physical activity and total time spent in active transportation, time spent in extracurricular physical activities and leisure time active transportation. Conclusion: The intervention resulted in an increase in physical activity in middle school children. Effects differed according to gender and context of the activities. Involvement of the parents increased the effectiveness in boys, but not in girls.

## 6.7 Impact of a nutrition education program in a healthy school campaign among primary school children in Kuala Lumpur, Malaysia

*Norimah Karim - Universiti Kebangsaan Malaysia; Ruzita Talib, Bee Koon Poh – UKM; Nasir Taib - Universiti Putra Malaysia; Zawiah Hashim, Tengku Marina Badlishah - Nestle*

**Purpose:** To evaluate the effectiveness of a nutrition education program (NEP) among schoolchildren in Kuala Lumpur

**Methods:** Some 800 children aged 8 - 10 years at 12 schools in Kuala Lumpur were exposed to a NEP which consisted of booklets for teachers and students, interactive CDs, comic books and sing-a-long songs and implemented by trained teachers in the Physical Education classes. A pre- and post-intervention questionnaire on food habits and physical activity was used to evaluate the effectiveness of the NEP.

**Results:** An encouraging change in food habits was demonstrated by beverages selected, whereby children chose healthier options such as plain water, chocolate-flavoured malt drink and soya bean milk more often than the more prevalent choice of cordial beverages pre-intervention. More children were aware of the significance of breakfast in that 54% agreed that breakfast was important for health. Snacking practice was reduced from 95% of children before to 72% of children after NEP. More vigorous physical activities such as cycling, badminton and running were carried out not only during leisure but also during school holidays compared with more sedentary activities such as reading, watching television and computer games. There was also marked improvements in the nutrition knowledge of the children involved in the NEP.

**Conclusion:** The NEP had a positive impact on the knowledge, attitude and practice of the children. The HSC was a successful first step in promoting healthy lifestyles and should be extended to include more schools.

## Notes

## Saturday June 18, 11.30-13.00 – Kleine zaal

## Paper session 7: Weight loss interventions

Chair: Pedro Teixeira

### 7.1 Optimizing value of weight management resources: what if extrapolation from research data

*Robert Jeffery, Judith Baxter, Peter Hannan - University of Minnesota School of Public Health; Rena Wing - Brown University School of Medicine*

**Purpose:** Intensive, sustained, behavioral interventions for obesity produce clinically significant health benefits, but most people stop losing weight and slowly regain after 6 months. When should treatment be ended or changed?
**Methods:** Using weekly weight data from 162 individuals treated for obesity for one year, this project modeled the relative benefits of discontinuing treatment at the point of estimated maximum weight loss and then shifting treatment resources to other needy individuals rather than continuing to attempt treatment. Point-of-maximum weight loss was estimated by the average point of minimum observed body weight, or by fitting a quadratic function to individual weight-loss histories starting at week 8 or week 16 of treatment. Potential benefits of early treatment termination were estimated by assuming that saved treatment sessions would be used to treat additional individuals with equal efficacy and that individuals no longer receiving treatment would either not regain weight or would regain weight at the same rate as those receiving treatment.
**Results:** Results at 40 weeks indicated that use of a group average termination procedure increased the number of individuals who could receive effective treatment by 60%. The individualized treatment termination procedure increased the estimated number of treated people by 80% - 100%. Invoking a treatment termination procedure beginning at 16 weeks achieved the best overall treatment resource efficiency.
**Conclusions:** Given finite resources, behavioral obesity treatments should be terminated, or at least changed, when participating individuals stop losing weight.

### 7.2 A randomised trial comparing three non-dieting interventions for overweight women

*Caroline Horwath - University of Otago; Lisa Katzer - self-employed; Alison Bradshaw - University of Otago; Sue O'Brien - self-employed; Janine Joyce - self-employed; Jennifer Jabs - Cornell University*

**Purpose:** As an alternative to energy-restricted diets, 'nondieting' treatments encourage eating in response to hunger and satiety. This study evaluated the effects of a group nondieting programme which included intensive training in the relaxation response. Since stress can adversely affect food intake and body weight, we hypothesized that relaxation response training would enhance 'nondieting' treatments by reducing psychological distress and improving stress management skills.
**Methods:** A 1-year randomised trial with 225 overweight women (BMI 28.2 - 60.1; 25-63 yrs) compared three nondieting treatments: a group programme including intensive training in the relaxation response (P1), a group programme without relaxation training (P2), and a mailed, selfguided version of P2 (P3). Interventions were 10-weeks long, followed by 8-months aftercare. Measures obtained at baseline, 10weeks, 4months and 12months included: psychological distress, eating restraint, intuitive eating, lifestyle behaviours (nutrition, activity, stress management), eating selfefficacy, blood pressure, weight and medical symptoms. An intention-to-treat analysis was conducted.
**Results:** 12-months after completion of the initial 10-week treatments, P1 produced the greatest improvements in stress management behaviours, depression, intuitive eating, medical symptoms and selfefficacy for lowfat eating. All programmes resulted in significant improvements in psychological distress, medical symptoms, eating selfefficacy and lifestyle behaviours. At 12 months, although mean weight was unchanged, most participants (72%) had either maintained or lost weight. P1 participants were more likely to have lost weight.
**Conclusions:** All interventions were beneficial; however, inclusion of intensive relaxation response training resulted in greater improvements in several measures.

### 7.3 Changes in self-esteem, body mass index and definition of dream weight in response to a "health at any size" intervention in premenopausal overweight women

*Simone Lemieux, Véronique Provencher, Catherine Bégin, Angelo Tremblay - Laval University*

**Purpose:** Overweight women may be characterized by decreased self-esteem and unrealistic expectations about weight loss. Our study aimed at investigating the effect of a "health at any size" approach (HAAS) on changes in self-esteem, body weight and definition of what would be a dream weight in 50 overweight pre-menopausal women

randomly assigned to one of the 3 following groups: 1) HAAS intervention group (N=20); 2) social support group (N=20) and 3) control group (no intervention) (N=10).
**Methods:** Measurements were taken before and after the 4-month intervention. Self-esteem was measured with the Battle's self-esteem inventory and dream weight ("the weight you would choose if you could weigh whatever you want") was evaluated using the Goals and Relative Weight Questionnaire.
**Results/Findings:** Preliminary results showed that women from the HAAS approach and from the social support group significantly increased their self-esteem ($p < 0.02$) whereas no change was observed in the control group. The weight identified as the dream weight significantly increased after the intervention by about 3 kg in both the HAAS and social support group while no change was seen in the control group. Significant changes in body weight (-2.1 ± 0.7 kg) were observed but only in the HAAS group, and were not correlated with changes in self-esteem.
**Conclusion:** In conclusion, these results suggest that a "health at any size" intervention is associated with an improvement in self-esteem that is not explained by weight loss.

## 7.4 Weight idealization and outcome evaluations in behavioral weight control: cross-sectional correlates and association with treatment success

*Pedro J. Teixeira - Faculty of Human Movement, Technical University of Lisbon; Jennifer A. Linde, Robert W. Jeffery - School of Public Health, University of Minnesota; Scott B. Going, Timothy G. Lohman - University of Arizona; Alexander J. Rothman - University of Minnesota; Luis B. Sardinha - Faculty of Human Movement, Technical University of Lisbon*

**Purpose:** Our goal was to explore the nature of estimates of ideal weight and weight loss evaluations and their role in weight control through their association with several key variables (previous dieting, body image, self-efficacy, self-esteem) and with weight change and attrition, in women involved in behavioral obesity treatment.
**Methods:** Subjects were 600 women (18-66y, 24-48 kg/m2), enrolled in three University-based treatment programs. Baseline assessments included the Goals and Relative Weight Questionnaire for ideal weight and outcome evaluations. Measured outcomes were weight loss (4-6 and 16-18 months) and program completion.
**Results:** Adjusting for age, BMI, and treatment program, lower body image (ANCOVA, $p<0.001$) and more frequent weight loss attempts ($p<0.05$) were linearly associated with stricter weight-related cognitions, especially idealized (dream) weight. Ideal weights and happy/acceptable weight loss evaluations were associated with outcomes, especially in the short-term (ANCOVA, $p<0.001$, intent-to-treat analysis); lower ideal weights predicted less weight loss whereas happy weights corresponding to a 10-15% reduction and acceptable weight losses below 10% of baseline weight forecasted the best results. Attrition was appreciable (26-39%) and significantly higher in subjects with more stringent outcome evaluations ($p<0.003$); an approximate 5% difference in weight outcome evaluations was observed between completers and dropouts.
**Conclusion:** In women initiating behavioral obesity treatment, body image predicts attitudes towards ideal weight and future weight loss, independent of age and BMI. Additionally, results offer some support to the benefits of having a positive but realistic assessment of treatment outcomes, which appears to also translate into improved program adherence.

## 7.5 An Internet and phone lifestyle intervention for weight loss: alife@work 6-month outcomes

*Marieke van Wier, Caroline Dekkers, Geertje Ariëns - Body@Work/VU Medical Center; Ingrid Hendriksen - Body@Work/TNO; Nico Pronk - Health Partners; Tjabe Smid - VU Medical Center and KLM Arbo Services; Willem van Mechelen - Body@Work/VU Medical Center*

**Purpose:** to evaluate, among an overweight working population, the effectiveness of the 'Leef je Fit' lifestyle programme on body weight, physical activity and eating habits. ' Leef je Fit' is a distance counseling programme via either phone or internet, which promises to be effective in reaching individuals with overweight who are less inclined to join programmes in a clinical setting.
**Methods:** a randomized clinical trial with three groups, i.e.,refence group, receiving general information on weight loss (N=460); phone intervention (N=462); and internet intervention (N=464). 1386 employees from 7 different companies in the Netherlands were included. Body weight was measured at baseline and at 6 months, directly after conclusion of the intervention. Self-reported weight, physical activity level and dietary habits were assessed by means of a questionnaire at both timepoints. The study will continue with 6-month interval measurements till 24 months after baseline.
**Results:** mean BMI at baseline was 29.6 kg/m2. 67% of the participants was male. Mean weight was 92.9 kg, 93.3 and 92.6 kg respectively for the reference-, phone- and internetgroup. 6 month follow-up measurements for the first 6 companies are finished. Preliminary results show that the intervention groups lost more weight than the reference group. In all groups men lost more weight than women.
**Conclusions:** this study was particularly successful in reaching males, and individuals with a BMI lower than 30 kg/m2. Preliminary results suggest a favourable effect from the intervention.

## 7.6 Prevalence, duration, and associations of weight control strategies among obese managed care organization members enrolled in a weight loss trial

*Jennifer Linde, Robert Jeffery - University of Minnesota; Nancy Sherwood, Nicolaas Pronk, Raymond Boyle - HealthPartners Research Foundation*

**Purpose:** We examined the prevalence of weight control strategies among managed care organization members in a weight loss trial. We hypothesized that greater engagement in strategies would be associated with weight loss success.

**Methods:** Data were taken from Weigh-to-Be (WTB), a two-year weight loss trial (N=1801, 72% female, mean age=50.7 years, mean weight=95.9 kg, mean BMI=34.2kg/m2). Every six months, participants completed a questionnaire assessing frequency and duration of weight control strategies (calorie reduction, fat reduction, increased fruit/vegetable intake, increased exercise, elimination of sweets, consumption of less food). Associations of strategies (endorsement and duration) with weight loss at 24 months were examined using general linear models with baseline weight as a covariate.

**Results:** Strategy prevalence rates ranged from 68% to 76%, with 87% engaging in any of the strategies during the 2-year period. For all dietary strategies, any use of the strategy between baseline and 18 months was associated with 24-month weight loss; those who did not engage in each strategy showed weight gains during that period (ps=.002-<.0001). For all strategies, greater duration of use between baseline and 18 months (in weeks) was associated with greater 24-month weight loss (all ps<.0001).

**Conclusions:** The prevalence of weight control strategies in this population was high, and use of strategies demonstrated a dose-response association with 24-month weight change. Future interventions may benefit from emphasis on persistence of similar strategies to achieve more successful outcomes.

## 7.7 Evaluation of an educational intervention that promotes compensatory behaviours in response to overeating: a randomised trial

*Birgitte Wammes - Erasmus University Medical Center; Boudewijn Breedveld - Netherlands Nutrition Centre Foundation; Johannes Brug - Erasmus University Medical Center*

**Background:** To help people prevent weight gain, the Netherlands Nutrition Centre initiated the Balansdag-intervention using print and radio advertising to promote the moderation of food intake and/or increased physical activity in response to overeating. This study was a formative evaluation determining whether intervention materials were appreciated, encouraged information seeking; had effect on determinants of behaviour change and compensatory behaviours.

**Methods:** A three-group randomised trial with pre-and post intervention measures was conducted among participants aged 25-35 y, recruited from an Internet-research panel. Data were collected using electronic self-administered questionnaires (N=1119). Following the baseline assessment on demographics, participants were randomised to the control, print or radio group. Post-test measures were collected after a four-week intervention period. Multiple linear regression analyses (N=857; 91.3% response) were used to investigate the impact of the materials on the prevalence of overeating, attitudes, perceived behavioural control, intentions and self-reported compensatory behaviours.

**Results:** At follow-up in the print and radio group we found significantly higher scores on attitudes, intentions and compensatory behaviours related to the moderation of food intake. Participants receiving the radio advertisement had a significantly lower perceived behavioural control. No intervention effects were found on the prevalence of self-reported overeating.

**Conclusion:** Results suggest that the Balansdag-intervention was successful in increasing peoples attitudes and motivations related to compensation of overeating. Although, for nation-wide implementation, the intervention should be expanded with strategies to overcome the barrier of low perceived behavioural control.

## Notes

## Saturday June 18, 11.30-13.00 – Keizerzaal

## Paper session 8: Special interest groups

Chair: Katrina Giskes

### 8.1 Do urban 'food deserts' exist? A multi-level geographical analysis of the relationship between retail food access, socio-economic position & dietary intake

*Martin White, Vicky Ryan, Ashley Adamson - University of Newcastle upon Tyne; Liz Williams - University of Sheffield; Jane Bunting, Simon Raybould, John Mathers - University of Newcastle upon Tyne*

**Purpose:** To determine whether a causal relationship exists between dietary intake and socio-economic or behavioural factors and retail access to food.
**Methods:** Cross-sectional surveys of diet and retail access to food in Newcastle upon Tyne. 3153 households and 5044 individuals provided data on diet, lifestyle, shopping behaviour, and socio-economic status. The price, availability and quality of 33 food items were assessed in all retail outlets.
**Results:** Most households (77%) shopped at large, multiple-owned supermarkets and travelled there by car (63%). Patterns of shop use, methods of travel, distance to shops and amount spent were strongly socio-economically patterned. Out of 560 stores selling food, most (216, 39%) were small convenience stores, though a small number (38, 7%) of large supermarkets (belonging to 11 national chains) act as the main food store for more than 90% of households. Larger stores were more likely to sell a wider range of foods, more healthier foods , and fruit and vegetables of a higher quality. Fruit and vegetables were more expensive in more affluent areas. A shop selling 5 food items was within 250m of most streets in the city. Multi-level regression models highlighted the importance of dietary knowledge, lifestyle behaviours and socio-economic factors as the primary determinants of diet.
**Conclusions:** This research extends current understanding of urban food poverty in industrialized countries. However, in Newcastle at least, any simplistic notion of retail food deserts as the primary cause of food poverty is untenable.

### 8.2 Integration of immigrants in the host society does not neccesarily lead to an increase of leisure time physical activity: a study among Turkish immigrants in the Netherlands

*Karen Hosper, Niek Klazinga, Karien Stronks - Academic Medical Centre-University of Amsterdam*

**Purpose:** Immigrant groups in Western countries are in general less physically active than the native population. It is argued that this difference will disappear if immigrant groups get more integrated in the host society (so-called acculturation). Though, little is known about the role of acculturation in relation to other circumstances, like socio-demographic, socio-economic and physical environmental factors. We studied how these circumstances influence the association between acculturation and leisure time physical activity (LTPA). We expected acculturation to be a less important correlate of LTPA among groups who experience barriers in their physical or social environment.
**Methods:** Cross-sectional data were obtained from the LASER-study, on determinants of health related behaviours among young people in Amsterdam. For the purpose of this study we included 485 Turkish participants aged 15-30 years who participated in an oral interview.
**Results:** Indicators of acculturation were positively associated with LTPA (OR between 1.59 and 2.25, all significant). However, the association was less strong among the people who were married (OR 1.19 (.51-2.82) versus 2.47 (1.29-4.71) among unmarried people) and who were living in a less attractive physical environment (OR 1.63 (.72-3.68) versus 2.43 (1.27-4.63) in a more attractive environment). Other circumstances showed similar trends.
**Conclusions:** Being more acculturated does not necessarily lead to more physical activity in leisure time. Instead, the impact of acculturation varies according to the circumstances people live in.

### 8.3 Why do women of low SES have poorer diets than women of higher SES?

*Victoria Inglis, Kylie Ball, David Crawford - Deakin University*

**Purpose:** In developed countries, persons of low socioeconomic status (SES), particularly women, are less likely to consume diets consistent with dietary guidelines. Little is known about the mechanisms that influence SES differences in eating behaviours. Few studies have focused on the environmental influences on food choice, and where they have, there have been conflicting findings. The purpose of the study was to investigate the role of perceived food availability, accessibility and affordability, in explaining SES variations in women s diets.

**Methods:** In 2004, a sample of 1580 women aged 18-65 years randomly selected from the Australian electoral roll, completed a mailed survey. The survey measured considerations underlying food choices and perceptions of the influence of availability, access and cost on these food choices. Women were selected from low, mid and high SES areas in Melbourne (15 neighbourhoods from each). Individual-level details such as education, occupation and income were also obtained.
**Findings:** The cost of food was a more important barrier for women of low SES. There were few significant SES differences in perceptions of availability, access and/or quality of healthy foods locally, although high SES women did report greater access to public and private transport.
**Conclusions:** Public health strategies aimed at reducing SES inequalities in diet might focus on promoting healthy diets that are low cost. Future research should confirm these findings by assessing objectively whether the availability, access and cost of healthy foods differ in areas of varying SES.

## 8.4 Associations between gender, physical activity, and dietary intake in African American adolescents

*Dawn Wilson, Kerry McIver, Margaret Ehlers, Diana Lattimore, Sarah Griffin - University of South Carolina*

**Purpose:** Increasing evidence indicates that physical activity and healthy diet may be protective against the development and progression of chronic illness. Few studies, however, have examined both physical activity patterns and nutrition intake across gender. The present study examined the relationship between gender, physical activity and dietary intake in 50 healthy African American adolescents (23 females, 27 males; ages 11 to 15 years).
**Methods:** Participants wore an accelerometer for 5-days, completed 2 random 24-hour dietary recalls (one week day, one weekend day), and completed psychosocial measures based on Social Cognitive Theory (social support, self-efficacy for diet and PA).
**Results:** Consistent with past research boys were more physically active than girls (moderate activity 105±33 vs. 69±38; moderate-to-vigorous 125±42 vs. 75±44, minutes per day, respectively; $p<.001$ for both; controlling for Body Mass Index (BMI) and age). Interestingly, boys also demonstrated a greater dietary intake of kcals per day (1819±622 vs. 1470±582; $p<0.05$; controlling for BMI and age) and total fat intake (73±28 vs. 57±33; $p=0.06$; controlling for BMI and age) as compared to girls. Psychosocial measures were not predictive of dietary intake or PA variables, however, girls did report higher levels of family support for physical activity than boys (63±9 vs. 57±8; $p<0.05$).
**Conclusions:** These findings expand on previous research by demonstrating that although boys are more active than girls their nutrition intake is higher in fat and calories. These findings may have implications for developing gender-specific interventions.

## 8.5 Increasing use of community resources among underserved women: knowledge as a mediator

*Stephanie Jilcott, Kelly Evenson, Shrikant Bangdiwala, Alice Ammerman - University of North Carolina*

**Purpose:** To determine whether a clinic-based behavioral intervention, which included community resource materials (CRM), increased use of diet and physical activity (PA) resources; To examine whether this effect was mediated by knowledge of or self-efficacy for accessing resources. Methods: Underserved women (n = 236) were randomized to receive a 12-month enhanced (EI) or minimum intervention (MI). CRM were designed to increase awareness and use of local diet and PA resources. Data on EI participants' self-reported use of resources were collected using a community resource survey. Knowledge, self-efficacy (4-items, alpha = 0.79), and use of resources were measured using a questionnaire administered at baseline and month 12. Change in reported resource use was the dependent variable in linear regression models, controlling for baseline values. We used the Sobel test for mediation, with change in use as the outcome and change in knowledge and self-efficacy as potential mediators. Results: 73.7% of the EI women recalled receiving the CRM. Resources used the most by EI women were: farmer's markets/stands (43.0%), parks/trails (14.0%), and walking programs (14.0%). The intervention had no effect on use of diet resources, and a borderline significant effect ($p = 0.062$) on use of PA resources. This effect was partially mediated by knowledge of PA resources (Sobel test statistic = 1.46, $p = 0.145$). Conclusions: Used in a multi-component intervention, CRM may increase use of PA resources, partially mediated by increased knowledge.

## 8.6 Childhood food insecuirty is associated with childhood overweight status

*Patrick Casey, Pippa Simpson, Jeffrey Gossett - University of Arkansas for Medical Sciences/Arkansas Children's Hospital Research Institute; Carol Connell - University of Southern Mississippi; David Harsha, Catherine Champagne - Pennington Biomedical Research Center; Janice Stuff - Baylor College of Medicine; Margaret Bogle - United States Department of Agriculture*

**Purpose:** Empirical research has not documented a relationship between household food insecurity and childhood overweight. We thus assessed the association of childhood food insecurity with childhood overweight status in a national sample.
**Methods:** Data from NHANES 2001-2002 and NHANES 1999-2000 were combined. Childhood food insecurity was calculated using the 8 specified questions from the U.S. Household Food Security Survey Module. Analyses were conducted using NHANES Analytic Guidelines. Using SUDAAN Release 9.0.0, between subgroups comparisons of percentages in weight categories were conducted with t-tests, and logistic regression models were used to evaluate the relationship between child food insecurity and overweight status, controlling for covariates. P-values were not adjusted for multiple comparisons.
**Results/_ndings:** When compared to food secure children, childhood food insecurity was associated with overweight (BMI e 95%) and at risk for overweight status (BMI e 85%) in both male (15.4% vs. 23.0%, p=.004; 29.7% vs. 40.7%, p=.002) and female (13.6% vs. 18.8%, p=.04; 27.8% vs. 36.6%, p=.02); teens (15.6% vs. 20.8%, p=.003; 30.1% vs. 38.3%, p=.02); and the most impoverished families (16.5% vs. 22.8%, p=.05; 29.8% vs. 39.3%, p=.01). In a regression model, child food insecurity status independently predicted (p<.05) at risk for overweight status controlling for poverty, sex, race, and child age.
**Conclusion:** Childhood food insecurity status is significantly associated with child overweight status independent of important demographic variables. This association is of particular importance for teens and children who live in impoverished families.

## 8.7 A multi-level study of socioeconomic inequalities in dietary behaviour and intake among the Dutch population: the GLOBE study

*Katrina Giskes - Erasmus MC; Gavin Turrell - Queensland University of Technology; Frank van Lenthe, Johannes Brug, Johan Mackenbach - Erasmus MC*

**Purpose:** To examine the influence of individual and area-level socioeconomic characteristics on dietary behaviour.
**Methods:** Information on socioeconomic position (SEP) and dietary behaviour was collected by structured, face-to-face interviews (rr= 55.6%, n=1339). Highest achieved education level and household income were the measures of individual-level SEP used, and area deprivation quartiles were used to characterize area-level socioeconomic characteristics. Dietary outcomes examined were the healthiness of food choices captured by a grocery food choice index, fruit and breakfast consumption and intakes of total fat and saturated fat. Participants were sampled from 85 areas (mean number of participants per area n = 18.4, range 2-49). Multi-level analyses were performed to examine the independent effects of individual and area-level socioeconomic characteristics on the dietary outcome variables.
**Results:** Adjusting for individual-level socioeconomic characteristics, few trends or significant effects of area deprivation were found for the dietary behaviours. Independent effects of individual-level SEP showed inequalities in some dietary behaviours that parallel chronic disease disparities.
**Conclusions:** The findings suggest that an individual s socioeconomic characteristics play a more important role in shaping dietary behaviour than the socioeconomic characteristics of the area in which they live. In this Dutch study, no independent influence of area-level socioeconomic characteristics on dietary behaviours were detectable, which contrasts with findings from the USA, the UK and Finland.

## Notes

## Thursday, June 16 – 11.00-14.00 – 2nd Balcony Grote zaal

## Poster session 1

Session/Nr:

### 1 - 40338 A qualitative study exploring socio-economic differences in parental lay knowledge of food and activity

*John Coveney - Flinders University*

**Purpose:** The study compared and contrasted ways in which people from different socio-economic backgrounds draw on and use different forms of lay knowledge about food and activity.
**Method:** Parents from 40 families were recruited from two socio-economically different suburbs (20 families from each suburb). Indepth interviews were conducted with the mother and father in each family to examine lay knowledge about food and activity. All interviews were transcribed, coded for specific themes. Content analysis was used to compare and contrast responses from each suburb.
**Results:** Parents in the high-income suburb were more likely to discuss food and activity in technical terms informed by contemporary nutritional or medicinal priorities. Parents in the low-income suburb did not share this discourse, but instead were more likely to discuss food and activity in terms related to children s outward appearance or functional capacity.
**Conclusions:** The research highlights marked differences in lay knowledge about food and activity across social class. It emphasises the need for public health nutrition policy makers and practitioners to pay attention to lay knowledge on its own terms, rather than attempting to inform or educate from pre-determined assumptions, principles and standards.

### 1 - 40341 Promoting physical activity in rehabilitating patients

*Hidde van der Ploeg - VU University Medical Center; Kitty Streppel - Roessingh Research and Development; Allard van der Beek - VU University Medical Center; Luc van der Woude - Faculty of Human Movement Sciences; Miriam Vollenbroek Hutten - Roessingh Research and Development; Wim van Harten - Netherlands Cancer Institute Antoni van Leeuwenhoek Hospital; Willem van Mechelen - VU University Medical Center*

**Purpose:** To determine the effects of the sport stimulation program 'Rehabilitation & Sports' (R&S) and R&S combined with the daily physical activity promotion program 'Active after Rehabilitation' (AaR) on sport and daily physical activity in people nine weeks after in- or outpatient rehabilitation.
**Methods:** Subjects in four intervention rehabilitation centers (n=603) were randomized into a group receiving R&S only (n=315) and a group receiving both R&S and AaR (n=284). Subjects in six control rehabilitation centers (n=603) received usual care. Most frequent diagnoses were stroke, neurological disorders and back disorders. Two sport outcomes and two daily physical activity outcomes were assessed using questionnaires seven weeks before and nine weeks after the end of rehabilitation. Data were analyzed by intention to treat and on treatment multilevel analyses, comparing both intervention groups to the control group.
**Results:** The R&S program showed no significant improvements. Intention to treat analyses in the R&S + AaR group showed significant improvements in one sport ($p=0.02$) and one physical activity outcome ($p=0.03$). The on treatment analyses in the R&S + AaR group showed significant improvements in both sport outcomes ($p<0.01$ and $p=0.02$) and one physical activity outcome ($p<0.01$).
**Conclusions:** The R&S program on its own had no effects on sport participation and daily physical activity behavior. The combination of the R&S and AaR programs improved sports participation and daily physical activity behavior in people nine weeks after rehabilitation.

### 1 - 40344 The contribution of intention and self-efficacy to the long-term maintenance of an active lifestyle

*Cora Craig - Canadian Fitness and Lifestyle Research Institute*

Future intention and self-efficacy predict exercise behaviour in the short-to-mid term. Less is known about their role in predicting participation over a longer term.
**Purpose:** To examine the contribution of future intention and self-efficacy in explaining physical activity levels over a 15 year period.
**Methods:** In total, 1650 Canadians aged 18 and older who participated in the 1988 Campbell Survey of Well-Being were traced and interviewed November 2002-April 2004. In 1988, future intention and self efficacy for vigorous activity were asked on 5-point Likert scales by self-administered questionnaire. Self-reported physical activity over 12

months was estimated using a modified Minnesota Leisure-Time Physical Activity Questionnaire. Individuals were classified as remaining active if their energy expenditure (kcal/kg/day) was above the median values in 1988 and 2002-04. The odds of remaining active were estimated using logistic regression controlling for age and sex.
**Results:** Overall, 31% of adults remained active over the fifteen-year period. Self-efficacy was associated with maintaining an active lifestyle (AOR = 1.9, 95% CI 1.3-3.0). The odds of maintaining an active lifestyle increased with the frequency with which one intended to exercise and ranged from 1.7 (95% CI 1.2-2.6) for 1-2 times per week to 5.7 (95% CI 3.8-8.7) for 4+ times per week.
**Conclusion:** Self efficacy and future intention are independent predictors of maintaining an active lifestyle over a fifteen-year period.

## 1 - 40348 Associations of self-reported health status with diet, physical activity, and weight change among obese managed care organization members enrolled in a weight loss trial

*Jennifer Linde, Robert Jeffery - University of Minnesota; Nancy Sherwood, Nicolaas Pronk, Raymond Boyle - HealthPartners Research Foundation*

**Purpose:** We examined the contribution of self-reported health status to dietary intake, physical activity, and weight loss among managed care members in a weight loss trial. We hypothesized that better health ratings would be associated with better diet quality, greater physical activity, and greater weight loss.
**Methods:** Data were taken from Weigh-to-Be (WTB), a two-year weight loss trial (N=1801, 72% female, mean age=50.7 years, mean weight=95.9 kg, mean BMI=34.2kg/m2). At baseline and 24 months, participants completed a 12-item Short Form Health Survey, dietary screeners for fat and fruit/vegetable/fiber intake, and the Paffenbarger Activity Questionnaire. Prospective associations of baseline health scores with 24-month dietary intake, physical activity, and weight changes were examined in general linear models. Cross-sectional associations of health changes with dietary intake, physical activity, and weight changes also were considered.
**Results:** Participants were relatively healthy, based on 1998 United States general population norms (T-scores=44.8-53.1). All significant prospective associations of SF-12 scales with outcomes were in expected directions, such that better baseline health ratings were associated with healthier dietary intake, increased physical activity, and greater 24-month weight loss. Similarly, all significant cross-sectional associations indicated that positive changes in health ratings were associated with positive changes in dietary intake, physical activity, and greater 24-month weight loss.
**Conclusions:** Self-reported health status is a good indicator of successful weight loss trial behaviors and outcomes.

## 1 - 40349 Activate update: highlighting the latest research and resources in childhood obesity prevention

*Richard Elder, Susan Borra, Alison Esser, Laura Hatch - International Food Information Council Foundation*

**Purpose:** In 2000, as a response to the childhood obesity issue, the ACTIVATE partnership conducted extensive research in order to communicate positive nutrition and physical activity messages to kids and parents. Five years later, this collaborative endeavor has launched and evaluated educational resources, Kidnetic.com and the Kidnetic.com Leader's Guide, and conducted new consumer research with families, unveiling their thoughts about living a healthy lifestyle.
**Background:** Process evaluation methods examined the Kidnetic.com Leader's Guide, an activity-filled curriculum based on content from Kidnetic.com, designed to reach kids and parents in community settings and teach them about healthy eating and physical activity. In addition, new research presents an updated view from kids and parents concerning their thoughts about food, physical activity, and health, in light of the current attention on obesity.
**Methods:** The Leader's Guide, launched in 2004, was peer-reviewed and underwent pilot programs in multiple geographic locations and community settings. Process evaluation methods were employed to assess the feasibility of implementing the Leader's Guide modules in real settings at the grassroots level. In addition, qualitative research methods, involving focus groups, were utilized to explore consumers' views about health in today's environment.
**Conclusions:** Early learning from pilot programs highlighted the Leader's Guide as a credible and timely resource for health professionals to utilize in community educational settings involving kids and parents. Furthermore, in order to design behavior change interventions, professionals must consider consumers' thoughts and feelings about nutrition and physical activity.

## 1 - 50350 Current nutrition problem in Kenyan society

*Muthotho James - Kenya Medical Research Institute*

**Introduction:** The current daily meals for all Kenyans is creating many medical nutrition problems. Mental fatigue, backache, joint muscle pains, swollen joint. Neuropathy have become major clinical presentation. Current meals lack Zinc, Selenium, Manganese, Magnesium, Calcium, Copper, Vitamins A and B and essential Amino Acids.
**Methods:** All patients over 35 years old suffering from above problems were enrolled in programs. Locally available foods rich in Zinc, Selenium, Calcium, Magnesium, Manganese, Copper, Vitamins A, B and other essential amino acids were incorporated in daily meals for the family. Break fast, lunch or supper. Forms to monitor clinical changes and BMI were used for a number of months. Artificial micro- nutrients were used for serious cases but later changed to natural diet supplying the same.
**Results:** Most patients who were registered had been on conventional drugs. Regular intake of porridge rich in Micro- Nutrients: - Zinc, Selenium, Vitamins A, B, C, and K and Magnesium were seen to improve conditions of joint pains, lethargy and neuropathy, in our elderly clients. It is also proved highly effective in reducing micronutrient deficiencies as well as improving vitality. For those who were suffering from skin conditions the rate at which healing of the skin was remarkably faster when put on this natural regimens.
**Conclusion:** Our study shows that the above current medical problems can easily be controlled by people feeding on foods rich in Zinc, Selenium, Manganese, Magnesium, Copper, Vitamin A, and B and Essential amino acids. Polished foods are not good for low resource countries.

## 1 - 50355 Diet and physical activity as determinants of non-communicable disease risk factors in Lebanon

*Nahla Hwalla, Michele Iskandar, Abla Mehio Sibai, Malek Batal, Omar Obeid, Nada Adra - American University of Beirut*

This study was designed to investigate the contribution of diet and physical activity (PA) as determinants of risk factors for non-communicable diseases (NCDs) in Lebanese adult population.
A cross-sectional study determined the prevalence of NCD risk factors and their associations with PA and dietary habits in an age stratified representative sample of 501 subjects attending health centers in Lebanon.
Overweight was prevalent in 56.4% and 73.9% of women and men respectively, while obesity in both genders was 23.6%. Hypercholesterolemia was found in 32.5% and 42.6%, high LDL-C in 26.6% and 39.3%, low HDL-C in 47.2% and 51.9%, hypertriglyceridemia in 22.4% and 52.3%, diabetes in 2.1% and 7.0%, and hypertension in 11.3% and 23.3% of women and men, respectively. Approximately 53% of subjects were physically inactive and only 15.6% performed health-enhancing PA. Obesity was significantly associated with physical inactivity in men. Higher blood lipids were associated with lower PA and obesity in men and women. Among food intake dietary components, only omega-3 fatty acid intake was related to increased triglycerides in women, low HDL-C levels in men, and increased blood pressure in both. Physical activity showed significant relationships with NCD risk factors, including overweight and obesity.
These findings indicate a high prevalence of physical inactivity and NCD risk factors in Lebanese population attending health centers. Intervention strategies to lower CVD risk factors and encourage PA are needed.

## 1 - 50356 Using community participatory methods to create and promote healthful choices at school lunch: process evaluation and lessons learned

*Sara Folta, Jeanne Goldberg, Christina Economos, Claire Kozower - Tufts University; Mary Jo McLarney - Somerville School District; Rick Bell, Stewart Landers - Tufts University*

**Purpose:** School-based interventions to address the childhood obesity epidemic are growing rapidly, even though published studies have shown their effect to be limited. The challenge of improving outcomes in an environment widely acknowledged to be an appropriate site for interventions requires an understanding of best practices for implementation. A promising approach, community-based participatory research (CBPR), was used to develop the Shape Up Somerville Audio Adventures project. The goal was to introduce healthier choices into the school lunch menu and to promote them in messages broadcast over school public address systems. CBPR provided guidelines for the intervention design and evaluation, including process measures.
**Methods:** Attendance data, checklists, direct observation, feedback and monitoring were used to assess context, reach, dose delivered and received, fidelity, and implementation.
**Results:** For practical reasons, the principles of CBPR were carried out more thoroughly in the food service component of the intervention, and changes in school lunch menu were implemented as intended. Schools did not play the messages as often as intended. Reach (participation and attendance) was similar in all schools. Challenges to achieving fidelity to the intervention design were overcome, in part, by working with members of the community. Overall, implementation of the food services component was good; implementation of the messages was fair.
**Conclusion:** Using the principles of CBPR enhances the quality of process evaluation data. Closer adherence to

these principles improved implementation of the food service component compared to the message component. This approach deserves further exploration.

## 1 - 50357 The effect of a nutrition media-literacy intervention on parental support for their children's fruit and vegetable consumption

*Alexandra Evans - USC Arnold School of Public Health; Marge Condransky - Clemson University; Sonya Duhe, Andrea Tanner - University of South Carolina; Jayna Dave - USC Arnold School of Public Health; Dawn Wilson - University of South Carolina; Martin Evans - USC Arnold School of Public Health; Sarah Griffin - University of South Carolina*

The purpose of the study was to evaluate the effectiveness of a nutrition and media literacy program for upper elementary school students to increase fruit and vegetables (FV) intake as well as parental support for this dietary change.
Two elementary schools were randomly assigned to either intervention or control condition and students were recruited to participate in the study. At the intervention school, 16 students (50% African American, 70% female, 60% low SES) participated in the 12 session after-school intervention and attended 2 Family Nights with their parents. During the intervention, students learned about nutrition, media literacy, and media skills and developed a media campaign for their parents. Eighteen children at the control school (22% African American, 50% female, 12% low SES) attended 2 Family Nights with their parents. 24-hour recalls and measures of perceived parental social support, self efficacy, and motivation were assessed at baseline and post-intervention.
While participants in the intervention did not show significant increases in FV consumption, upon completion they scored higher than participants in the control group on the scales measuring positive parental emotional social support ($p<.05$), parental instrumental social support ($p<.05$), and self-efficacy ($p<.05$) and lower on negative parental emotional social support ($p<.05$).
The media intervention was effective in changing perceived parental support for making healthy changes. Because parental social support is imperative for children to be able to make dietary changes, interventions that affect parental support are necessary for sustainable lifestyle changes of the child.

## 1 - 50358 The prevalence and consequence of chronic energy deficiency (CED) obesity on children's nutritional status: recent evidence from India

*Athimulam Kulasekarn Ravishankar - Annamalai University*

**Purpose:** This study assesses the incidence of CED and Obesity among married women in the age group of 15-49 years in India, find out the relationship between food intake practices and the prevalence of CED and obesity and to assess the impact of BMI on the nutritional status of their children in India. Prevalence and consequences of CED and Obesity is examined in a population-based representative sample of 77733 currently married women during 1998-99 from a nationwide survey. Logistic regression analysis is used to assess the effects of CED and Obesity variables on the probability of reproductive outcome. Report provides an overall view about the prevalence of BMI (chronic energy deficiency) and obesity situation in India and across the states among the women in 15-49 age groups. Morethan one-third of women (36 percent) have a CED and it is pronounced more among rural women, illiterate women, Muslim women, and women living with low standard of living. And 11 percent of women are overweight or obese in India. But this percentage is significantly high among women who living with high standard of living (27 percent), highly educated women (26 percent) old ages (17 percent) and urban residents (24 percent). It is concluded that the India facing the burden of both nutritional disorders. On the one side, it has the high incidence of CED among the poor people and on the other side the people who have the new changing lifestyles and dietary habits suffering from obesity.

## 1 - 50359 Obesity and physical activity status of 65 years of age and older people living in a district of Ankara, Turkey

*Dilek Aslan, Hilal Ozcebe, Sinem Takmaz, Sena Topatan, Aysegul Sahin, Mucella Arikan, Burcu Tanriverdi - Hacettepe University, School of Medicine*

**Purpose:** In this study, it was aimed to determine obesity and physical activity status of 65 years of age and older people living in an urban district of Ankara province, Turkey.
**Methods:** The total number of 65 years of age and older people was 913 and in this cross-sectional study, we had a sample of 350 older people. Data collection was conducted by five of the researches in two weeks and each individual was visited in her/his own setting by the researchers. The body weight/height measures were also completed and body Mass Index (BMI) standards-NCHS-BMI percentile standards developed by World Health Organization (WHO) were used to determine obesity.

**Results:** The mean age of the participants was 71.5±5.4 and majority of them were females (55.7%). Based on BMI, 37.3% of the elder people were normal and 62.7% of them were obese. Women were more obese than men (p=0.004). According to the NCHS-BMI percentile standards, only 2.0% of the total participants were obese. Almost one out of three participants (36.1%) had their percentile standard values between 50 and 74. Sensitivity and specifity of the BMI measurements were as %93.6 and %86.1 due to the reference measurement (NCHS-BMI percentile standards) for this study.
**Conclusions:** The results of the study highlighted the requirement of the intervention programs in order to decrease the obesity prevalence and to increase the physical exercise frequency of the target group.

## 1 - 50361 A systematic review on the effectiveness of worksite health promotion (WHP) programs, including environmental modifications to promote physical activity and healthy dietary habits

*Luuk Engbers, Mireille van Poppel, Marijke Chin A Paw, Willem van Mechelen - VU university medical center, EMGO institute*

**Purpose:** Systematically assess the effectiveness of Worksite Health Promotion (WHP) programs with environmental modifications, on physical activity, dietary intake and health risk indicators.
**Background:** It is widely believed that WHP strategies should go beyond education or communication, to achieve significant behavioural changes among the target population. Environmental modifications could be an important addition to a WHP program.
**Methods:** Online searches were performed for articles published until January 2004 using the following inclusion criteria: (Randomised) controlled trial (RCT/ CT); the intervention should include environmental modifications; outcome must include physical activity, dietary intake and health risk indicators; healthy population. Methodological quality was assessed using a checklist derived from the methodological guidelines from the Cochrane Back Review Group. Conclusions on the effectiveness were based on a rating system of five levels of evidence.
**Results:** A number of 13 trials were included. All studies aimed to stimulate healthy diet, three trials focused on physical activity. Methodological quality of most trails was rated as poor. Nonetheless, strong evidence was found for an effect on dietary intake, inconclusive evidence for an effect on physical activity, and no evidence for an effect on health risk indicators.
**Conclusions:** It is difficult to draw general conclusion based on the small number of studies included in this review, however evidence exists that WHP programs including environmental modifications can influence dietary intake. More controlled studies of high methodological quality need to be initiated that investigate the effects of environmental interventions on diet and especially on physical activity in an occupational setting.

## 1 - 50362 The effects of a child-developed nutrition media campaign for parents

*Alexandra Evans, Sonya Duhe, Andrea Tanner - University of South Carolina; Marge Condrasky - Clemson University; Diana Lattimore, Jayna Dave, Dawn Wilson, Meredith Palmer - University of South Carolina*

The purpose of the study was to examine the effects of a child-developed media campaign intervention on increasing availability of fruit and vegetables (FV) in the home and social support from parents.
Twenty 4th and 5th grade students and parents were recruited from 2 elementary schools. At the intervention school, during the after-school intervention, 20 students learned about nutrition, media literacy, and media production skills. Using their production skills, they developed a media campaign for their parents. Parents were exposed to the media campaign for 2 weeks. At the control school, 21 students and parents attended 2 Family Nights only. Parents completed surveys measuring FV availability at home and instrumental and emotional parental social support for eating FV.
13 parents at the intervention (60% low SES) and 15 parents at the control school (12% low SES) completed baseline and posttest measures. T-test statistics indicated that parents in both conditions scored similarly on the baseline measures. After exposure to the media campaign, parents in the intervention group scored significantly higher on scales measure FV availability (10.64±.81 vs. 9.78±.67;p<.05) and instrumental social support (59.50±5.42 vs. 48.70±11.57;p<.05), compared to parents in the control group.
The media campaign was effective in changing the home environment. Because a home environment supportive of healthful dietary habits is crucial for children to eat healthier, interventions that affect the home environment are necessary for sustainable lifestyle changes of the child.

## 1 - 50366 Comparison of the effect of solid and liquid pre-exercise carbohydrate feeding on endurance exercise capacity

*Nahid Salarkia, Forogh Azam Taleban - National Nutriton and Food Technology Research Institute*

**Purpose:** This study was carried out in order to determine whether solid and liquid carbohydrate feedings have the same effect on serum glucose and endurance exercise capacity when consumed before exercise.
**Methods:** In a randomized clinical trial 20 endurance- trained men with mean age 21±3.1 Yrs and weight 71±8.2 Kg was studied. Subjects divided in two groups, randomly. They performed exercise tread- mill at 70% VO2max after ingesting: 1) Lentil meal, as a low glycemic solid carbohydrate and 2) glucose, as a liquid carbohydrate meal one hour before exercise. Blood samples were drawn before and one hour after test meal and 30 minutes after exercise. VO2max (Maximum oxygen uptake) to assessment of cardiovascular fitness measured in the end of the exercise trial.
**Results:** Endurance time was found to be longer after lentil meal than glucose (15.8±1.7 VS 13.1±2.2 min, $P<0.05$). At the end of exercise, the lentil group gave higher plasma glucose concentrations than the glucose group (93.8±16 VS 88.7±12.9 mg/dl, $P<0.05$). Changes of VO2max in lentil and glucose group were: 45.1±3.2 and 43.9±3.8 ml.kg-1 min -1,respectively, which were not statistically significant.
**Conclusion:** This study showed that a low glycemic solid carbohydrate may represent a better pre-exercise food choice than liquid carbohydrates by providing a more continues supply of glucose during exercise.

## 1 - 50373 The effect of improving physical activity and work style on work-related upper extremity disorders in computer workers-a randomised controlled trial

*Claire Bernaards - Institute for Research in Extramural Medicine; Vincent Hildebrandt – TNO; Geertje Ariëns - Institute for Research in Extramural Medicine*

**Background:** Although numerous intervention programs have been developed for workers with work related upper extremity disorders (WRUEDs), little is known on their effectiveness. A review study showed limited evidence for the effectiveness of exercises when compared with no treatment and no evidence for expensive ergonomic interventions but the number of studies was small (Verhagen et al. 2003). Based on the load tolerance model, our hypothesis is that stimulating physical activity and improving work style (i.e. improving postural habits and ergonomics, using frequent breaks and exercises, coping with work-related stress) is more effective in reducing WRUEDs in computer workers than work style improvement only or no treatment at all.
**Methods:** The RSI@Work project is a randomised controlled trial (RCT) with a six-month intervention period and measurements at baseline, 6 months and 12 months. Workers were eligible to participate when they reported frequent non-specific complaints in neck and upper extremities during the last two weeks or six months. Participants were randomly assigned to the (1) combination group (i.e. stimulating physical activity and improving work style), (2) work style group (i.e. improving work style) or the (3) control group (no advice). The intervention consists of six interactive group meetings. Primary outcome variables are recovery from WRUEDs, presence, intensity and reoccurrence of WRUEDs, and degree of disability.
**Results/conclusions:** 450 computer workers were randomized into group 1 (N = 147), group 2 (N = 148) or group 3 (N = 156). The first results can be presented in June 2005.

## 1 - 50374 Agreement between self-reported stage of change and actual behaviour with regard to physical activity and work style

*Claire Bernaards - Institute for Research in Extramural Medicine; Vincent Hildebrandt – TNO; Geertje Ariëns - Institute for Research in Extramural Medicine*

**Background:** Misclassification in stage of change often occurs in stage-based interventions to change behaviour. The stage of change concept has once been applied to postural habits (Keller et al. 2001) but little is known on misclassification in stage of change with regard to work style behaviour such as postural habits. The present study investigates the agreement between self-reported stage of change and actual behaviour with regard to physical activity and work style behaviour (i.e. postural habits and ergonomics of the workplace, coping with work stress and using frequent breaks and exercises during computer work).
**Methods:** In the present study we applied the Precaution Adoption Process model (Weinstein 1988) to physical activity and work style behaviour to investigate awareness and stage of change with regard to these two behaviours. Actual physical activity was assessed by using a modified version of the Short QUestionnaire to ASsess Health enhancing physical activity (SQUASH) (Wendel-Vos et al 2003). Actual postural habits and ergonomics were partly observed and partly assessed by self-report. 'Coping with work stress' was assessed using the short version of the Effort-Reward imbalance questionnaire (Hanson et al. 2000). Actual use of frequent breaks and exercises during computer work were self-reported using five short questions. Agreement between dichotomised stage of change (i.e. healthy/ not healthy behaviour) and actual behaviour will be studied with Cohen's Kappa.

**Results/conclusions:** 452 computer workers filled out the baseline questionnaire in November 2004. Results will be available in June 2005

## 1 - 50375 On-site training to improve the quality of PE classes for 1st and 2nd grade schoolchildren

*Juliana Kain, Ricardo Cerda, Barbara Leyton, Ricardo Uauy - University of Chile*

**Background:** Childhood obesity in Chile is high. We implemented a school-based obesity prevention program in 2003-4 (3 intervention schools (I ) and 1 control (C).
**Purpose:** To determine the quality of PE instruction and to evaluate an on-site training program to enhance student activity levels (SAL)
**Methods:** In 2003, we determined SAL of children 1st to 4th grade (300 in the intervention group and 90 controls), using the System for Observing Fitness Instruction Time (SOFIT). SOFIT is a validated method which distinguishes different types of movement intensities. The results indicated an urgent need to train the teachers. In 2004, we provided 8 on-site training lessons and a guideline to nine,1st and 2nd grade teachers in the intervention group. We compared SAL in both groups of children at baseline and 2 months after instruction was completed.
**Results:** Results of the initial study showed that of the total instruction time (TIT) in I, 44,8% was spent lying/sitting (LS), 33.1% standing, 18.8% walking and 3.3% running, while in C, these were 55.5, 27.2, 15.3 and 2 % respectively. In 2004, results showed that in I, LS declined from 28.5% of TIT to 4.5%, while running increased from 0.8 to 1.7%; in C, LS remained unchanged at 43%, while running declined from 0.8 to 0%.
**Conclusions:** The % time children are inactive in PE classes is extremely high. On-site training to increase SAL proved to be very effective.

## 1 - 50377 What help do young women want in their efforts to control their weight? Implications for program development

*David Crawford - Deakin University*

**Purpose:** To examine young womens views on the usefulness of strategies for weight control, their preferences for mode of program delivery, and likelihood of participating in a weight control program that meets their preferences.
**Methods:** A postal survey was conducted. A questionnaire was mailed to women aged 18-33, randomly selected from the Electoral Roll. It included questions on: socio-demographic background; height and weight; perceived usefulness of various types of information and practical classes on weight control; preferred mode of delivery for a program; willingness to participate.
**Results:** Of the 462 women who responded (41% response), 82% reported they were interested in/trying to control their weight. These women considered information on weight control to be more useful than practical sessions. Information about meal planning, cooking and low-fat recipes and how to manage stress were considered most useful. 58% of women reported they would prefer to participate in an individual face-to-face program delivered by a health professional. Other modes of delivery were far less popular. 31% of women reported it was very likely they would participate in a weight control program if it included the sort of things they considered useful and was offered in the way they preferred; a further 35% felt it likely.
**Conclusions:** Tailoring the content and delivery mode of weight management programs to young womens preferences may enhance program participation and adherence. Health professional-delivered, individual, information-based programs appear most popular among this target group.

## 1 - 50379 Physical activity and quality of life in older adults: influence of health status and self-efficacy

*Edward McAuley, James Konopack, Shawna Doerksen, Katherine Morris, Robert Motl - University of Illinois*

**Purpose:** We adopted a social cognitive perspective to understanding how physical activity and quality of life are related, hypothesizing that such effects are indirect through self-efficacy and health status rather than direct. Moreover, we examine the relationship between global quality of life and health status indicators of health-related quality of life. Methods: Baseline data from a 24-month prospective trial were collected from 249 older women, M age = 68.12 yrs. All participants completed measures of physical activity for older adults, exercise self-efficacy, physical health status (Late Life Function and Disability Instrument and SF-12), mental status (perceived stress and SF-12), and the Satisfaction with Life Scale. Data were analyzed using covariance modeling for initial confirmatory factor analyses (CFA) and subsequent structural analyses.
**Results:** The five-factor measurement model and the structural model fit the data well. Analyses indicated a significant effect of physical activity on self-efficacy but not on physical or mental health. Self-efficacy had direct

effects on mental and physical health status but not on satisfaction with life. Both health status factors had significant effects on satisfaction with life.
**Conclusions:** Our findings lend support to a social cognitive explanation of how physical activity is related to quality of life. Moreover, the data bring together two distinct approaches to quality of life and support relations among them. We conclude that health status is a proximal rather than distal indicator of quality of life.

## 1 - 50381 Associations between sedentary behavior and social capital in a regional Australian population

*Kerry Mummery - Central Queensland University; William Lauder - University of Dundee; Grant Schofield - Auckland University of Technology; Cristina Caperchione - Central Queensland University*

**Background:** How social capital is related to an increasingly important disease risk - physical inactivity has not yet been investigated. In the present study the associations between of social capital and sedentary behavior was investigated in a sample of Queensland (Australia) adults.
**Methods:** Data was collected from 1,278 persons by means of a computer-assisted-telephone-interview survey. The association between the social capital variables and sedentary behaviour was studied by means of logistical regression. Multivariate analysis adjusted for selected socio-demographic factors on the differences in sedentary behavior and quartile groupings of social capital scores. Differences in the levels of social capital between socio-demographic groupings were assessed by t tests and analysis of variance.
**Results:** Sedentary behavior was negatively associated with the measure of social capital. Individuals in the top quartiles of social capital were significantly less likely to be sedentary Conclusions: Low social capital is associated with sedentary behavior. The results offer direct implications for health promotion programs aimed at increasing levels of physical activity at the community or population level.

## 1 - 50385 Where do children play? A qualitative study of parents' perceptions of influences on active free-play

*Jenny Veitch, Jo Salmon, Kylie Ball, Sarah Bagley - Deakin University*

**Purpose:** Many Australian children have highly sedentary lifestyles. For some children it may be difficult to find opportunities to be active, perhaps due to a lack of space in their backyard, or limited access to public open spaces (POS) such as parks/playgrounds. The aim of this qualitative study was to better understand where children usually play in their free time and why, by investigating parents perceptions of the individual, social and environmental influences on childrens out of school hours active free play and independent mobility.
**Methods:** Using an ecological framework, in-depth interviews were conducted with 78 parents from a selection of primary school populations representing low, mid and high socioeconomic areas of Melbourne, Australia. Thematic analysis was used to analyse data.
**Findings:** Our findings suggest that childrens usual active play is restricted to a limited number of play spaces, and a lack of independent mobility restricts their ability to access POS. Six major themes emerged as the most commonly reported influences: parental safety concerns, childs level of independence, childs attitudes to active play, social networks, facilities at parks and playgrounds, and urban design factors.
**Conclusions:** The study findings have important implications for future urban planning and childrens opportunities for active free play. Integral to a greater understanding of influences on childrens active play in future studies will be the inclusion of quantitative assessment of these ecological influences in a larger sample and the use of objective measures of childrens physical activity.

## 1 - 50387 Do health behaviors correlate? Results from the SMILE study

*Hein de Vries, Astrid Reubsaet, Jonathan van 't Riet, Saadhna Panday – Maastricht University*

**Purpose:** Successful prevention is dependent on examination of behavioural determinants. So far, much attention is given to separate health behaviours, whereas little is known about combinations of health behaviours. To examine which health behaviours occur most frequently, which combination of health behaviours did occur and which clusters of lifestyles could be identified, data was gathered from the Survey of Medical Information and Lifestyle in Eindhoven (SMILE), allowing us to investigate not only separate health behaviours but also general lifestyles.
**Methods:** First, cross-sectional study was conducted among 9450 respondents. Data were collected on smoking, alcohol, nutrition and physical activity. ANOVA s and cluster analyses were used to examine gender and SES differences and to identify possible clusters of lifestyles. Second, longitudinal data are collected as well, but the results are not yet analyzed, but will be presented at the conference.
**Results:** The results show significant differences between gender and SES for the outcome measures. Cluster

analyses revealed that the 4- and 5-cluster solution seem to distinguish best. Further, most people perform two or three healthy behaviours, whereas only 7% meet the guidelines for all five behaviours. The combination of non-smoking, low alcohol and meeting the PA-norm is the most common pattern. Finally, in-depth analysis will analyze gender and SES differences as well as longitudinal changes.
**Conclusions:** Cluster analysis did not yet reveal a straightforward solution. More in-depth studies may reveal specific lifestyles within subgroups. Combining two or three healthy lifestyles seems to be most popular.

## 1 - 50388 Vital at work : results of a health prevention project by a German health insurance company

*Ulrich Oltersdorf - Federal Research Centre for Nutrition and Food; Hans Steiner - University of Karlsruhe; Werner Gudat - Silberberg Klinik; Simone Perger, Frank Otten -TAUNUS BKK*

**Purpose:** Lifestyle-related diseases lead to increasing economic burden. Prevention is a task of the modern health systems. An important setting for such activities is work place. Information from health and nutrition surveys are needed for planning, implementing and evaluation of prevention programmes.
**Methods:** The project initiated by TAUNUS BKK, a German health insurance company, included a baseline (March - Dec 2003) and a follow-up survey (March - Dec 2004). Altogether 1583 employees were investigated in 36 companies (mainly food retailer) in Germany; 535 of them were re-examined. The MED-Mobil survey team accomplished clinical examination, questionnaires on food, physical activity, lifestyle and facilities for catering. The results of the baseline survey were used to implement prevention programs related mainly to nutrition and physical activity, related to individuals (hotlines, courses) and to the work (e.g. cantine)
**Results:** Health and nutritional status of the employees are similar to those known in Germany. 50,3 % have BMI (>25; increasing with age; food habits according the healthy eating index of the majority is unfavourable, as the high degrees on physical inactivity. Impact of intervention measurements is diverse, and this can be related to the diverse groups with different types of employees in different working situation.
**Conclusions:** The potential for prevention at working place is high, but success depends on many factors, which have different relevance in the specific situations. Good planning is needed, as well evaluation, and the program elements have to selected carefully together with the employees and the employers.

## 1 - 50391 Toward a Québec strategy for promoting healthy lifestyles that help prevent chronic disease: a reference framework for Quebecers

*Brigitte Lachance - Ministère de la Santé et des Services sociaux*

The lifestyle change strategies introduced in recent years have not yielded the results expected, in terms of the switch to a healthy lifestyle. In fact, there has been a drop in physical activity among young people and a significant increase in obesity in Québec in the past 10 years.
Limited experiences in Québec and abroad as well as advances in social epidemiology have led many experts to propose a new paradigm to guide measures for fighting chronic disease. They contend that to improve health and effectively reduce health inequalities, there is no choice but to improve the social environment linked to healthy behavior.
The use of a model that combines individual initiatives and pivotal factors, such as public environments and policies, is a promising avenue for increasing the effectiveness of healthy lifestyle promotion measures to help prevent chronic disease.
On the basis of the Québec Public Health Program 2003 2012, which includes goals to be achieved and activities to be implemented throughout Québec to promote healthy lifestyles that help prevent chronic disease, the reference framework attempts to clarify the integrated vision and theoretical models suggested to devise actions initially geared toward weight issues.

## 1 - 50393 Design and analysis plans for the trial of activity in adolescent girls (TAAG)

*June Stevens - University of North Carolina; David M. Murray - University of Memphis; Diane J. Catellier - University of North Carolina; Peter J. Hannan, Leslie A. Lytle - University of Minnesota; John P. Elder - San Diego State University; Deborah R. Young - University of Maryland; Denise G. Simons-Morton - National Heart Lung and Blood Institute*

**Purpose:** To describe the design and analysis plans for TAAG
**Background:** The TAAG trial was designed to test an intervention that aims to reduce by half the age-related decline in moderate to vigorous physical activity (MVPA) in middle school girls.
**Methods/key points:** The intervention will be evaluated using a group-randomized trial involving 36 middle

schools. The primary endpoint is the mean difference in intensity-weighted minutes (i.e., MET-minutes) of MVPA between intervention and comparison schools assessed using accelerometry. MVPA will be assessed in two cross-sectional samples, one drawn from 6th graders at the beginning of the study and the second drawn from 8th graders following the 2-year implementation of the intervention. This design is consistent with the goals of TAAG, which focus on environmental-level rather than individual-level interventions. The number of girls studied at baseline is half the number studied at endpoint, which is an efficient design that retains statistical power. A two-stage model will be used to test the primary hypothesis. In the first stage, MET-minutes of MVPA will be regressed on school, time (baseline or follow-up), their interaction, ethnicity and week of data collection. The second stage model will regress adjusted school means at follow-up on intervention status, adjusting for the baseline school mean.
**Conclusions:** The TAAG study advances the field of group-randomized trials through the use of a study design and analysis plan tailored to serve the main study hypothesis.

## 1 - 50394 Using economic and behavavioral theory to boost consumption of whole grain foods

*Lisa Mancino - ERS-USDA; Andrea Carlson - CNPP-USDA*

**Purpose:** The latest Dietary Guidelines for Americans recommend that half of all daily grain servings be whole grains. Thus most Americans will need to dramatically increase whole grain intake and reduce consumption of refined grains. Creating nutrition messages to help individuals achieve this goal requires an understanding of which foods, eating occasions and locations are most conducive to eating whole grains.
**Methods:** Our data comes from most recent National Health and Nutrition Examination Survey (1999-2002), which collects medical, dietary, and behavioral information on a nationally representative sample of the U.S. Using an economic model of consumer demand, we use multivariate analysis to estimate how individuals consumption of whole grains correlates with socio-economic factors, health indicators, and behaviors related to food choices.
**Findings:** Of the 55 percent of Americans who report consuming any whole grains, whole-grain crackers, salty snacks, and ready-to-eat cereals provide the bulk of whole grain intake. Women, non-Hispanic whites, and individuals who are older, more educated, eat more meals at home, or have higher incomes are more likely to consume whole grains.
**Conclusions:** If eating out continues to grow without changes in the choices made at restaurants, more people will consume refined grains at the expense of whole grains. Health campaigns may want to educate individuals, especially young adults, on ways to make better choices when dining out. These findings also suggest possible ways food manufacturers can introduce more whole-grain products, such as reformulating snack crackers and breakfast cereals.

## 1 - 50396 A systematic review of the effectiveness of computer-tailored education on physical activity and dietary behaviors

*Andrea Werkman - Wageningen University; Willemieke Kroeze, Johannes Brug - Erasmus University Medical Center*

**Purpose:** To systematically review the scientific literature on computer-tailored physical activity and nutrition education, addressing the effectiveness of computer-tailored education and potential determinants of its effectiveness.
**Background:** Computer-tailored health education interventions emerged in the early 90s. This appeared to be a promising strategy for changing health behaviors. Since earlier reviews on this topic were published in 1999, it is time for an updated review.
**Methods:** Cochrane instructions were used. Intervention studies published from 1965 to September 2004 were identified through a structured search in PubMed, PsycInfo and Web of Science, and examination of reference lists of relevant publications. Studies were included that: applied a pretest-posttest randomized-controlled trial design, were aimed at primary prevention among adults, used computer-tailored interventions to change physical activity and dietary behaviors, and were published in English. The search resulted in 30 publications; 11 on physical activity behaviors and 26 on nutrition behaviors, with some studies investigating multiple behaviors.
**Conclusions:** Three out of eleven physical activity studies and 20 out of 26 nutrition studies found significant effects of the tailored interventions. The evidence was most consistent for tailored interventions on fat reduction. Overall, there seems to be potential for the application of computer tailoring for promoting healthy diets, but more research is needed to test computer-tailored interventions against other state-of-the-art intervention techniques and to identify the mechanisms underlying successful computer tailoring.

## 1 - 50397 Evaluating a university health check augmented with a theory-based leaflet

*Ian Kellar - University of Brighton; Charles Abraham - University of Sussex*

**Purpose:** To evaluate a theory-based leaflet, used to augment a health check that had been previously found to result in changes in diet but not to affect exercise behaviour. The study examined whether intervention-induced behaviour change was mediated by changes in cognitions specified by the Theory of Planned Behaviour (TPB).
**Methods:** In an experimental design, 118 students at Sussex University completed a questionnaire assessing their exercise behaviour using TPB-specified constructs. Intervention participants undertook a health check, received a one page leaflet that included TPB-derived persuasive messages, and were asked to form specific Implementation Intentions regarding exercising over the following week. All participants completed a follow-up questionnaire measuring self-reported behaviour four weeks later.
**Results/Findings:** Controlling for baseline exercise behaviour, an ANCOVA revealed a significant difference between the intervention and control group in terms of the number of days on which they performed at least 30 minutes energetic exercise over the past week at the 4-week follow-up ($F(1, 115) = 34.366$, $p < .001$; M s = 3.69 and 1.94, respectively). This difference constitutes a large effect size ($d = .96$). TPB-specified cognitions did not account for intervention-induced behaviour change, but did moderate intervention effectiveness.
**Conclusions:** The results show that our brief leaflet-like intervention successfully promoted energetic exercise during one week at a 4 week follow-up in comparison to a control group. The study demonstrates the applicability of targeting intentions and implementation intention formation to promoting exercise behaviour.

## 1 - 50402 Changes in fitness, BMI and body image in urban, African American adolescent girls

*Carolyn C. Voorhees, Daheia Barr-Anderson, Tao Yu, Deborah Rohm-Young - University of Maryland*

**Purpose:** Intervention effects may differ depending on baseline body weight and body image characteristics. This paper seeks to determine whether change in fitness following a school based intervention differed depending on baseline body mass index (BMI) and Body Image.
**Methods:** Ninth grade girls from an urban, high school (83% African American) participated in a 2-semester intervention designed to increase physical activity and fitness. Height and weight was measured via standardized methods with BMI analyzed categorically (normal, overweight or obese). Fitness was measured by heart rate response to a multistage step test at baseline and follow-up. Fitness change was determined by submaximal change in heart beats/minute. Fitness was categorized from low to high (1- 4). Body image variables were derived from appearance evaluation, appearance orientation, fitness orientation and fitness evaluation subscales of the validated Multidimensional Body Self-Relations Questionnaire.
**Results/Findings:** Both groups had significant changes in fitness categories from baseline to follow-up ($p=0.016$). When comparing baseline BMI and fitness categories participants in higher baseline fitness categories had marginally lower BMI ($p=0.059$). Overall, girls had psychologically healthy body image on a variety of scales, regardless of BMI. Normal BMI girls in both groups had significant change in fitness ($p=0.048$). Change in fitness was significantly related to baseline fitness and appearance orientation in both groups.
**Conclusions:** Adolescent girls with positive appearance and fitness orientation improved their fitness more than those with lower scores. Future interventions may want to consider these factors.

## 1 - 50405 Physical activity and nutrition of pupils in Kaunas

*Elvyra Griniene - Lithuanian Academy of Physical Education; Ricardas Radisauskas - Kaunas University of Medicine*

**Purpose:** To evaluate the peculiarities of pupil s nutrition (N) and their connection to physical activity (PhA).
**Methods:** 427 pupils from Kaunas secondary schools were questioned in autumn, 2003. An anonymous adopted from HBSC questionnaire was used.
**Results:** It was found that 31.0% of the questioned were PhA, went in for sports daily or several times a week for more than 4 hours after lessons. 35.5% of the pupils were not PhA, did not take up any sports. The N habits of both PhA and inactive pupils were similar: 54.1% of the PhA pupils and 63.5% of the inactive pupils had breakfast regularly while 32.5% and 35.0% of them ate all day long. Almost similarly frequently the pupils of both groups ate such recommended wholesome food products as green vegetables (29.6% and 25.8%), fruit (53.1% and 52.6%), brown bread (28.6% and 28.5%) and not recommended products as butter (52.1% and 50.5%), smoked meat or sausage (43.8% and 41.5%) daily. PhA pupils used more such wholesome food products as fat-free milk (30.6% and 24.6%), eggs (36.7 and 18.1%) daily and not healthy food products as sweets (55.2% and 45.3%), chips (30.3% and 5.1%), drank carbonated drinks (27.5% and 7.8%), $p<0.05$.
**Conclusion:** The N of pupils in Kaunas did not depend much on their physical activity after lessons.

## 1 - 50408 Prevention of obesity in children at kindergarten results from the project "healthy Karlsruhe - healthy children in the city"

*Ulrich Oltersdorf - Federal Research Centre for Nutrition and Food; Hans Riemer - City of Karlsruhe; Susanne Bappert, Klaus Bös - University of Karlsruhe*

**Purpose:** The intention of the project is to positively influence the lifestyle (esp. nutrition, activity and mobility) of children at the setting kindergarten sustainably by an efficient co-operation of city officials and health and scientific institutions.
**Methods:** An intervention program was developed which is characterised by the intersectorial approach (food, physical activity, sport, mobility, environment) and by a realistic input, not as often short-term and high input, but long-range (3 years) and moderate intensity of intervention programs, in order to fit into time and economical frame of kindergartens. This program was implemented in 13 kindergartens (starting 2002; with about 900 children) and their are 13 control groups. The program was evaluated in several surveys annually, mainly by anthropometric measurements and physical fitness. The last examination will be in spring 2005.
**Results:** It can be seen that obesity starts already at the kindergarten; 6% of the 3year-old and 12% of the 6-year-old are obese. The general fitness and physical motoric ability of the small kids is insufficent, and this is related to overweight. The positive effects of the prevention programs could be seen already in the second year examination. But the effect differs in the different kindergartens.
**Conclusions:** The experiences of Karslruhe project are good. The program is feasible for extension to other communities.

## 1 - 50410 Innovative community projects targeting physical activity and nutrition: indicators for success

*Anne Krayer, Claire Paisley, Catherine Robinson - University of Wales, Bangor*

**Purpose:** Community projects have the potential to support dietary change and increase physical activity. This study explores factors contributing to the successful implementation of 25 community projects addressing nutrition and physical activity. The projects are on-going and preliminary findings are presented here.
**Methods:** Data was obtained from questionnaires, project observations and interviews. Qualitative analysis focused on identifying and comparing themes and quantitative data was analysed using descriptive statistics.
**Findings:** Preliminary findings indicate that community projects work particularly well if: - There are already established frameworks in terms of 'working' practice and available resources - Several individuals are involved working as a team and sharing skills - A project 'champion' exists with a vision for the project - Relevant partnerships have been developed - Long-term planning and sustainability have been considered. Are more likely to be successful if: - Programmes are relevant and acceptable to the community - Programmes take into account environmental, cultural, social and economic factors influencing choices of community members. Community projects - were initially resistant to invest time and effort in monitoring and evaluation, partly based on lack of skills - built stronger partnerships with the research team due to the development of an evaluation plan and timetable - experienced a shift in attitude towards recognising that evaluation and monitoring were essential parts of the project.
**Conclusions:** This research suggests that a host of factors contribute to the success of community projects.

## 1 - 50412 Fitnesswatch: a fitness assessment and management system for school going children and youth of India

*J. P. Verma - LNIPE*

The present study is an effort to develop a fitness assessment and monitoring system for school going children and youth of India. Two thousand children and youth from different schools and colleges in the age categories of 7 to 20 years constituted the sample. These subjects were tested on different parameters of health related fitness viz.; cardio respiratory endurance, muscular strength, muscular endurance, flexibility and fat%. Index were developed to assess cardio-respiratory endurance, muscular strength, muscular endurance and fat% whereas flexibility was measured by using the direct data obtained on sit and reach test.
Standards were developed and weights were computed using statistical techniques. Finally a single index of fitness was developed by using these weights. A graphical system was developed to categorize an individual into either of three zones like need improvement zone, healthy fitness zone and excellent zone on each of the five parameters. A protocol was developed to generate a fitness prescription of an individual based on his/her present fitness status.
All the above-mentioned functionality was imbedded in the expert system developed by the author to generate all the reports of an individual based on his/her current fitness status. The system is named as FitnessWatch and generates five outputs of an individual namely: Performance Sheet, Main Score Sheet, Graphic Sheet, Statement on Present Profile and Fitness Prescription.

## 1 - 50414 Physical activity enhances menopause-related quality of life: results of a 4-month randomized controlled trial

*Steriani Elavsky, Edward McAuley - University of Illinois*

**Purpose:** In some women, the menopausal transition may lead to diminished quality of life (QOL). This randomized controlled exercise trial evaluated the effects of physical activity on menopausal symptomology and menopause-related QOL.
**Methods:** A sample of peri-menopausal women (N = 109, M age = 49.78 yrs) participated in a 4-month exercise trial with random assignment into walking, yoga, or wait-list control groups. Psychological measures and measures of cardiorespiratory fitness and body composition were administered at the beginning, mid-point (only psychological), and end of the trial. Utian Quality of Life Index (UQOL; Utian et al., 2002) and Greene Climacteric Scale (GCS; Greene, 1998) were used to assess menopause-related QOL and menopause symptomology, respectively.
**Results:** Across the trial, there were significant improvements in the health dimension of QOL in both the walking ($p < .001$) and yoga ($p < .01$) groups as compared to the controls. Additionally, the walking group benefited with regard to the emotional domain of QOL ($p < .001$) and occupational QOL improved across all groups ($p < .05$). No significant changes were observed relative to the sexual dimension of QOL. Across groups, there was a significant decrease in symptom reporting from baseline to month 4 ($p < .001$), with the walking group experiencing the greatest reduction ($p = .05$).
**Conclusions:** Physical activity is one behavioral factor that may enhance menopause-related well-being. Whether physical activity participation impacts menopausal QOL indirectly through its effects on other outcomes remains to be determined.

## 1 - 50416 The relationship between social physique anxiety and stage of exercise behavior change

*Bradley Wilson, Matthew Kratzer, Keith King - University of Cincinnati*

The purpose of this study was to determine if a relationship exists between the social physique anxiety scale (SPAS) and stage of exercise behavior change (SEBC) These data will provide information about how students feel about their bodies at different stages of exercise behavior. The participants for this study were college students attending a large, urban, Midwestern university. All participants completed a survey that included questions about demographics, a 12-item Social Physique Anxiety Scale, and one question about current exercise behavior. A significant inverse relationship was found between the SPAS and SEBC ($r = -.182$, $p = .001$). Also, significant differences existed between the social physique anxiety scores of males ($M = 29.34$) and females ($M = 34.71$), ($t(329) = -6.008$, $p < .001$), as well as between African American ($M = 28.99$) and Caucasian ($M = 32.46$), Hispanic ($M = 38.29$), and Asian American ($M = 37.75$) students, ($F(4, 330) = 4.42$, $p = .002$). Also examined was each stage of change related to exercise behavior and found that a significant difference existed between the SPA scores of individuals in the maintenance phase and those in the preparation and action phases ($F(4, 330) = 8.025$, $p = .002$). These data indicate that exercisers, males and African-Americans are more likely to have lower physique anxiety. This information will assist exercise professionals in understanding the relationship between exercise behavior and physique and if physique is a potential barrier to regular exercise participation.

## 1 - 50417 The "fun, food, & fitness" program: development of a theoretically based Internet program promoting maintenance of healthy eating and physical activity behaviors to 8 year old African American girls

*Debbe Thompson, Janice Baranowski, Karen Cullen, Tom Baranowski – Baylor College of Medicine*

**Purpose:** Little attention has been accorded to the theoretical foundation for the design of Internet-based behavior change programming. This presentation will demonstrate how Social Cognitive Theory (SCT) and Elaboration Likelihood Model (ELM) were combined to create a theoretically-informed Internet-program promoting maintenance of healthy diet and physical activity (PA) behaviors.
**Background:** Establishing healthy diet and PA behaviors among youth is critical to preventing obesity. Novel methods/dissemination channels that capture and hold attention while promoting behavior change are needed. Internet-based programs hold promise. They have the potential for wide dissemination, due to the ubiquitous nature of the Internet. Grounding Internet-based interventions in both behavior change and communication theories has the potential to create effective interventions with persuasive appeal.
**Key points:** This program employed the Internet to maintain diet and PA behavior changes established in a summer camp. It provided girls with learning opportunities (e.g., online comics, problem solving activities) and then engaged them in self-regulatory activities (e.g., goal setting/review). SCT informed the learning activities (e.g., behavior

modeling) and targeted mediating variables such as self efficacy, outcome expectancy, and skills, using self control procedures (e.g., goal setting, problem solving, asking/negotiation). Animation, culturally-sensitive characters, and interactivity were guided by ELM and were incorporated to attract attention and enhance personal relevance, thereby promoting cognitive elaboration.

**Conclusions:** Internet-based behavior change programs offer unique opportunities to meet the needs of youth, and can be designed using a framework informed by behavior change and communication theories. Future work needs to explore different types and combinations of these theories.

## 1 - 50419 Correlates of preschool children's food neophobia: food preferences, eating behaviours and demographics

*Georgie Russell, Tony Worsley - Deakin University*

Food liking is a well known determinant of self-selected food choice in young children. Food neophobia (fear of new foods) encumbers children s formation of food likes through reducing children s exposure to new foods. However, there is little research on the specifics of children s food neophobia at the population level. Thus, we surveyed 371 Australian parents of 2-5 year old children to examine food preference, eating behaviour and demographic correlates of food neophobia. Respondents reported on their child s liking of 176 foods and drinks, food neophobia (Food Neophobia Scale), eating behaviours (Child Eating Behaviour Questionnaire) and demographics. Food and drink items were grouped into Australian Guide to Healthy Eating (AGHE) food groups. Data were analyzed with ANOVA, t-tests and Pearson s product-moment correlation coefficients as appropriate.

We found no significant relationships between food neophobia and demographic variables. However, food neophobia was negatively correlated with preferences in each AGHE food group; especially vegetables and legumes ($R= -.601$, $P<0.01$). Children were grouped into low, medium and high neophobia groups. We found significantly higher scores for the high neophobic group for the number of untried foods, number of foods disliked, satiety responsiveness, and fussiness; and significantly lower scores for the number of foods liked and enjoyment of food. These data suggest young children's food neophobia may be hindering their ability to develop a liking for a variety of foods, especially vegetables and legumes, and thus may impede consumption of a healthful diet.

## 1 - 50420 Walkable neighbourhoods and community engagement: is there a relationship?

*Lorinne du Toit, Ester Cerin, Eva Leslie, Neville Owen - The University of Queensland; Adrian Bauman - University of Sydney*

**Purpose:** We examined data from the Physical Activity in Localities and Community Environments (PLACE) study to determine whether more-walkable neighbourhoods are associated with higher reported levels of social and community engagement.

**Methods:** The PLACE study used a stratified design to select neighbourhoods classified by Geographic Information System methods as high or low walkable in Adelaide, Australia. The Walkability index was derived from objectively measured physical environment attributes (dwelling density, street connectivity and net retail area). The sampling frame was constructed from private household addresses. Participants were 2194 residents, aged 20-65, who completed a mailed questionnaire on individual, social and environmental factors. Social and community engagement measures included interaction with neighbours, sense of community, informal social control and social cohesion. Walking for transport and walking for recreation (self-reported) were hypothesised as mediators of possible relationships between Walkability and indices of community engagement. Multilevel regression models were used to examine the relationships between Walkability, walking behaviours and community engagement, after controlling for socio-demographic factors.

**Results:** No significant statistical relationships between Walkability and interaction with neighbours, informal social control or trust/social cohesion were found. A weak relationship ($b=0.004$; $t=2.0$; $p<.05$) with sense of community was found; however, this was not mediated by walking for transport or for recreation.

**Conclusions:** Walkable neighbourhoods may not be more sociable . Interventions promoting social engagement through the built environment may not be transferable between neighbourhoods without modification for differing local factors, which may include the characteristics of residents.

## 1 - 50421 Active commuting to school: associations with personal factors and the family, social and built environment

*Anna Timperio, Kylie Ball, Jo Salmon, Rebecca Roberts - Deakin University; Billie Giles-Corti - The University of Western Australia; Dianne Simmons - Deakin University; Louise Baur - The University of Sydney; David Crawford - Deakin University*

**Purpose:** Few studies have examined contextual influences on children's behaviour. This study examined contextual correlates of active commuting to school.

**Methods:** Cross-sectional study of 235 5-6 and 677 10-12 year-old children. Measures: proxy reports of child active commuting and individual, family, social and neighbourhood factors; child perceptions of their neighbourhood (older children); measured height/weight; characteristics of the shortest route to school (using Geographic Information Systems). Multiple logistic regression analyses were performed, adjusted for sex, socioeconomic status and clustering by school.
**Results:** Variables negatively associated with walking/cycling to school among younger and older children, respectively, included: parent perception of few other children in the neighbourhood (OR=0.3; OR=0.6); parent perception of no lights or crossings for their child to use (OR=0.4; OR=0.6); objectively assessed route to school with busy roads to cross (OR=0.1; OR=0.3); objectively assessed steep incline en route to school (OR=0.3, younger children only); objectively assessed route with good street connectivity (OR=0.7, older children only). Younger (OR=5.2) and older (OR=10.2) children with an objectively assessed route to school <800m were more likely than other children to walk/cycle to school.
**Conclusion:** Promoting social aspects of active commuting, child-friendly urban design and equipping children with skills to safely negotiate their environment may be important. In contrast to studies with adults, neighbourhoods characterised by cul-de-sacs may support children's active commuting.

## 1 - 50422 The development and evaluation of a brief pilot nutrition and exercise intervention for the prevention of weight gain in general practice patients

*Alison Booth, Caryl Nowson - Deakin University; Nancy Huang, Cate Lombard, Kate Singleton - Victorian Council on Fitness and General Health (VICFIT)*

**Purpose:** To develop and pilot test the use of a brief (<5 minute) nutrition and exercise intervention administered by general practitioners (GPs) to patients in the form of a prescription (script).
**Methods:** The script included five nutrition messages and personalised exercise advice for a healthy lifestyle or the prevention of weight gain. GPs were asked to administer 10 scripts to 10 patients over two to four weeks. The target group included patients with a BMI between 23 and 30 kg/m2. Patients' weight, height, waist circumference, gender, date of birth; type and frequency of physical activity prescribed; the selected nutrition messages and; reasons for administering the script were recorded.
**Results:** Nineteen GPs (63% female) provided a median of nine scripts over a four week period. Scripts were administered to 145 patients (mean age: 54 ± 13.2 years, mean BMI: 31.7 ± 6.3 kg/m2, 57% female) with 52% classified as obese (BMI >30). GPs cited 'weight reduction' as a reason for writing the script for 78% of patients.
**Conclusions:** GPs administered the script to obese patients for the purpose of weight loss rather than to prevent weight gain among the target group. GPs may have been unaware that their patients were obese as BMI was not necessarily documented. Moreover, GPs may be resistant to initiate preventive health messages as their traditional role involves treatment delivery. This raises questions regarding GPs capacity to identify healthy/overweight patients and their willingness to undertake health promotion in this group of patients.

## 1 - 50423 Misconceptions about physical activity

*Tamara Smeets, Hein de Vries - Maastricht University*

**Purpose:** Physical activity is considered important for a healthy lifestyle. In the Netherlands, just as in other European countries, a growing part of the population does not meet the recommendation of 30 minutes of moderate physical activity on preferably all days but at least 5 days a week. Little is known about the reasons why Dutch adults engage in physical activity and may decide to increase their activity level. The aim of the present study is to identify differences in determinants between groups in different motivation stages using an adaptation of the transtheoretical model.
**Methods:** A random sample of addresses was obtained through the Dutch national Telephone Company. These addresses were sent a questionnaire. Respondents had to be between 18 and 65 years. The questionnaire assessed physical activity, cognitive pros and cons, affective pros and cons, social influence of partner, family and friends, self-efficacy, implementation intentions, stages of change and sociodemographic variables.
**Results:**The guideline for physical activity was met by 40% of the respondents. Differences were found between stages of change in affective pros, cognitive pros and cons and self-efficacy. Most profound differences were found between adults in the unaware precontemplation and aware precontemplation stage.
**Conclusions:** It is important to identify misconceptions. As long as adults do not know what they are doing wrong, they are not motivated to change. For respondents unaware of their low activity level, the first step is to provide tailored feedback on their actual activity level, and their beliefs about physical activity.

## 1 - 50426 Tracking of physical activity and television viewing in the 1958 British birth cohort

*Tessa Parsons, Chris Power - Institute of Child Health, UCL; Orly Manor - Hebrew University*

**Purpose:** To investigate, in a large national cohort, the extent of tracking of physical activity between 11 and 42 years. To assess whether activity level in adulthood was influenced television viewing in adolescence/early adulthood.
**Methods:** The 1958 British birth cohort includes all births in one week, March 1958, in England, Scotland and Wales. From a target population of 17,733 births, information was obtained on 98%. The main outcome measure was frequency of leisure time activity at 11, 16, 23, 33 and 42y, with 11,370 participants contributing data at 42y. Tracking of activity was assessed using multi-level models, and relationships between television viewing and activity by Spearman s correlation coefficients.
**Results:** From 11y to 42y activity tracking was low; the longitudinal correlation coefficient was 0.09 (95% CI 0.08, 0.11) for males, and 0.06 (95% CI 0.05, 0.07) for females. Spearman correlation coefficients for activity increased during adulthood; from 0.20 in men and 0.11 in women between 23y and 33y, to 0.31 in men and 0.23 in women between 33y and 42y. Activity in adulthood (33y or 42y) was not predicted by television viewing in adolescence/early adulthood (11y, 16y or 23y).
**Conclusions:** Tracking of activity frequency over a 30y period is very low, but activity habits may become more stable in mid-adulthood. Adult activity levels do not seem to be dependent on frequency of television viewing in adolescence/early adulthood, suggesting that these factors operate independently.

## 1 - 50430 Exploring the impact of environmental change on lifestyle and physical activity behaviour: focus group study results

*Tanya Trayers, Debbie Lawlor, Kenneth Fox, Andy Ness - University of Bristol; Chris Riddoch - Middlesex University; Rosemary Deem - University of Bristol*

**Purpose:** Interventions to increase physical activity have traditionally focussed on individuals. These have been relatively unsuccessful. Several lines of evidence suggest that environment modification may be a plausible alternative strategy to promote population level changes. The purpose of this study was to assess the effects upon lifestyle and physical activity behaviour in a deprived neighbourhood of the following developments: A new section of the National Cycle Network, a traffic-free path. A Home Zone, a residential area modification, focused on children, pedestrians and cyclists.
**Methods:** Three initial qualitative focus groups were carried out using a purposive sample of adult residents (n=10), local authority planners (n=3), and primary school pupils (n=9), prior to environmental change. An interpretive and grounded theory approach was used to analyse the data.
**Results:** Themes relating to negative perceptions of neighbourhood safety, antisocial behaviour and locality aesthetics emerged. Adult residents expressed concerns about the proposed changes, with protection of streets for personal car parking being their priority. Little enthusiasm for a cycling facility was expressed. Pupils highlighted a lack of freedom for play, resulting from crowded, car-filled streets. Urban planners were driven by the urgency for regeneration, but felt there was community resistance to change.
**Conclusion:** The focus group data indicated initial views about an innovative community-focused, environmental intervention. Benefits and drawbacks of urban change were viewed differently by residents and planners. Policy makers and planners need to recognise and accommodate the range of concerns of a community prior to such change.

## Notes

## Notes

## Thursday, June 16 – 15.30-18.00 – 2nd Balcony Grote zaal

## Poster session 2

Session/Nr:

### 2 - 50433 Daily consumption of fruits and vegetables: intention and behaviour among adults of normal weight with and without genetic susceptibility to obesity

*Dominique Beaulieu, Gaston Godin, Léo-Daniel Lambert, Louis Pérusse - Laval University*

**Purpose:** The aim of the study was to identify the factors associated with daily consumption of at least five portions of fruits and vegetables among adults of normal weight with and without genetic susceptibility to obesity.
**Methods:** A sample of 171 participants aged 18 to 55 years completed a self administered questionnaire based on Ajzen's theory of planned behaviour. Self-reported behaviour was assessed at three-month follow-up. Genetic susceptibility was defined as the presence of obesity for one of the first degree parents (IMC>30kg/m2).
**Results/Findings:** Intention (B=.28, p<.005) and past behaviour (B=.34, p<.001) explained 28% (p<.0001) of variance of the follow-up behaviour. In turn, 67% (p<.0001) of the variance in intention was explained by perceived behavioural control (B=.42, p<.0001), personal normative beliefs (B=.33, p<.0001), subjective norm (B=.15, p<.005), and gender (B=.15, p<.005). Genetic susceptibility to obesity did not contribute to the prediction of either intention or behaviour.
**Conclusions:** Results highlight the influence of social cognition over genetic susceptibility regarding daily consumption of fruits and vegetables. Interventions should thus be concerned with lowering the barriers and promoting access to resources that facilitate daily consumption of fruits and vegetables.

### 2 - 50434 Physical activity promotion for pregnant Latina and African American women: the making of health promoting materials using CBPR

*Cheryl Dudley-Brewster, Edith Kieffer, Tasha Toby – University of Michigan; Trelisa Glazatov – Glazatov Productions; Penni Johnson – NSO; Wanda Polderman – CHASS; Renee Mccune - University of Michigan*

**Purpose:** To discuss the process of developing and evaluating physical activity promotion materials for use by low-income, pregnant, minority women utilizing a community-based participatory research (CBPR) partnership process.
**Methods:** As a component of CBPR, planning and project activities were organized, activated and coordinated with a collaboration of community resident women of childbearing age, community-based organizations representatives, health care providers, and university representatives. This project has three phases. Phase one involved collecting data using focus groups and short surveys with a sample of the target population to evaluate existing videos and written materials from professional organizations. A rapid summary analysis was conducted by the project committee to identify key themes. In the second phase, these themes are being used to develop the new materials. The third phase is the evaluation of the newly developed materials using both qualitative and quantitative methods.
**Results/Findings:** The existing materials were not well received and are rarely used by this population. Participants felt underrepresented culturally and linguistically. New materials should include pictures representative of the population and present information without relying soley of text. Folklore and beliefs must be addressed in new materials. Materials should be disseminated broadly beyond health care provider offices. Results of the final evaluation of the new materials will also be presented.
**Conclusions:** CBPR approaches provide an ideal framework for creating inclusive health education materials that address literacy, cultural and linguistic concerns, and be disseminated to a broader audience.

### 2 - 50441 Psychosocial and environmental factors influencing fruit and vegetable intake of children from a lower socio-economic region of Brisbane

*Aline Aussillous – INSFA; Shawn Somerset - Griffith University*

**Purpose:** To associate psychosocial and environmental factors with fruit and vegetable (F&V)intake of children (years 4-7) from a lower socio-economic school.
**Methods:** Two questionnaires were used to explore preferences and knowledge about F&V. Questionnaires were completed in class and compared with self-completed 24-hour diet diaries. All students (n=114) completed the questionnaires. Parents (43% participation) also were surveyed about their children's attitudes regarding F&V.
**Results:** Diet diaries showed 41.6% reported consuming no fruit, vegetables or legumes during 24 hours. Several questions were significantly associated with reported fruit intake: "lots of fruit and vegetables at home?" (p = 0.013), "Do you eat lots of fruit?" (p = 0.009) and "Does your family eat lots of fruit?" (p = 0.028). Girls and younger children showed more interest in fruit and vegetables in general. Banana (94.7%), apple (93.6%) and strawberry (90.4%) were correctly identified by 94.7, 93.6 and 90.4% of students, respectively. Lower rates were seen with starfruit (35.1%) and

peach (41.5%). Children's interest in gardening waned with age, with 71.4%, 58.1%, 45% and 18.2% being interested for grades 4, 5, 6 and 7, respectively. Knowledge of peer fruit and vegetable preferences was low.
**Conclusion:** Availability of fruit and vegetables at home, and nutrition and health knowledge were major issues associated with fruit and vegetable consumption. These data will be used as baseline data for an intervention involving school gardening.

## 2 - 50442 Parental concerns about childhood obesity and the strategies employed to prevent unhealthy weight gain in children

*David Crawford, Anna Timperio - Deakin University; Amanda Telford - RMIT University; Jo Salmon - Deakin University*

**Purpose:** Little is known of parents views and practices regarding their childs weight. This paper describes parental perceptions about their childs weight and the proportion taking action to prevent unhealthy weight gain.
**Methods:** Cross-sectional study of families of children aged 5-6 (n=291) and 10-12 (n=919). Measures: childs BMI (measured height/weight); parents classified their childs current weight; parents reported how concerned they were about their child s current and future weight; parents reported whether they used strategies to help prevent unhealthy weight gain in their child. Pearson Ç2 was used to examine differences by childs weight status.
**Results:** 23% of younger and 29% of older children were overweight or obese. Only 11% of parents of younger overweight/obese children considered them as overweight. Among parents of older overweight/obese children, 37% saw them as overweight. 2% of parents of younger overweight/obese children and 20% of the parents of older overweight/obese children were quite/very concerned. These proportions increased slightly when asked about their child s future weight. 31% of parents of younger and 43% of parents of older children used strategies to prevent their child gaining too much weight. Parents of younger girls more often reported they employed prevention strategies.
**Conclusions:** Childhood overweight and obesity appears to be poorly recognised by parents, particularly those of young children. Despite this, a significant number of parents are taking action to prevent unhealthy weight gain in their child.

## 2 - 50443 The home environment and obesogenic eating in early adolescence

*Karen Campbell, David Crawford, Jo Salmon, Alison Carver - Deakin University; Louise Baur, Sarah Garnett - The Children's Hospital at Westmead; John Boulton - Gosford Hospital*

**Purpose:** To describe relationships between the home environment and characteristics of 12-13 year old adolescent's diets likely to promote obesity.
**Methods:** A cross-sectional study of 350 adolescents aged 12-13 years was conducted. Parents' diets were assessed using National Nutrition Survey (NNS) Food Frequency Questionnaire (FFQ), while adolescent diet was assessed with FFQ derived from existing NNS data. Potential predictors were broad ranging and included both personal and familial level variables. Predictor variables were included in a series of separate multiple-linear regression analyses for each of the dietary outcomes, which included high-energy fluids, sweet and savoury snacks and takeaway foods.
**Results/Findings:** The home environment predictors had a strong influence on adolescent diet, yet differed substantively by gender. The association between maternal and adolescent boy's diet was noteworthy. After adjusting for all predictors in the model, mother's intake of high-energy fluids (std beta=.219; p=.003), sweet snacks (std beta=.203; p=.01), savoury snacks (std beta=.208; p=.008); and in the unadjusted model, take-away food consumption (std beta=.228; p=.004), was predictive of boy's intake of all these foods.
**Conclusions:** This study extends previous research highlighting associations between home environment and adolescent eating. Insights regarding the pervasive influence of mother's own eating provide important direction for obesity prevention strategies and for future research.

## 2 - 50444 A meta-analysis of environmental characteristics and adults physical activity

*Mitch J Duncan - Central Queensland University; John C Spence - University of Alberta; W Kerry Mummery - Central Queensland University*

**Purpose:** This research aims to quantitatively summarise associations between selected environmental characteristics and physical activity (PA).
**Background:** Narrative reviews of environmental research are unable to provide empirical summaries of associations between environmental characteristics and PA, such as that available through the application of meta-analytical techniques. Meta-analytical techniques were used to help alleviate ambiguous associations between environmental characteristics and PA.
**Methods:** Studies were included if they assessed physical activity as the outcome measure, reported an odds ratio (OR) for physical activity and the environment and provided sufficient details for the calculation of an effect size ES

(OR, 95% CI). Data for unadjusted and adjusted OR's were analysed separately using a general-variance based fixed effect model. Self-report variables were included if a minimum of 5 ES were present, variables included were proximity of PA Facilities, shops, sidewalks, and the presence of high crime, heavy traffic, unattended dogs and street lighting. R2 measures were calculated using Nagelkerke s R.
**Conclusions:** No significant associations emerged between unadjusted ORs and PA. The perceived presence of PA facilities (OR 1.28), sidewalks (OR 1.23), shops and services (OR 1.15) and perceiving traffic not to be a problem (OR 1.13) were positively associated with PA using adjusted ORs and when combined accounted for 22% of variance in PA. Current results highlight the importance of using ecological models in future PA research and interventions.

## 2 - 50445 Predictors of program adherence in the Health-eSteps program: a randomised control trial of an Internet-based physical activity program

*Rebekah Steele, Kerry Mummery - Central Queensland University*

**Purpose:** The aim of this study was to examine predictors of program adherence across three intervention arms (face-to-face, Internet-mediated and Internet-only) in a 12-week randomised control trial of the Health-eSteps Program, a behavioural change program targeted at increasing physical activity in inactive adults.
**Methods:** Baseline data and adherence rates from program participants were analysed using descriptive analysis and logistical regression. Adherence was defined as the number of times the individual accessed the program, expressed as a percentage of that prescribed.
**Results:** Significant differences in program adherence were found (Ç2=10.374, p< 0.05), between intervention arms. Examination of adjusted odds ratios showed that the odds of adhering to the program were higher for internet-mediated (ORs 2.66) and internet-only (ORs 3.17) participants than for those in the face-to-face group. Further analysis showed that after controlling for psychosocial variables, participants with high physical activity self-efficacy were 1.93 times more likely to adhere and participants allocated to the face-to-face arm were 82.7 % less likely to adhere to the prescribed program if they were classified as obese.
**Conclusion:** These results suggest that the two internet arms were effective in disseminating program information. With much invested interest in issues of program adherence, engagement and retention in internet-based research, identifying factors that predict program adherence is critical for the development of physical activity interventions.

## 2 - 50448 A cluster-analytical approach toward physical activity and eating habits among children

*Dieter Sabbe, Ilse De Bourdeaudhuij, Carine Vereecken, Lea Maes - Ghent University*

**Purpose:** To investigate whether a reliable cluster distribution can be found among children based on physical activity and eating habits, and to explore subgroups' characteristics.
**Methods:** Flemish ten-year-olds completed a self-administered questionnaire on physical activity and eating habits (n=1725). K-means cluster analysis was based on the weekly quantity of intense and moderately-intense physical activity, excess-index (sugar and fat-containing products consumed weekly), and diversity-index (measures whether the daily diet totally covers the Food Guide Pyramid). Chi-squares were calculated to test associations with sex, social economic status (SES - highest parental education) and overweight.
**Results:** A five-cluster solution was the most reliable: Cluster1: High intense physical activity, average moderately-intense physical activity, low excess, higher diversity.
**Cluster2:** High physical activity, very high excess, high diversity. Cluster3: Average intense physical activity, highest moderately-intense physical activity, lower excess, higher diversity. Cluster4: Below the sample average on all indexes, diversity extremely low. Cluster5: Lowest physical activity, higher excess, highest diversity. Cluster one is significantly associated with higher SES, and overweight (13.7%); cluster two with boys, lower SES, and normal weight; cluster three with overweight (13.6%); cluster five with girls. No significant relationships were found with cluster four.
**Conclusions:** It was not possible to identify completely healthy or unhealthy subgroups. Most children combine adequate physical activity with unhealthy eating habits (and vice versa). Even though cluster one seems the healthiest we found more overweight. This unexpected observation needs more investigation.

## 2 - 50452 Socio-economic differences in nutrtion behaviour and physical activity in Germany

*Uta Zander - Justus-Liebig-University of Giessen*

**Purpose:**The paper gives a comparative description of nutrition and exercise behavior of people from different socio-economic backgrounds. It is hypothesised that nutrition habits and level of physical activity is strongly related to peoples socio-economic characteristics as people of high socio-economic status follow more healthy diets and perform more exercise than people of low socio-economic status. The main aim is to show that a differentiated socio-economic examination of peoples eating and physical activity practices provides reliable base for preventive target

group related health and nutrition policy strategies.
**Methods:** Secondary analyse of time budget data of the German Statistical-Office was conducted to assess peoples time spent in eating/drinking and sports differentiated after household income and educational level. Complementary data from a representative face-to-face survey of the German population 14 years and over about eating and sport behavior were statistically analysed after the same socio-economic variables. Comparative results of both surveys were confronted.
**Findings:** Results approved significant coherences between peoples socio-economic characteristics and physical activity and nutrition habits. With increasing income and level of education respondents display more health-conscious nutrition and sport behaviour. Conversely it applies that low levels of education and income correlates significantly with more unhealthy nutrition and less performance of exercise.
**Conclusion:** Concepts and implementations of preventive strategies aiming to reduce overweight and to encourage physical activity need to deal intensively with the conditions of people's everyday life and their structural and mental scopes and restrictions.

## 2 - 50457 Nutrition sociallisation in German family households. Opportunities and boundaries

*Anke Möser - Justus-Liebig Universität Giessen*

**Purpose:** The process of young children s nutrition socialisation is mainly located in family households. Family meals offer the opportunity for teaching children about healthful eating behaviour and providing them with various foods. Mothers can teach children also food related techniques and knowledge during meal preparation. The increasing number of mothers in labour work force and an ascending flexibility in the arrangements of family meals may influence nutrition socialisation in families.
**Method:** To investigate the opportunities and boundaries of nutrition socialisation in families quantitative time budget data (2001/02 vs. 1991/92) from the German Federal Statistical Office were used. Data analysis with SPSS offer information about allocation of time for meal preparation and eating/drinking of mothers in family households.
**Results:** Mothers spent 2001/02 more than 20 minutes less on meal preparation, setting the table and cleaning up than ten years ago. Surprisingly the amount of time spent on eating increased in the last ten years. In detail, mothers spent 2001/02 more time with eating if they ate together with family members than alone. The data reveal also that family meals are furthermore important.
**Discussion:** The opportunities to include children in the process of meal preparation and teach them food related techniques and knowledge are reduced, if the time aspect is considered. But nutrition socialisation in the context of family meals is furthermore possible. These changing basic conditions for nutrition socialisation in family households make strong nutrition policy strategies necessary to improve the nutrition education of children.

## 2 - 50460 The use of pedometers in follow-up care after treatment in obese adolescents

*Benedicte Deforche, Ilse De Bourdeaudhuij - Ghent University; Ann Tanghe - MPC Zeepreventorium; Greet Cardon - Ghent University*

**Purpose:** To investigate the use of pedometers as a motivational tool for maintaining physically active after treatment in obese adolescents.
**Methods:** 40 youngsters, who completed an obesity treatment, were randomly assigned to a 5-month maintenance program or control condition. The experimental group was encouraged to increase physical activity and to monitor daily steps by means of pedometers. Subjects kept a daily log of steps and sent it weekly to the therapist who phoned them biweekly to discuss their activity behaviour and to set step goals. In both conditions, pedometer counts were recorded for 7 days before and after the intervention. In addition, the experimental group was asked questions about the use of the pedometer.
**Results:** The experimental group showed an increase of 3326 steps/day, but the control group had a similar increase of 2584 steps/day. Subjects were very positive about the use of the pedometer, but their enthusiasm decreased during the last months ($p<0.05$). There was no relation between post pedometer counts and frequency of wearing the pedometer, but the more subjects indicated to be motivated by wearing the pedometer during the last months of the intervention, the higher the post pedometer counts ($r=0.6$, $p<0.05$).
**Conclusions:** Not just wearing a pedometer, but being motivated even after several months by wearing one, was related to higher amounts of daily steps after the intervention. Unfortunately, compared to a control group, this maintenance program was not effective in increasing daily number of steps.

## 2 - 50462 Reliability and validity of a Dutch questionnaire on psychosocial determinants of commuting physical activity

*Marieke Verheijden - TNO Work and employment; Elles Janssen - Maastricht University; Karin Proper - TNO Work and employment; Rineke Vasse - Maastricht University; Vincent Hildebrandt - TNO Work and employment*

Increasing commuting physical activity levels may improve the working population's total physical activity levels. A questionnaire to assess psychosocial determinants of commuting physical activity was developed for research and intervention purposes. Underlying factors and their internal consistency and test-retest reliability were assessed.
The questionnaire was sent to 129 Dutch adults (secondary school teachers, nurses and medical doctors, general and technical support staff, and civil servants). The response rate was 105/129, 81%. Participants received a second copy (response rate: 91/129, 71%) of the questionnaire two weeks after they had returned the first questionnaire. Factor analyses (factor loading > 0.5) were conducted. Scales were constructed when Cronbach's alpha >= 0.6. Test-retest intraclass correlation coefficients were computed for each scale.
Participants (36% male) were 22-63y. 34% of the participants reported commuting physical activity. Scales were constructed for attitude (2 subscales: pros and cons), self-efficacy (2 subscales: situational self-efficacy, social self-efficacy), social influence (3 subscales: subjective norm, family and friends modelling, workplace modelling), barriers, and habit (Cronbach's alpha: 0.60-0.93). Test-retest reliability was good: intraclass correlations coefficients were e 0.70 except for social self-efficacy (0.46) and subjective norm (0.55).
The questionnaire is a reliable instrument to assess psychosocial determinants of commuting physical activity. Analyses (to be completed in February 2005) on the relation between the psychosocial determinants, intention to change behaviour, and self-reported commuting physical activity will provide insight in the validity of the questionnaire.

## 2 - 50463 IPAQ: physical activity and inactivity in the Czech Republic

*Josef Mitas, Karel Frömel, Erik Sigmund, Jana Pelclova - Palacky University*

The purpose of the study is to investigate, what motivates people in the Czech Republic to be physically active or to be inactive. The inhabitants were asked about their health, their life style and their relationship to physical activity. The monitoring of physical activity and inactivity in population is a part of the international research IPAQ since the year 2003. The International physical activity questionnaire is regularly used for randomly selected respondents in age group 18-69. Current research shows decrease of physical activity according to age. Males participate in organized physical activity more than females. Time spent by sitting during the week increased. There is interesting finding that females walk more than males and the total walking time in week do not decrease with increasing age by females. Females participate most in swimming and aerobic dance which is in accord with their preference of physical activity (swimming, cycling and aerobic dance). Males participate most in cycling and swimming and they prefer to participate most in soccer and cycling. More than one half of Czech Republic population does not participate in any organized physical activity. The research of physical activity and inactivity based on questionnaires has its limits. To eliminate the limits is possible to use the combination of questionnaires and devices in the research. The findings should help us to prepare special PA programs that people would like to participate in. The aim is to increase physical activity in all age groups as a part of their life style.

## 2 - 50465 Diet of Surinamese immigrants of the Netherlands: influence of acculturation and education level

*Mary Nicolaou - Free University Amsterdam and University of Amsterdam; Rob Van Dam - Free University Amsterdam; Karien Stronks - University of Amsterdam*

**Objective:** To examine the association between ethnicity, acculturation and education level in relation to healthfulness of the diet in Creole and Hindustani Surinamese and native Dutch residents of the Netherlands.
**Methods:** 1528 randomly selected subjects aged 35-60yrs. Food intake was measured using a short food frequency questionnaire. We calculated a healthy eating score (HES) based on consumption of fruit, vegetables, red meat, fish, vegetable oils, breakfast and salt use. Highest attained education level was measured and acculturation of the Surinamese was assessed by age at migration, number of resident years and a scale measure of social contacts with native Dutch.
**Results:** Surinamese had a higher HES as compared with native Dutch, but some aspects of diet (breakfast and salt use) were less prudent than for the native Dutch. In native Dutch, education level was positively associated with a healthier diet but in Surinamese this association was inconsistent. Social contacts with native Dutch were positively associated with the HES and vegetable intake in women but not men. Residence duration (mean=22yrs) and age at migration (mean=21yrs) were not associated with diet.
**Conclusions:** Our findings indicate that greater degree of acculturation of immigrants in western countries does

not necessarily lead to a less healthful diet. Education level has different associations with the diet of immigrants than that of native residents. Ethnicity was associated with clear differences in diet, despite long duration of residence, suggesting that ethnicity should be considered in nutrition health promotion.

## 2 - 50466 Longitudinal dietary change from adolescence to adulthood: explanatory factors for dietary change

*Amelia Lake, John Mathers, Andrew Rugg-Gunn, Ashley Adamson - Newcastle University*

**Purpose:** A longitudinal dietary survey study measured dietary change and investigated factors influencing change from adolescence to adulthood.
**Methods:** Dietary data (2 x 3-day food diaries) were obtained from the same 187 respondents in 1980 (11.6 yrs) and 2000 (32.5 yrs). Foods consumed were assigned to one of the five categories from The Balance of Good Health [1]. Respondents were given feedback on their dietary change (1980 - 2000) and were asked to select, from a list of 24 explanatory factors, what might explain changes in their eating habits.
**Results:** For five factors, change in eating patterns, were significantly different ($p<0.05$) between individuals who selected that explanatory factor and those who did not. 'Desire to maintain health' (n=122), 'Change in food likes' (n=113), 'Body weight' (n=103), and 'Knowledge about food' (n=101) were associated with a greater increase in fruit and vegetable intake, while 'Type of job' (n=74) was associated with a decrease. 'Desire to maintain health' and 'Body weight' were associated with a greater decrease in foods containing fat and/ or sugar. Only 'Type of job' was associated with an increase in meat, fish and alternatives. 'Desire to maintain health' and 'Knowledge about food' were associated with increased intake of bread, other cereals and potatoes.
**Conclusions:** Explanatory factors were associated with change in intake of food groups from adolescence to adulthood, which help to explain this complex and multi-factorial process.

## 2 - 50469 Descriptive epidemiology of an international pedometer super data set

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**Purpose:** To describe the collaborative process involved in creating an internationally collaborative pedometer 'super data set' and the preliminary descriptive data.
**Methods:** During 2004 known pedometer researchers were invited to contribute data that had been collected 1) using a Yamax-manufactured pedometer; 2) for a minimum of 3 days; 3) on ostensibly healthy adults; and, 4) who were not recruited specifically on physical activity, body composition, or disease status (e.g., diabetes) variables. In addition, direct and complete measures of height and weight were required to compute body mass index (BMI); self-reported body composition data were excluded. Local ethical approval was secured and secondary analysis of the combined super data set was approved.
**Results:** Ten researchers from the USA contributed data. Four others contributed data each representing Australia, Canada, France, and Sweden. The final super data set represented 2942 individuals ranging in age from 18 to 94 years (894 males, age=48.9±13.1 years, BMI=27.8±4.8kg/m2; and 2048 females, age=48.3±14.0 years, BMI=27.8±6.4 kg/m2; age and BMI differences between genders NS). Males took 8301±3,600 steps/day vs. females who took 7350±3386 steps/day ($t=6.87$, $p<.0001$). Steps/day was inversely correlated with age and BMI in males ($r=-.272$ and $r=-.262$, respectively) and females ($r=-.240$ and $r=-.289$, respectively), all $p<.01$.
**Conclusions:** This super data set represents a unique collaborative opportunity to establish important criterion referenced standards.

## 2 - 50470 Concurrent validity of the Pam accelerometer compared with indirect calorimetry and CSA

*Sander Slootmaker, Marijke Chin A Paw - VUmc - EMGO Institute*

**Purpose:** To examine the validity of the PAM accelerometer relative to the CSA accelerometer and indirect calorimetry (VO2) in assessing energy expenditure during physical activity in adults.
**Background:** Accurate measures of physical activity are required by researchers interested in describing and evaluating the relationship between physical activity and important health outcomes. Recently the interest in objective monitoring of PA using body worn motion sensors increased. The Pam accelerometer is a promising new

tool to assess PA and gives personal feedback. In this study the concurrent validity of the PAM is assessed.
**Methods:** Thirty-two participants performed three activities, walking on a treadmill ( 3, 5 and 7 km/h), walking the stairs (80 and 100 bpm) and cycling (60 and 80 rpm) in a controlled situation. Physical activity was assessed during the 5 minutes of each activity by the Cosmed K4 b2, the CSA accelerometer and the Pam accelerometer. The correlation for each activity of Pam-VO2 and Pam-CSA are expressed in the Pearson correlation coefficient.
**Results:** The correlation between Pam-VO2 and Pam-CSA was highest for treadmillwalking resp. r=0,91 and 0,90. Lower correlations were found for stair climbing (resp. 0,66; 0,68) and cycling (resp. 0,01; 0,50).
**Conclusions:** The Pam can give a valid estimation of the energy expenditure during walking on a treadmill in adults. The Pam underestimates activities like stair climbing and cycling.

## 2 - 50471 A systematic review of the effectiveness of physical activity and other lifstyle interventions in prevention of obesity in adults

*Mahmoud Mobasheri, Edwin van Teijlingen, W.C.S. Smith – University of Aberdeen*

**Purpose:** To review and analyses the evidence on effectiveness of intervention studies for the prevention of obesity in adults and role of physical activity.
**Background:** Adults form a larger part of population and the aging population leads to more chronic medical problems such as obesity. Change in quality and quantity of diet and sedentary lifestyle may lead to increase in the rate of obesity in adults. Several studies have been conducted to interpret the size of specific roles for each of these factors but still the evidence of effectiveness is not clear.
**Method:** Search strategies were run through MEDLINE, EMBASE from 1966 to February 2004 for systematic reviews, primary studies and narrative papers. They were assessed for quality; low quality papers were excluded.
**Conclusions:** We found 3 systematic reviews, 11 primary and 15 narrative studies in prevention of obesity. The best known strategies for the prevention of obesity are behavioural and lifestyle intervention including diet, physical activity, community interventions, media and educational programmes and integrated strategies. Interventions aimed to promote of physical activity and modify dietary habits are as successful in older ages as in younger age. However, there is insufficient evidence of the effectiveness most of these strategies. Many suggest their needs to be appropriate integrated strategy for each country and populations based on their socio-economic characteristics with emphasise on physical activity.

## 2 - 50473 An examination of attentional bias for exercise and food related words

*Tanya Berry - Wilfrid Laurier University; Shaelyn Strachan - University of Waterloo; Keith Malhotra - Wilfrid Laurier University*

**Purpose:** Research has shown attentional bias for food-related stimuli in bulimics (Dobson & Dozois, 2004) and for exercise-related words in exerciser schematics (ES; Berry, 2004). The exercise study requires replication because results do not include nonexerciser schematics (NS). It is also unknown if non-bulimics show attentional bias for food-related stimuli. This research tested the hypotheses that: 1) ES would show attentional bias for exercise-related words and that NS would show attentional bias for sedentary-related words; 2) healthy eater schematics will show attentional bias for healthy-food related words.
**Methods:** Participants (N=66) in experiment one completed a Stroop task (exercise words with controls, sedentary words with controls) then completed an exercise schema questionnaire (Kendzierski, 1988). Experiment two participants (N=35) completed a Stroop task (healthy-food words with controls, unhealthy-food words with controls) and completed a healthy-eating schema questionnaire.
**Results/Findings:** A repeated measures ANCOVA showed that ES showed attentional bias for exercise-related words over matched control words, $F(1, 32) = 5.27$, $p<.05$. NS showed attentional bias for sedentary-related words over matched control words, $F(1, 7) = 41.87$, $p<.001$. Results for experiment two showed attentional bias for healthy words over control words for all participants, $F(1, 31) =5.62$, $p<.05$, but no interaction.
**Conclusions:** These results may reflect the emotional pull of the stimuli. Further, future research should examine whether exercise is a more cognitively involving task than is eating.

## 2 - 50475 Transtheoretical model of change (stages of change) can reasonably reflect sodium intake in postmenopausal women

*Jasminka Z. Ilich, Rhonda A. Brownbill, Michelle Moder, Heather Miller - University of Connecticut*

High sodium intake is common in many population groups and could have adverse effects on cardiovascular system, kidney, and/or bones. To assess the readiness of potential research subjects to assume sodium reduced diet, we utilized the Stages of Change Model adapted from Green and Rossi, incorporating 5 stages: precontemplation, contemplation, preparation, action, and maintenance. Subjects included 136 healthy, postmenopausal women, mean±SD age 68.6±7.1

y, recruited in a clinical trial examining the effect of sodium (Na) intake on bone mass. The trends in Na intake were estimated using a semiquantitative questionnaire that classified subjects into low, medium, high or very high Na consumers. 69 women (50.7%) were in precontemplation, 55 (40.4%) in preparation and 12 (8.8%) in maintenance stage. 13% of women in precontemplation stage were medium, 72% high and 16% very high Na consumers. Of women who were in preparation stage, 13% were low, 15% medium, 60% high and 13% very high Na consumers. Of women who were in maintenance stage, 42% (n=5) were low, 33% (n=4) medium, 17% (n=2) high and 8% (n=1) very high Na consumers. In conclusion, most of the women in precontemplation stage were classified as high/very high Na consumers, while some (28%) of those in preparation stage were classified as low/medium Na consumers. Most women in maintenance stage were classified as low/medium Na consumers. In this case the stages of change reasonably reflected the estimated Na intake.

## 2 - 50476 The effect of implementation intentions on the walking behaviour of sedentary Canadian adults

*Jennifer Robertson-Wilson, Lucie Lévesque, Beth Doxsee - Queen's University*

The development and implementation of effective, low-cost population interventions to increase physical activity behaviour are of interest to health promotion researchers and practitioners. Implementation intentions (Gollwitzer, 1993, 1999) may be one method to increase the strength between individuals' intention and actual participation in a variety of behaviours, including vigorous exercise (e.g. Milne et al., 2002).
**Purpose:** The purpose of the study was to examine the effect of implementation intentions on the walking behaviour of 90 sedentary Canadian adults (n=43 men, mean age= 46.53, SD= 12.54; n=47 women, mean age= 45.58, SD= 9.59) intending to become more active.
**Methods:** Participants were randomized to either control or intervention groups and self-reported walking behaviour (Humpel et al., 2004) and walking intention (Courneya & Bobick, 2000). The intervention group formed implementation intentions to increase their walking behaviour over six weeks by reporting when, where, and with whom they would walk. Participants reported walking behaviour via telephone again two weeks post-baseline. A repeated-measures ANOVA was conducted comparing walking for any reason across group, gender, and age between baseline and 2-week follow-up.
**Results:** Results revealed a significant time by gender by group effect (F (1, 82)= 3.941, p= .05) where men-controls decreased, men-interventions increased, and women-controls and interventions slightly increased their walking behaviour over time.
**Conclusion:** Our findings suggest that implementation intentions may be worthy of consideration as a low-cost method to increase walking behaviour among sedentary adults.

## 2 - 50477 Transtheoretical model of change (stages of change) as a tool for implementing compliance with sodium reduced diet over a 3-year period in postmenopausal women

*Jasminka Z. Ilich, Rhonda A. Brownbill, Michelle Moder, Heather Miller - University of Connecticut*

The objective was to examine usefulness of Stages of Change Model (SCM) in implementing low sodium (Na) intake protocol and help with its compliance in a longitudinal clinical trial investigating the effect of Na on bone mass in postmenopausal women. The model included 5 stages: precontemplation, contemplation, preparation, action, and maintenance. Subjects included 136 healthy, postmenopausal women, mean±SD age 68.6±7.1y at enrollment, who were evaluated every 6-month during a 3-year study. After the initial screening, half of the subjects were assigned into control group and another half into intervention group in which various measures to reduce Na intake were implemented, including educational and low-sodium recipes distribution. SCM was used every 6-month to determine subjects readiness for reduced Na intake. Na and energy intake was assessed by three-day dietary records, analyzed by Food Processor. Na intake was statistically higher in women in precontemplation stage than in those in maintenance stage at the beginning of the study, 2511±688 vs. 1449±543mg/day (Mean±SD), p=0.0001, respectively. This trend remained at every 6-month evaluation throughout the study, even when adjusted for energy intake. At 3-year evaluation, Na intakes in women in precontemplation and maintenance stages were 2768±817 and.1265±284mg/day, p=0.0001, respectively. We conclude that SCM could successfully reflect long-term Na intake and be used to help with compliance with Na reduction in postmenopausal women.

## 2 - 50478 Promoting physical activity in middle school children using technology

*Valerie George - Florida International University; Elly Zanin, Casi Favre - Broward County Public Schools;Yomari Cruz, Maves Ranola - Florida International University*

Recent reports indicate that children in the United States do not get enough physical activity (PA). Many students do

not demonstrate an understanding of how to assess their fitness. Physical inactivity has implications for risk of future chronic diseases. The program, The Bridge-Bridging the Gap in Physical Education, was developed to train teachers to use technology to help promote PA. Nineteen teachers from 15 schools in Florida participated in workshops and received a laptop, handheld computer, pedometers, heart rate monitors (HRM),and instructions on how to use this equipment to collect data using the TRIFIT program. Over 2,000 middle school students participated in the program. Data from HRM from a random sample (n=399, 56% males, 44% females)indicated that students spent an average of 49% of their time in the target heart rate zone during aerobic activities. In a subset of students(n=27),the average number of reported daily steps in a 30-40 minute class using a pedometer over a three-week period was 1763 steps. Students (64%)agreed that the HRM helped them learn about physical fitness. Over 75% of the students showed an understanding of the concept of cardiovascular fitness. Forty five percent of the students reported that they strongly felt that the program helped them increase their PA. Teachers reported that students were more motivated to participate in PA when they used the pedometer and HRM. Using technology is an effective way to promote and increase student participation in physical activity.

## 2 - 50482 Nutrition knowledge dietary practices of high school kabaddi players of Dharwad City, Karnataka State, India

*Renuka Meti, Saraswathi Govind - University of Mysore; Apparao Bujurke - VTU University, Belgaum*

**Purpose:** In India few studies are conducted in sports, nutrition Based on the records sports scientists say that of every million population of nation one world class athlete should emerge India with more than 12 billion population is not in position to produce at least 12 world class athletes (Venkataraman 1999) . Adequate diet in terms of quantity and quality before, during and after training will maximize performance (Burke, 2001). The objective was to assess nutrition knowledge, dietary practices of high school male kabaddi players (70). The data obtained by questionnaire administered to a sample of 70 kabaddi players randomly selected high schools.
**Results:** The research revealed that 56% were knowledgeable about balanced diets, in general nutrition 44 % were aware about fats than carbohydrates, vitamins, minerals, proteins. Knowledge regarding functions of vitamin A (57%) sodium (53 %) vitamin D. (78%) stated protein rich foods are necessary during practice. 27% knew the importance of hydration during sports (7%) identified appropriate time of meal before competition. Intake of carbohydrate rich foods immediately after the sports activities is 21%. The findings on dietary practices of the players revealed that only 39% consumed balanced diet regularly. Seven percent consumed special food namely egg, milk before the event. 23% drank cold drink during competition. (18%) had cold drinks immediately after the event. Consumption pattern revealed that (98%) consumed cereals as staple food and millets were consumed weekly. The least consumed were fruits, vegetables, milk.
**Conclusion:** Effective approach to nutrition education is to be completed.

## 2 - 50483 Neighborhood influences on energy expenditure in women in the Stanford five city project

*Rebecca Lee - University of Houston; Catherine Cubbin - University of California San Francisco; David Ahn, Marilyn Winkleby - Stanford University School of Medicine*

**Purpose:** Neighborhood-level socioeconomic status (SES)has been shown to be independently associated with individual-level physical activity (PA); however,little is known about specific factors in neighborhoods that explain this association. This study investigated associations between neighborhood SES and PA among women, and whether any associations were mediated by availability of PA resources.
**Method:** Individual-level data were drawn from women aged 25-74 who participated in the Stanford Heart Disease Prevention Program (1979-1990, N=2639) and included age, race/ethnicity, marital status, income,education, and energy expenditure as assessed by the Stanford 7-day Physical Activity Recall. Neighborhood-level data included a census-derived index of SES and closest distance to and density of physical activity resources (parks and gyms). Multilevel models were used for the main analyses.
**Results:** In contrast to expectations, women residing in low SES neighborhoods reported significantly greater energy expenditure (after controlling for age, race/ethnicity, marital status, income, and education)compared with their counterparts living in high SES neighborhoods. Neither distance to nor density of PA resources mediated the relationship between neighborhood SES and energy expenditure.
**Conclusions:** Residing in a low SES neighborhood was associated with an increase in total energy expenditure, perhaps due to greater reliance on public transportation, fewer technological conveniences, and/or greater energy expenditure at work or at home (e.g., childcare,housework). Access to PA resources, however, did not explain this association. In order to develop effective interventions and policy implications, future investigations are needed to understand how neighborhood environments influence physical activities, which may vary by place and time.

## 2 - 50484 Nutritional status and related knowledge of rural adolescent girls in selected blocks of India

*Anita Malhotra - Lakshmibai College (University of Delhi); Santosh Jain Passi - Institute of Home Economics (University of Delhi)*

**Purpose:** To assess the nutritional status and related knowledge of rural adolescent girls in four blocks of Delhi (Alipur, Kanjhawala and Mehrauli) and Rajasthan (Deeg ).
**Methods:** 181 girls (aged 11-21 years) randomly selected from each of the areas comprised the sample. Dietary intake data were gathered by one day 24 Hour Recall coupled with Food Frequency Questionnaire. Data on weight/height/ BMI were gathered, hemoglobin status was assessed by cyanmethemoglobin method and an interview schedule was employed to elicit nutrition related knowledge.
**Results:** Data indicate that the diets were cereal based and monotonous; 58.4% of subjects were found to have intake < 75% of RDA while a substantial proportion of them had inadequate nutrient intake (NAR<0.66) with respect to most of the micronutrients especially iron (93.4%), vitamin A (75.7%) and folic acid (81.8%). The incidence of anaemia (hemoglobin level <12 g/dl), thinness (BMI for age <5th centile) and stunting (height for age <3rd percentile) was 93.2%, 35.9% and 30.4%. Further, a large majority of the subjects had inadequate knowledge relating to deficiency diseases, immunization as well as childcare practices. They were also unaware of the significance of menstruation and the dangers of early pregnancy and HIV/AIDS.
**Conclusions:** Nutritional supplements and knowledge relating to nutrition, reproductive health and HIV/AIDS must be imparted effectively to the adolescent girls belonging to rural poor communities of India so as to empower them for performing their present as well as future roles.

## 2 - 50487 The trial of activity in adolescent girls (TAAG) intervention: description and selected process data

*Leslie Lytle - University of Minnesota; Cheryl Alexander - Johns Hopkins; John Elder - San Diego State University; Jamie Moody - San Diego State University; Deb Parra-Medina - University of South Carolina; Larry Webber - Tulane University; Brit Saksvig - University of Maryland; Dianne Ward - Univ. of North Carolina*

**Purpose:** This presentation describes the TAAG intervention and preliminary findings from process evaluation.
**Background:** TAAG is a multi-site intervention trial evaluating the effectiveness of school and community-linked interventions to reduce the decline in physical activity in girls in six field centers and 36 middle schools in the United States. The intervention involves four primary components. Programs for Physical Activity (PPA) works with school and community agencies to increase physical activity opportunities for youth. TAAG Promotions uses a social marketing approach to motivate youth to be active and sponsors specific promotional activities. TAAG Physical Education emphasizes promoting a PE environment that encourages and supports active participation of all students. TAAG Health Education with Activity Challenges (TAAG HEAC) offers health education that can be taught in a traditional or physical education class with lessons that help build behavioral skills related to increasing physical activity.
**Methods/key points:** At the end of the first year of intervention, 114 programs were implemented as part of the school/community linked PPA activities and the majority (76%) were offered as after school programs. Progress toward TAAG PE objectives was generally good; in nearly 78% of the classes observed, teachers used various strategies, such as keeping students active during role call, to minimize management time. In TAAG HEAC, 74% of the classes were held in a traditional classroom and 26% were offered in the context of PE class.
**Conclusions:** The first year of the TAAG intervention showed good progress toward implementation of TAAG intervention activities.

## 2 - 50489 The development of an electronic diary to collect in-situ data about sedentary behavior and eating

*Simon Marshall - San Diego State University; Ryan Tucker Readdy - Oregon State University*

**Purpose:** Develop a self-reporting tool for measuring sedentary behavior and eating using Computerized Ecological Momentary Assessment (C-EMA).
**Methods:** Twelve children (50% female, mean age=12.4 yr, SD=0.79) were recruited to a participatory research study to create an electronic diary (e-diary) that prompted the in-situ assessment of sedentary- and eating behaviors. The e-diary was developed using Pendragon Forms software and uploaded to Palm m125 Personal Data Assistants (PDA). During four randomly selected days, participants responded to an auditory prompt by tapping a response option on a touch-sensitive screen to a series of chained questions about what they were doing, where they were, and who they were with. Participants also wore a pedometer to record the step taken each day.
**Results:** Data extraction revealed the e-diary to yield valid behavioral samples. The number of minutes spent in sedentary behavior each day was inversely correlated (r=-0.48) with the number of steps per day. Using follow-up

focus groups, the e-diary was modified to make the user-interface more self-intuitive; allow each diary entry to take <20 seconds and require <7 screen taps; and permit more user-defined functionality of hardware and software.
**Conclusions:** An inexpensive hand-held computer can be used to collect naturalistic behavioral data about physical activity and eating. Further research should examine the use of ubiquitous technology for collecting valid and reliable behavioral data about physical inactivity and eating.

## 2 - 50490 Self-Efficacy, cognition, and fitness in older adults

*Katherine Morris, Shawna Doerksen, Edward McAuley, Charles Hillman, Sarah Buck, Jason Themanson, Matthew Pontifex - University of Illinois at Urbana-Champaign*

Physical fitness and self-efficacy (SE) have been shown to be related to cognitive performance in older adults. Purpose: Examine the reciprocally determining nature of the efficacy and cognitive function (CF) relationship in older adults. Methods: Participants (n=24) completed the Flanker s task employing both compatible and incompatible trials following an acute exercise bout. SE relative to physical activity and CF were assessed before and after the exercise bout and the cognitive task, respectively. A graded maximal exercise test assessed fitness. Hierarchical multiple regression was employed to examine the role of efficacy and fitness in accuracy of responding and the role of accuracy in predicting post-performance SE. Results: Only exercise SE was a significant predictor of cognitive performance on incompatible trials (2=.49, p<.05) and approached significance on compatible trials (2=.45, p=.057). After controlling for baseline values of SE, cognitive performance was a significant predictor of post-performance cognitive efficacy in the incompatible (2=.24, p<.05) but not the compatible task (2=.12, p>.1). Conclusion: Our findings suggest SE and CF appear to be more consistently related in the context of more challenging cognitive tasks (i.e., incompatible tasks) providing support for the utility of social cognitive theory in the understanding of CF in older adults. Subsequent research should further examine the extent to which fitness effects on cognitive processing are attenuated by social cognitive factors. Such an approach would provide a social psychophysiological understanding of physical activity and mental health in older adults.

## 2 - 50494 Effects of dietary intake and physical activity on weight gain in menopausal women: a sub-study of the womens' health Australia project

*Lauren Williams - University of Newcastle; Wendy Brown - University of Queensland; Anne Young - University of Newcastle*

**Purpose:** This research examined dietary and physical activity behaviours in a population-based cohort of women who gained weight, compared with those who did not gain weight, at menopause.
**Methods:** This nested cohort study of the Womens Health Australia Project selected women according to menopause status from a population-based cohort aged 48-53. Literature review and focus group discussions on factors affecting weight gain were used to develop a written survey containing physical, behavioral and environmental measures. The survey was mailed to 1161 women in menopause transition. Women who gained more than 2.25 kg over a three year period (weight-gainers) were compared with women who lost weight or remained stable (non-gainers). Analyses were conducted using SPSS.
**Results:** The survey response rate was 77% (875 women). Forty percent of the group gained more than 2.25 kg in the preceding three years. Weight-gainers reported a higher frequency of hot flushes and night sweats than non-gainers. Weight-gainers were more likely to be in full-time employment, to view career as their main role in life, and to report that being under time pressure had increased their energy intake. Weight-gainers reported doing less vigorous physical activity. While there was no significant difference between the dietary intake of the two groups, more weight-gainers reported dieting behaviour and quitting smoking than non-gainers.
**Conclusions:** These research findings have the potential to inform development of population-based strategies to prevent weight gain at menopause.

## 2 - 50495 Fostering interdisciplinary collaboration between health care providers and physical activity counselors

*Michelle Fortier, William Hogg, Tracey O'Sullivan, Shane Sweet, Culver Diane - University of Ottawa*

Modern primary care teams are characterized by multi-disciplinary professionals working collaboratively to provide comprehensive health care. One benefit of such teams is the combined resource of distinct knowledge sets from the various disciplines represented on the team. When a new discipline is added to a primary care team, it is essential to maximize interdisciplinary collaboration to ensure the knowledge set from the new representative discipline is utilized to its potential as a resource for the team. Currently, the PAC: physical activity counseling project (Fortier, Hogg et al.) has introduced a physical activity counselor to the primary care team. An intervention is being implemented to maximize interdisciplinary collaboration and promote the integration of the PAC in this setting. The purpose of

this presentation is twofold. The first objective is to present qualitative results from a pilot study which focused on the identification of factors that may facilitate interdisciplinary collaboration when physical activity counselors are introduced to a primary care team. The second objective is to highlight the strategies being used in the PAC project to foster interdisciplinary collaboration. The pilot study involved 2 focus groups and 6 interviews with health care providers, and 3 focus groups and 10 interviews with physical activity specialists. The results indicated that building trust, effective communication and role clarity are 3 key factors which may facilitate interdisciplinary collaboration. Strategies to promote these components are being used in the PAC project. A qualitative and quantitative approach is being utilized to evaluate effectiveness.

## 2 - 50500 Does using active modes to travel to work increase physical activity?

*Billie Giles-Corti, Tya Smith, Terri Pikora, Max Bulsara - The University of Western Australia; Fiona Bull - Loughborough University; Trevor Shilton - National Heart Foundation; Karin Stark - Department of Environment*

**Purpose:** To examine whether using active modes to travel to work increases physical activity in a University population.
**Methods:** Randomly selected students and staff received a letter inviting their participation in an on-line survey. Details of the website and individualised login were provided. After receiving two follow-up letters or emails, 48% of students (n=1040) and 55% of staff (n=1170) responded The survey comprised a one week recall of daily commuting patterns, barriers and motivators affecting transport decisions, stage of behaviour change and self-reported recreational physical activity in the last 7 days.
**Results:** 21.5% of staff and 46.8% of students regularly used active modes to travel to the university. An additional 30% of staff and students indicated preparedness to switch to active modes. Staff using active modes walked significantly more minutes per week than those who drove (p=0.046), although no such relationship was found among students. In both staff (p<0.000) and students (p<0.001), cyclists and drivers achieved significantly higher levels of vigorous activity than those who walked or used public transport.
**Conclusions:** Implementation of green travel plans on a university campus is likely to substantially increase the number of staff and students who use active modes to commute to campus. However, unless drivers who switch to active modes choose to cycle or maintain their current level of vigorous activity, the net result may be an overall decrease in physical activity. The implications of the findings will be discussed.

## 2 - 50505 Effectiveness of tailoring messages to participant-selected topics for women's health

*Lisa Quintiliani, Marci Campbell, Munni Begum - University of North Carolina*

**Purpose:** Tailored messages based on participant-selected topics are currently implemented in interventions, however, this is supported mostly by behavioral rationale, not quantitative research. Using data from the Health Works in the Community Intervention (1999-2004), we investigated whether allowing women to choose the topic of their tailored message impacted dietary behavior after 18 months of follow-up.
**Methods:** At baseline, participants chose one behavioral priority which was primarily manifested in a single tailored message in the overall intervention (88:eating healthier, 48:exercise, 560:both, 92:smoking, 149:stress). Among those choosing either priority pertaining to eating, analyses of covariance compared mean dietary intake for receiving a matching tailored message versus receiving no message at all, adjusting for confounding variables. Multiple linear regression also explored relationships for nutrition and physical activity. Of 937 participants, 52.5% were African American, 43.6% Caucasian, mean age 43.0 years.
**Results/Findings:** For those choosing both eating and exercise, participants receiving a tailored message reported fewer fat grams/day than those not receiving a message, (49.3g vs. 56.2g, p=0.03); for choosing only eating healthier the comparison was 46.7g vs. 55.5g, p=0.23. These trends were not found for fruit-vegetable servings.
**Conclusions:** Some evidence to support tailoring to participant-selected topics was found as tailored messages may have provided additional benefit for dietary fat reduction. More research using randomized designs and multiple messages is needed to understand how to best tailor in multiple behavior interventions.

## 2 - 50506 Associations of perceived local environment factors with walking for transport

*Ester Cerin, Eva Leslie, Lorinne duToit - Cancer Prevention Research Centre; Adrian Bauman - School of Public Health*

**Purpose:** Environmental and policy interventions to increase adults walking for transport may help to promote higher levels of physical activity. Associations of perceived local environment attributes with walking for transport were examined.
**Methods:** The PLACE study used a stratified sample design to select neighbourhoods classified by Geographic Information System methods as high or low walkable , a based on dwelling density, street connectivity and net

retail area. Residents (n = 2,650; aged 20-65) completed a mail survey on their walking behaviours and perceptions of their community environment (based on the Neighbourhood Environment Walkability Scale; NEWS). Multilevel models were used to estimate associations between the subscales of the NEWS scale and walking for transport, after controlling for socio-demographic characteristics.

**Results:** In total, the perceived local environment factors explained 4.8% of the variance in walking for transport over and above socio-demographic characteristics. Residential density , Land use mix-diversity , the individual-level factors Access to services and Traffic hazards were reliable, and the neighbourhood-level factors Access to services and footpaths and Street connectivity and walkability were the most reliable predictors of walking for transport.

**Conclusions:** Perceived environment factors explained a small but significant portion of the observed variation in walking for transport. Although neighbourhood-level perceived environmental attributes were more explanatory of walking for transport than were individual differences in perception of environmental attributes, they were both significant. In explaining walking behaviour, we need to account for the objective environment as well as the subjective interpretation of the environment.

## 2 - 50510 Evaluation of malnutrition in elderly with anthropometry

*Danijel Todorovski - Macedonian Red Cross; Lidija Todorovska - Medical Faculty Skopje; Danijel Todorovski - Macedonian Red Cross*

**Background:** Many protocols for nutritional assessment in elderly incorporated only a few anthropometrical parameters: weight, BMI, or upper arm circumference. Aim: To evaluate severity and clinical types of protein-energy malnutrition (PEM) in elderly with anthropometrical parameters. Subjects: 260 subjects with PEM, older than 65 years (age 73.5 ± 6.0 y).

**Methods:** Demographic and medical data were collected, and it was done clinical investigation and anthropometry. Following anthropometrical parameters were evaluated: stature; weight; BMI; upper arm, forearm, tight and calf circumferences; eight skin-fold thickness; four bone diameters; upper muscle and fat areas. Anthropometrical parameters were compared with NCHS references.

**Results:** Age distribution of PEM elderly was: 41.2 % from 65-75 y, 42.3 % from 75.1-85 y and 16.5 % over 85 y. 89 % of elderly with PEM had non-oedematous PEM (undernutrition and marasmus), 38.5 % had mild, 48.7 % had moderate and 12.8 % had severe PEM, according to the Wellcome classification. The most elderly with PEM had signs of chronic type of malnutrition, according to Jenkins classification.

**Conclusion:** Elderly are at risk of chronic, non-oedematous malnutrition with depletion of both protein and fat stores. Precise analysis of PEM is very important in a creation of the nutritional intervention.

## 2 - 50511 Implicit food choice determinants in childhood obesity

*Mietje Craeynest, Geert Crombez, Jan De Houwer - Ghent University; Ann Tanghe - Medical-Paediatric Centre Zeepreventorium; Ilse De Bourdeaudhuij - Ghent University*

**Introduction:** Childhood obesity is associated with excessive (fat) food intake. For prevention and treatment, it is important to look for the underlying determinants of this behaviour. Research suggests that implicit rather than explicit determinants differentiate between subjects with versus without obesity. In two separate studies, it was investigated whether children with obesity preferred unhealthy food, and whether they identified more with high-fat food than with low-fat food, compared with lean children.

**Methods:** In the first study, 38 children with severe obesity and 38 lean children (17 boys, 9-18 yo) conducted an Extrinsic Affective Simon Task (EAST; De Houwer, 2003). In the second study, 40 children with severe obesity and 40 lean children (17 boys, 9-18 yo) conducted an Implicit Association Task (IAT; Greenwald et al., 1998). In both studies, explicit attitudes were assessed by a questionnaire.

**Results:** In both studies, group differences were only found at the implicit level. The first study revealed that children with obesity preferred both healthy and unhealthy food, while the controls were neutral. In the second study, children with obesity identified both with high-fat and low-fat food, while the controls only identified with low-fat food.

**Discussion:** The results suggest that children with obesity prefer food (both high-fat and low-fat) more than lean controls, but only at the implicit level. Berridge (1996) differentiates between two distinctive underlying motivations of food preference: liking (pleasure and palatability) and wanting (appetite, incentive motivation). Further research could explore this wanting component.

## 2 - 50513 Validation of cheap pedometers against the Yamax Digiwalker SW-200 in adults

*Katrien De Cocker, Greet Cardon - University Ghent*

**Purpose:** Nowadays cheap pedometers are used as merchandising products. The purpose of the present study is to evaluate if cheap pedometers are valid to measure steps in adults.
**Methods:** Thirty-five volunteers (20 - 60 years) tested 973 cheap pedometers. The participants wore 1 validated Yamax Digiwalker SW-200 pedometer and 5 pedometers from a cheap brand called stepping meter ( 1 or $ 1.3 per pedometer) during one day. Every day 5 other cheap pedometers were worn until all pedometers were tested. Steps of all pedometers were registered and the differences between counts from the Digiwalker and the stepping meter were expressed as percentage of the valid value of the Digiwalker step counts. The criterion used to determine a stepping meter as a valid pedometer was a deviation of maximum 10 % from the Yamax Digiwalker step counts.
**Results:** Results indicated that only 252 (25.9 %) stepping meters met the criterion, whereas 74.1 % made an over- or underestimation of more than 10 %. In more than one third (36.6 %) of all invalid stepping meters the deviation was 50 % or more. Most (64.8 %) of the invalid pedometers overestimated the actual steps taken (mean overestimation 48.86 % ± 70.55).
**Conclusion:** The cheap pedometers can not be used for physical activity promotion targets because of the low validity, resulting in incorrect information on steps counts.

## 2 - 50514 Regularity of meal patterns in Finnish adolescents

*Kristiina Ojala, Raili Välimaa, Jari Villberg, Jorma Tynjälä, Lasse Kannas - Research Center for Health Promotion, University of Jyväskylä*

**Purpose:** It would be important to explore the factors contributing the development and maintenance of regular meal patterns in adolescents who are often accused of irregular eating. The purpose of this study was not only to describe adolescents frequency of meal consumption but also to investigate the relationships between regularity of meal patterns and health behaviours as well as other background factors.
**Methods:** The nationally representative data was drawn from the international survey of Health Behaviour in School-aged Children (HBSC study). Finnish students attending the 7th (age 13 years) and 9th grade (age 15 years) completed a questionnaire during a class period in 2002 (N = 3477). Logistic regression analysis was used to study the effect of several background factors on the regularity of their meal patterns.
**Results:** About 40 % of boys and some 30 % of girls ate three main meals regularly every weekday. Exiguous alcohol consumption and smoking, and plans for higher education after compulsory school were evidently associated with regular meal patterns. Physical activity had significant effect only in boys model. Changes within the distribution of weekly family meals and mother s monitoring appeared to account for a considerable part of the more regular meal patterns among adolescents.
**Conclusions:** The findings suggest that the regularity of adolescents meal patterns is significantly associated not only with specific adolescent behaviours but also parenting practices. These findings encourage investigators to explore more cautiously the interrelationships between the factors affecting the development of adolescents meal patterns.

## 2 - 50516 Some steps towards a common scale for measuring physical activity

*Astrid Chorus, Gert Jacobusse, Stef van Buuren, Marijke Hopman-Rock - TNO Quality of Life*

Data on physical activity are routinely gathered in many countries. However, a wide variety of instruments is used, which complicates cross-country comparisons. One strategy to deal with this problem is to create new cross-nationally applicable instruments, but this is often difficult to implement, it works only for new data and it compromises historical comparability. The alternative strategy is to see if data obtained by different instruments can be translated into a common scale, which allows the use of existing data.
Response Conversion (RC) is one way of relating instruments to a common scale, and uses the concept of a 'conversion key' to translate the responses of different questions into scores on a common scale. In our study, we created a conversion key from data from the European Physical Activity Surveillance System (EUPASS) study.
All scores from the EUPASS data were expressed on a common scale through application of RC. The UK turned out to have the lowest mean physical activity, 0.7 SD below the highest mean of Germany. The Netherlands also have a quite low mean, almost 0.7 SD below Germany. In The Netherlands, especially retired people show little physical activity, compared to people in other countries. Through all countries, people with overweight and bad health were less physically active.
The RC methodology is a useful intermediate tool for improving comparability of physical activity data. In addition, the availability of a conversion key opens up new possibilities in Computerized Adapted Testing (a demo will be demonstrated).

## 2 - 50517 Nutritional status in institutionalized elderly in republic of Macedonia

*Lidija Todorovska - Medical Faculty Skopje; Danijel Todorovski - Macedonian Red Cross; Danijel Todorovski - Macedonian Red Cross*

**Background:** There are little data about the nutritional disorders of geriatric population in R. of Macedonia.
**Objective:** In cross-sectional study, to evaluate the nutritional status of Macedonian institutionalized elderly.
**Subjects:** 450 subjects older than 65 years (mean age 71.5 ± 4 y), from three geriatric centers.
**Methods:** Nutritional status was assessed with clinical evaluation (clinical status, muscle strength, ADL, IADL and MNA); biochemical parameters (hematology, prealbumin, albumin, transferrin, cholesterol) and anthropometry (stature, weight, BMI, waist/hip ratio, skin folds, upper arm circumference, elbow diameter, corrected upper muscle and fat area).
**Results:** 19.7 % of investigated elderly were well-nourished and 80.3% had nutritional disorders: 12.5 % were obese, 46.7 % had protein-energy malnutrition (PEM) and 21.1 % were with risk of PEM. PEM elderly shown reduction of all investigated anthropometric parameters; and had significantly lower values of hemoglobin and cholesterol (10.7 ± 2.4; 2.4 ± 0.9 mmol/l), compared with well-nourished elderly (12.5 ± 3.5; 3.9 ± 1.1 mmol/l, respectively). The major risk factors of PEM were dental problems, changes of appetite, psychiatric diseases and old age.
**Conclusion:** Nutritional disorders are prevalent health problem of institutionalized elderly in our geriatric centers and there is a need of nutritional intervention in this population.

## 2 - 50518 School-related and leisure time physical activity in children: the association with fitness

*Greet Cardon, Stefanie Verstraete, Ilse De Bourdeaudhuij - Ghent University*

**Purpose:** To evaluate the association of school-related (SPA) and leisure time physical activity (LPA) with fitness in children.
**Methods:** A total of 742 children (mean age: 11.5 years ± 0.7) filled out a PA questionnaire with assistance of a parent and performed the standardized Eurofit physical fitness test.
**Results:** More involvement in PA was significantly associated with better scores for balance (LPA: r: 0.14; SPA: r: 0.15), coordination and speed of limb movement (LPA: r: 0.08; SPA: r: 0.07), flexibility (LPA: r: 0.08; SPA: r: 0.09), explosive strength (LPA: r: 0.24; SPA: r: 0.18), static strength (LPA: ns; SPA: r: 0.09), upper body muscular endurance (LPA: r: 0.16; SPA: r: 0.14), running speed and agility (LPA: r: 0.19; SPA: r: 0.08), cardio-respiratory endurance (LPA: r: 0.34; SPA: r: 0.22) and body fat (LPA: r: 0.14; SPA: ns). For all fitness scores, except static strength and flexibility, children with high involvement in SPA and LPA scored significantly better than children with low involvement in both types of PA. Fitness scores in children with low SPA but high LPA involvement and children with low LPA but high SPA involvement did not differ significantly, except for cardio-respiratory endurance, which was higher in children with high LPA and low SPA involvement.
**Conclusion:** Since SPA and LPA are both associated with fitness the organisation and promotion of both types of PA are advocated in children.

## 2 - 50673 Grafitti, greenery and obesity in adults

*Anne Ellaway - MRC Social & Public Health Sciences Unit*

**Purpose:** Obesity levels are increasing among the population, with concomitant health problems. Some studies have found that features of the local social and physical environment might influence health and the ability to lead a healthy life. In this paper, we explore whether aspects of the surrounding residential neighbourhood are associated with patterns of obesity and health behaviour (frequency of taking exercise) among adults participants in the WHO Large Analysis and Review of European Housing and Health Status (LARES) study.
**Methods:** To examine whether a measure of obesity (mean Body Mass Index, derived from self reported height and weight, adjusted for sex, age and SES) and/or a health behaviour (frequency of taking exercise) is associated with independent assessments by trained interviewers of features of the local environment i.e. presence of 'incivilities' (litter, graffiti and dog fouling) and/or extent of 'pleasant surroundings' (plants and flowers). We used multivariate analysis of adult respondents in the LARES dataset (n=6900) using Body Mass Index and frequency of taking exercise as outcome variables, adjusted for sex, age and socioeconomic status.
**Results:** Obesity is associated with the surrounding social and physical environment such that respondents who live in areas with high levels of 'incivilities' and low levels of a 'pleasant surroundings' have higher mean Body Mass Index, and less frequent reported exercise behaviour.
**Conclusions:** Public health interventions which aim to reduce levels of obesity should include improving the local social and physical environment to encourage more active lifestyles.

## 2 - 50780 Applying learnings from children s nutrition education & health promotion intervention studies to promote food products for children within a realistic purchase environment

*Karin Stubenitsky - Foods Research Centre, Unilever Research & Development; Orla Cronin - Orla Cronin Research Ltd*

**Background:** Within the nutrition education & health promotion intervention area, a large part has been dedicated to promote healthy behaviour in children. For example, a number of studies have investigated how to increase general healthy behaviour (e.g. hygiene practices, physical activity levels), whereas a number of other studies focused on improving healthy eating behaviour (e.g fruit & vegetable intake, reducing sugar intake). However, in most nutrition education & health promotion intervention studies, products were given for free, whereas in a real situation the choice would need to be paid for. In addition, because of the nature of the target group, most of these studies have used the natural environment of children to achieve this, such as schools, communities and other contexts relevant to children. It would be beneficial to check the outcome within a realistic purchase environment (e.g. supermarket).
**Purpose:** Our objectives therefore were 1) to review the area of nutrition education & health promotion intervention dedicated to children, and to summarise its learnings, 2) to translate the learnings into a framework that would be relevant to promote food products for children within a realistic purchase environment.
**Method/key learnings:** The learnings were identified through a literature review of nutrition education & health promotion intervention studies dedicated to children. The poster will describe the learnings from the first objective and will give examples of the framework.
**Conclusions:** The learnings and framework will aid our understanding of the applicability of nutrition education & health promotion intervention to promote food products for children within a realistic purchase environment

## Notes

## Notes

## Friday, June 17 – 11.00-14.00 – 2nd Balcony Grote zaal

## Poster session 3

Session/Nr:

### 3 - 50520 Time-distribution of sedentary behavior in Australian children

*Kate Ridley - Flinders University; Tim Olds, Jim Dollman - University of South Australia*

**Purpose:** Sedentary behavior and physical activity may co-exist and have independent relationships with health. However, little is known about the sedentary behavior patterns of children. Many studies consider sedentary behavior merely as an absence of physical activity or as a selected activity, such as television viewing.
**Method:** A sample of 894 children (age=11.8±0.7 y) recalled their activity during the previous 24-h using a validated self-report use-of-time instrument - the Multimedia Activity Recall for Children and Adolescents (MARCA) on 2 school days (SD) and 1 non-school day (NSD). Descriptive use-of-time analyses were performed. Unpaired t-tests compared sedentary behavior between genders. Sedentary behavior was defined as activities requiring <2 METs, other than sleeping.
**Results:** There were no differences between genders in time spent being sedentary (SD=577 min.d-1, NSD=319 min. d-1), or most prevalent sedentary behavior out-of-school hours (television). However boys spent significantly more time watching television and playing video games, while girls spent more time reading and socialising. Out-of-school hours sedentary behavior was most prevalent after 6:00pm on SDs and occurred in peaks and troughs during various times on NSDs. The greatest variability in total activity level (%CV in METs) occurred between 4:00pm and 6:30pm on SDs and 8:00am and 5:30pm on NSDs.
**Conclusion:** The most prevalent sedentary behaviors, critical times for participation and variation among specific groups should be considered when planning sedentary behavior interventions.

### 3 - 50524 Socioeconomic differences in 11 year olds' fruit and vegetable intake: predictive validity of parent and student reported parental social class

*Rikke Krølner - Copenhagen University*

**Purpose:** Socioeconomic variation in children's eating habits is an under-investigated issue. This study considered parental social class as determinant and children's fruit and vegetable intake as outcome and compared the predictive validity of parent and student reported parental social class.
**Methods:** Cross-sectional study. Data from questionnaires from students in 59 randomly selected schools and their parents. Participation rates: Students 92%, n=1,919, parents 69%, n=1,436. Logistic regression analyses included 1,410 cases with matched student-parent data. Determinant: Parental occupational social class (I-V). Outcome: Children's self-reported intake of fruit and vegetables (food frequency questionnaire).
**Results/Findings:** Intake of fruit and vegetables decreased by declining social class, both when using student and parent reported social class. OR for eating fruit less than five days a week was 1.28 (CI: 1.13-1.45) per social class unit decline when using child information on mother's social class and 1.19 (1.07-1.33) when using parent information. For vegetables, estimates were 1.31 (1.17-1.46) and 1.21 (1.10-1.35). Analyses on father's social class showed a similar pattern.
**Conclusions:** There was a graded relationship between parental social class and children's fruit and vegetable intake, whether social class was reported by students or parents. As the response rate is higher among children, the study suggests that student reported social class is used as determinant when analysing socioeconomic variation in children's eating habits.

### 3 - 50525 Identifying the 'energy gap': magnitude and determinants of five year weight gain in mid-age women

*Wendy J Brown - University of Queensland; Lauren Williams - Research Centre for Gender and Health; Jessica Ford - University of Queensland; Kylie Ball - Deakin University; Annette J Dobson - University of Queensland*

**Purpose:** The aims of this study were to estimate average yearly weight gain in mid-age women, and to identify the determinants of this weight gain, and of gaining weight at double the average rate.
**Methods:** The study sample comprised 8071 participants (aged 45-55 years) in the Australian Longitudinal Study on Women's Health who completed mailed surveys in 1996, 1998 and 2001.
**Results:** On average the women gained 2.42 kg (95% CI:2.29-2.54) over 5 years. This equates with an energy imbalance of about 10kcal or 40kJ per day. Variables associated with energy balance (physical activity, sitting time and energy intake), as well as quitting smoking, menopause / hysterectomy, and baseline BMI category were significantly associated with weight gain. After adjustment for all the other biological and behavioural variables, the odds of

gaining weight at twice the average rate (>5kg over 5 years) were highest for women who quit smoking (OR=2.94; 95% CI: 2.17, 3.96). There were also independent relationships between the odds of gaining >5kg and (1) decreased habitual physical activity; (2) increased time spent sitting; (3) energy intake, (but only in women with BMI > 25 at baseline); (4) menopause transition and (5) hysterectomy.
**Conclusions:** The findings suggest that in addition to energy intake and expenditure there are other physiological factors associated with weight gain in mid-life. Nevertheless the size of the energy imbalance suggests that small changes in the modifiable behavioural variables could prevent further weight gain.

## 3 - 50526 Environmental determinants of adolescent sedentary behaviour

*Andrew Vince, Trish Gorely - Loughborough University*

Few studies have been carried out into adolescent sedentary behaviour and even fewer have looked at determinants of such behaviour. It is argued that too seldom have young people been asked to discuss and provide their perceptions on why they participate in sedentary behaviour and what they feel could be done to reduce this. The aim of this research was to examine the inter-relationships between adolescent sedentary behaviours and influences of the physical and social environment. The research adopts a critical realist approach and group interview data collection. Participants were (n=109) school based adolescents aged 11-16years Emerging themes include; (Safety issues, Parental influence, Inertia, Peer pressure, financial constraints, Time, Climate, and Availability issues). An understanding of adolescents perceptions of their environments and how they determine sedentary behaviour may been seen as central to the success of interventions aimed at reducing sedentary behaviour. We intend to illustrate how young peoples involvement in social science research can be valuable in informing policy and practice. Of the potential determinants of sedentary behaviour in adolescents it is argued that environmental influences are the least understood, but arguably one of the most important targets for public health interventions. Adolescents have been identified as having considerable environmental constraints placed on their activities, and as being largely excluded from discussions about their environments. The key challenge is to increase understanding of the modifiable environmental determinants of sedentary behaviour, and to translate that knowledge into practical actions for public health benefit.

## 3 - 50528 Physical activity and endometrial cancer risk: a systematic review

*Dorien Voskuil - The Netherlands Cancer Institute; Evelyn Monninkhof, Sjoerd Elias - University Medical Center Utrecht; Femke Vlems - Dutch Cancer Society; Floor van Leeuwen - The Netherlands Cancer Institute*

**Purpose:** This study is the first to systematically review the epidemiological evidence for an association between physical activity and endometrial cancer risk, taking into account the methodological quality of each study. The results will be used to optimize information on cancer prevention by the Dutch Cancer Society.
**Background:** Epidemiological studies have suggested that physical activity is associated with a decreased risk of endometrial cancer, even after taking obesity into account which is a known risk factor for endometrial cancer.
**Methods/key points:** We conducted a search for all English-language literature published before January 2005 on physical activity and endometrial cancer, and systematically reviewed all epidemiological studies. Two investigators independently scored the characteristics, results, and quality of each study.
**Results:** Occupational, leisure-time, or total physical activity was evaluated in relation to endometrial cancer in 15 analytic epidemiological studies. All 5 cohort studies reported a decreased risk (RR<0.8) in the most active group of total or leisure-time activity, 3 were statistically significant. Eight out of 10 case-control studies reported a decreased risk, 6 were statistically significant. Additional results will be reported on the quality of the studies and the potential for residual confounding and publication bias.
**Conclusions:** There is consistent evidence for 20-40% risk reduction related to physical activity and endometrial cancer risk. To support any advice to the general public more research is needed to clarify specific aspects of this association, such as the optimal frequency, intensity and timing of physical activity.

## 3 - 50529 Exploring the role of subjective well-being on long-term weight management in overweight and obese women

*Antonio Palmeira, Pedro Teixeira, Teresa Branco, Sandra Martins, Claudia Minderico, José Barata, Sidonio Serpa, Luis Sardinha - Faculty of Human Movement*

**Purpose:** Weight loss treatments typically induce positive changes in subjective well-being (SWB). Conversely, it is possible that changes in SWB operate as one mechanism by which long-term compliance is influenced. This study analyzes SWB variables during a short-term behavioral intervention and their association with weight loss (WL) 1 year after treatment.
**Methods:** Subjects were 132 females (BMI=30.2±3.7kg/m2; age=38.34±5.83y) who completed a 4-month (4m) weight

management program. Treatment followed standard guidelines to increase physical activity and normalize eating behaviour. Self-esteem, depression, and mood state were evaluated from self-report validated instruments, at baseline and at 4m (0.80<a<0.92). Statistical analysis was conducted for completers and for all subjects, following intent-to-treat principles. Attrition at 16-months (16m) was 27%.

**Results:** Mean baseline-4m (-3.7±4.0%), and baseline-16m (-4.5±6.7%) WL were observed (p<0.001). All SWB variables improved from baseline-4m but only reduction in total mood disturbance (TMD) was associated with WL (r=0.36, p<0.01). Baseline-4m reductions in depression and TMD and increases in self-esteem were predictive of baseline-16m WL (p<0.05). Self-esteem was additionally associated with 4-16m WL (r=-0.20, p<0.05). In multiple regression, TMD explained 14.0% of the variance in baseline-16m WL (p<0.001). Self-esteem change (baseline-4m) was an independent predictor of baseline-16m WL (sr2=4.5%, p=0.045), after adjustment for initial weight change.

**Conclusion:** Obesity treatment programs have other important outcomes besides changes in body weight. Improvements in mood and self-esteem could mediate results in weight management by establishing a positive program mind set , as described in Seligman s Positive Psychology paradigm, leading to enhanced task adherence and better results.

## 3 - 50531 Prediction of 16-month weight change in women using variables derived from different behavior change theoretical models

*Antonio Palmeira, Pedro Teixeira, Teresa Branco, Sandra Martins, Claudia Minderico, Jose Barata, Sidonio Serpa, Luis Sardinha - Faculty of Human Movement*

**Purpose:** Could short-term changes in variables from the Theory of Planned Behavior, Transtheoretical Model, and Social-Cognitive Theory (TTM/SCT) predict long-term outcomes in an obesity treatment program? This study analyzes exercise and weight management (WM) theory-driven variables, collected before and after a short-term intervention, regarding their predictive power for weight change (WC) 1 year after.

**Methods:** Subjects were 132 females (BMI=30.2±3.7kg/m2; age=38.34±5.83y) who completed a 4-month behavioral treatment program. Treatment followed standard guidelines to increase physical activity and normalize eating behaviour. Psychosocial variables where gathered from self-report using validated instruments (0.70<a<0.95). Statistical analysis was conducted for completers and for all subjects, using intent-to-treat principles. (27% attrition at 16-months)

**Results:** Weight changed significantly (p<0.001) from baseline-4m (-3.7±4.0%), and baseline-16m (-4.5±6.7%). All theory-driven variables improved significantly baseline-4m, with the exceptions of exercise self-efficacy (SE), WM behavioral processes of change, and subjective norms (exercise and WM). Baseline-16m WC was correlated with exercise cognitive processes of change, SE, and social support, and with WM SE, attitudes, and perceived behavioral control. In multiple regression to predict baseline-16m WC, exercise TTM/SCT variables explained 11.6% (p=0.050) with a significantly contribution from social support (sr2=4.2%). WM TTM/SCT predicted 8.7% (p=0.041) of WC and WMSE contributed with 8.4%.

**Conclusions:** Long-term weight outcomes are influenced by changes that may happen very soon during treatment. Exercise social support and self-efficacy for weight control emerged as variables that should be looked upon in this period, namely with frequent assessments of change and by developing specific intervention content for their enhancement.

## 3 - 50534 Awareness of health risk behaviour in nutrition: intake of fruit and vegetables

*Margit Groth, Jeppe Matthiessen, Anja Biltoft-Jensen, Sisse Fagt - Danish Institute for Food and Veterinary Research*

**Purpose:** Lack of awareness of own health risk behaviour could constitute a barrier to changing behaviour in a more healthy direction. The complex nature of food and nutrition makes it even more difficult to evaluate own risk behaviour within this area. The purpose of this study was to investigate the relationship between individuals own assessment of their intake of fruit and vegetables and their actual intake as measured by a 7-day pre-coded food diary.

**Methods:** The study population was a nationwide sample of 3 297 participants aged 15-75 years. Response rate was 50%. Subjects own assessment of intake was measured by a personal interview using questions from the Stages of Change model. Classification based on subjective assessment was compared with an alternative classification where subjective assessment was combined with actual intake as measured by a 7-day pre-coded food diary.

**Results:** 67% of the population assessed their intake as satisfactory and were accordingly classified in the action/maintenance stage. However, when their actual intake was included only 17% of the population should be classified in this stage. Instead, almost 60% of those originally classified as action/maintainers should be classified in the precontemplation stage.

**Conclusion:** Many subjects do not want to change their risk behaviour with regard to intake of fruit and vegetables because they are not aware of it. This should be considered when health promotion strategies are chosen. Classification of target groups could be improved if more objective measures of dietary behaviour are included.

## 3 - 50535 Risk factors for excessive weight gain during pregnancy

*Ellen Althuizen, Mireille van Poppel, Willem van Mechelen - VU University Medical Center, Jaap Seidell - VU University*

**Purpose:** 6-18 months postpartum 14%-20% of women is 5 kg or more heavier. The most important determinant of retaining weight is the amount of weight gained during pregnancy. However, reasons why some women gain or retain far more weight than others are still not known and are therefore studied in the New Life(style) project.
**Methods:** 168 women participated in this observational study. Questionnaires on prepregnancy body mass index (BMI), weight development, dietary habits, and physical activity (PA) were administered at 30 weeks gestation and at 6, 26 and 52 weeks postpartum. With logistic analyses, risk factors for gaining above recommended Institute Of Medicine (IOM) guidelines were identified.
**Results:** Participants had a mean (SD) age of 31.0 (4.7) years and prepregnancy BMI of 24.2 (3.9). Women gained 14.1 (5.6) kg on average during pregnancy. Remarkably, 67% of the overweight women gained above IOM-guidelines, compared to 35% of normal or underweight women and 29% of obese women. Logistic univariate analyses indicated age at menarche (OR 0.77, 95% CI 0.60-0.99), total weight gain (OR 2.7, 95% CI 1.9-4.0) and individual target weight gain (OR 1.32, 95% CI 1.11-1.58) as risk factors for gaining above recommendations. No significant relations were found for PA. Multivariate analysis (including data on nutrition) will be performed.
**Conclusions:** Future interventions may want to pay attention to giving pregnant women advice on healthy weight gain during pregnancy.

## 3 - 50536 Determinants of physical activity among early adolescents: findings from a longitudinal study

*Jo Inchley, Candace Currie - University of Edinburgh*

**Purpose:** The Physical Activity in Scottish Schoolchildren (PASS) study is a longitudinal research project which aims to track levels of physical activity during the adolescent transition and through the teenage years, and to identify key determinants of physical activity behaviour.
**Methods:** Over 1600 schoolchildren were recruited to the study in 2002 from four regions across Scotland. Three waves of data collection have been undertaken to date with the children at age 11, 12 and 13 years. Data is collected annually by questionnaire survey administered during class time in school. Physical activity measures include moderate and vigorous physical activity, sports club participation and travel to school. Drawing on an ecological approach, a wide range of psychological, social and environmental factors are assessed, for example, enjoyment, self-esteem, exercise self-efficacy, perceived competence, parental and peer support, and availability of local facilities. Demographic variables and measures of maturational status are also included.
**Results:** This paper will present key findings from the first three years of data from the PASS study. Patterns of physical activity participation during the early adolescent period will be explored and evidence for the role of psychological, social and environmental factors will be presented.
**Conclusions:** Promoting physical activity among children and adolescents is a public health priority. It is essential that interventions are based on empirical evidence. The PASS study aims to help inform development of appropriate interventions by providing evidence of the influence of psychological, social and environmental factors on physical activity behaviour during the adolescent period.

## 3 - 50538 Temporal and environmental correlates of Scottish children's sedentary and active behaviours

*Trish Gorely, Stuart Biddle - Loughborough University; Simon Marshall - San Diego State University; Ian Murdey, Noel Cameron - Loughborough University*

**Purpose:** Trends in overweight and obesity among youth are often linked to decrease physical activity and increase sedentary behaviours. The purpose of this study was to analyse behavioural trends across the day and environmental correlates of sedentary and active behaviours in youth.
**Methods:** Sampling took place across 14 randomly chosen local education authorities in Scotland. 1056 participants aged 13-16 years (female 60%) completed an ecological momentary assessment diary for 4 days (three weekdays, one weekend day).
**Results:** After school, there was a slight shift in likelihood of behaviour from motorised to active travel compared to before school. During the week TV/video and sports and exercise peak at different times of the day. During weekends when behaviours occurred was more variable. For boys, evening TV viewing was highly likely but earlier in the day boys were more likely to be playing sports/exercise than watching TV. For girls there was never a likelihood for sports greater than TV. Analysis of where young people were for certain behaviours showed that during a weekday, if in the lounge, there was a high chance for both boys (70%) and girls (62.5%) they would be watching TV. At weekends, the likelihood was similar. For physically active pursuits, locations outside of the house were important.

**Conclusions:** Temporal and environmental contexts are associated with the likelihood of certain sedentary and active behaviours occurring. Those involved in behavioural research need to assess such factors alongside psychological variables for a better understanding of health behaviours.

## 3 - 50539 Differences in social-psychological and physical environmental factors according to moderate and vigorous physical activity levels of Scottish adolescent girls

*Sarah Whitehehad, Stuart Biddle, Mary Nevill, Toni O'Donovan - Loughborough University*

**Purpose:** To examine moderate and vigorous physical activity group differences in social-psychological and physical environmental factors among Scottish adolescent girls.
**Methods:** Design: Cross-sectional survey. Participants: 352 Scottish girls, age 11-16, mean age 13.25 years. Measures: Self-report of physical activities, questionnaire assessing six social-psychological and five environmental factors. Analysis: Activity group differences were assessed using MANOVA with univariate follow-ups (social-psychological) and Kruskal-Wallis tests with Mann-Whitney follow-ups (environmental). Data were analysed separately by age (11-13 and 14-16 years).
**Results:** Moderate activity: No social-psychological variables varied as a function of activity group for 11-13 or 14-16 year olds. Positive neighbourhood perception was higher in 11-13 year olds reporting greater moderate activity. Use of home equipment, availability of facilities nearby, and use of nearby facilities were all higher among 14-16 year olds higher in moderate activity. Vigorous activity: Mother s activity, social support, and use of home equipment were higher among 11-13 year olds higher in vigorous activity. Among 14-16 year olds, importance of being physically active, use of home equipment, positive neighbourhood perception, availability of local facilities, and use of local facilities were all greater for those higher in vigorous activity.
**Conclusions:** Environmental factors appear more important and the influence of significant others less so for older girls. Factors related to moderate and vigorous activity differed; the two may need to be targeted independently.

## 3 - 50540 Systematic review of physical activity and breast cancer risk

*Evelyn M Monninkhof, Sjoerd G Elias - UMC Utrecht; Femke A Vlems - The Dutch Cancer Society; Jantine Schuit - National Institute for Public Health and the Environment; Dorien W Voskuil, Flora E van Leeuwen - The Netherlands Cancer Institute*

**Purpose:** This review provides an update of the epidemiologic evidence for the association between physical activity and breast cancer risk. We also explored whether study quality explains discrepancies in results between the different studies. The Dutch Cancer Society will use the results to optimize information on breast cancer prevention.
**Methods:** Studies were identified through a systematic review of literature available on Pubmed through March 2004. Cohort and case-control studies that assessed total or leisure time activities in relation to occurrence of breast cancer were included. The fully adjusted risk estimates and 95% confidence intervals for the highest versus lowest level of activity were documented for each study, as well as evidence for a dose-response relationship. The methodological quality of the studies was assessed with a comprehensive scoring system.
**Results:** Results of the included cohort (N=17) and case-control (N=28) studies show that high levels of physical activity are associated with a decrease in breast cancer risk. Breast cancer risk is about 20-40% lower when the highest activity level is compared with the lowest one. Evidence for a dose-response relationship was observed in about half of the high quality studies. The evidence for a decreased breast cancer risk was slightly stronger for postmenopausal breast cancer than for premenopausal breast cancer. Study quality could not explain the heterogeneity in study results.
**Conclusions:** This review shows that (an increase in) physical activity is an effective means to reduce breast cancer risk in the population at large.

## 3 - 50541 Evaluation of a pilot program using student-athlete mentors to increase physical activity among 3rd graders

*Amber Vaughn, Tausha Robertson, Dianne Ward - UNC-Chapel Hill*

**Purpose:** Researchers have examined social determinants of children s physical activity (PA) and found that children look to family, friends and media for social norms, social support, and role models. This pilot assessed the impact of an intervention using collegiate student-athletes on weekly PA time and selected determinants of PA.
**Methods:** Two elementary schools participated in a 6-wk intervention that paired athletes from a local university with 3rd grade classrooms. Athletes visited classrooms weekly to lead students in fun physical activities and encourage children to meet weekly activity goals. Activity goals increased from 10 min/day in wk 1 to 60 min/day in wk 6. Children recorded weekly PA minutes on activity trackers and completed pre- and post-intervention surveys. Teachers completed a program evaluation.
**Results/Findings:** All 145 3rd graders participated in the program and 113 (77.9%) completed both surveys. On

average, 87.6% returned activity trackers each week. Based on these self-reports, children's PA increased from 30 min/day in wk 1 to 59 min/day in wk 6. No significant changes were observed in social determinants except for a child s confidence in their ability to set and reach activity goals (p = 0.04). Teachers reported that the time this program required was reasonable and that they would be very likely to recommend it to others.
**Conclusions:** This program appears to increase the time children spend being active. Further work is needed to confirm PA min., assess maintenance, and examine sustainability.

## 3 - 50543 The recess period: a key moment of prepubescent children's daily physical activity?

*Comlavi Guinhouya, Hervé Hubert, Grégory Dupont, Alain Durocher - University of Lille 2*

**Objective:** this study was designed to investigate the significance of the recess period in the habitual physical activity in French school children.
**Methods:** prepubescent children, attending school in rural area, participated to the experiment. Children were monitored during the whole week with a Computer Science and Applications (CSA) accelerometers (Model, 7164). Two selected school days data were used for analyses.
**Results:** Analyses indicate that, according to the strict recommendation of 2 × 15 min for recess in elementary school, children can involve in moderate-to-vigorous physical activity (MVPA) up to 20% of their daily MVPA. This proportion increased with the recreation time. Furthermore, there was no relationship between recess MVPA and daily MVPA.
**Conclusion:** the present results suggest that 1) recess are likely important periods for this population of French elementary pupil s daily activity - they must be appropriately distributed during the school time; 2) proper physical education classes must be planned within the school day schedule, in order to supplement the recess activity and enable children to experience adequate amount of daily physical activity with respect to recommendations for health.

## 3 - 50544 Validation of the one-minute dietary assessment to assess the dietary behaviors of Hong Kong adolescents

*Georgia Guldan, Soman Wong - The Chinese University of Hong Kong; Risa Ozaki - Prince of Wales Hospital; Juliana Chan, May Auyeung - The Chinese University of Hong Kong*

**Purpose:** Hong Kong adolescents have unhealthy eating habits and diet-related diseases. This study aimed to evaluate a 19-question One-Minute Diet Assessment (OMDA) tool against 3 days of 24-hr dietary recall data from 229 Chinese secondary school students (57% female) to obtain a valid, rapid assessment tool to assess diet quality.
**Methods:** OMDA questions represented different daily and weekly dietary behaviors. Scores were calculated from the OMDA responses, and some questions were examined individually against the 24-hr recall nutrient intake data.
**Results/Findings:** Spearman s correlation coefficients between daily fiber intake estimated from a the 24-hour recall and the OMDA fiber score were r=0.196 (P=0.003) for all teenagers and r=0.212 (P=0.036) for males, and were r=0.17 (P=0.004) for all teenagers and r=0.249 (P=0.004) for females between total daily fat intake and the OMDA fat score. A higher OMDA Score was associated with lower daily intake of energy (P=0.046), total fat (P=0.026), cholesterol (P=0.008), saturated fatty acids (P=0.014) and percentage energy from saturated fatty acids (P=0.037) for all teenagers. Additionally, responses about breakfast and milk/soymilk consumption were significantly correlated with the 24-hr dietary recall breakfast and calcium information.
**Conclusions:** The OMDA screener demonstrated good validity with respect to key nutrient intakes, having potential as a rapid dietary screener for assessing and counseling Hong Kong adolescents about imbalanced diets.

## 3 - 50546 The influence of impulsivity on food intake

*Ramona Guerrieri, Chantal Nederkoorn - Maastricht University*

**Purpose:** A central question in this line of research is why obese people find it difficult to resist tasty food, despite all the negative consequences of being obese. It is hypothesized that obese people have a general deficit in impulse control, which makes it more difficult to resist the temptation of food in the current obesogenic environment. Previous research has shown that obese adult women and obese children appear more impulsive on several behavioural tasks and self-report measures. In the current study, we investigated further whether impulsivity indeed causes overeating. We hypothesized that high impulsive normal weight women would eat more during a taste test compared to low impulsive women. Moreover, we expected that impulsive people would eat more in an inviting environment with variety.
**Methods:** Normal weight women were subdivided into high and low impulsives. All participants performed a taste test, during which food intake was measured. Participants had to taste either white candy or a variety of coloured candy. Several measures of restraint, eating behaviour and impulsivity were administered.

**Results:** Preliminary analyses show that the high impulsive participants ate significantly more during the taste test, compared to low impulsive participants. The variety of coloured candy vs white candy did not influence food intake.
**Conclusion:** The preliminary results of this study confirm the relation between impulsivity and food intake. Not only are obese people more impulsive, impulsive people also eat more. However, impulsive people did not appear to be more sensitive to a variety of colours.

## 3 - 50547 Environmental determinants of health behaviours as perceived by lower and higher socioeconomic groups: results of focus groups

*Carlijn Kamphuis, Frank van Lenthe, Katrina Giskes, Hans Brug, Johan Mackenbach - Erasmus MC*

**Purpose:** The contribution of environmental factors to socioeconomic inequalities in health behaviours is largely unknown. This study aimed to investigate socioeconomic differences in the perception of environmental determinants of fruit and vegetable consumption (FV) and physical activity (PA).
**Methods:** Four focus group interviews involved a total of 38 adult participants. People were selected on their education level and neighbourhood deprivation. Two interviews were held among low-educated participants residing in deprived neighbourhoods, and two groups consisted of high-educated people residing in advantaged neighbourhoods. Sessions were audiotaped and transcribed verbatim. A content analysis of the transcripts was done by the first and second author independently, using the data analysis software NVIVO.
**Results:** When asked what determines their FV and PA, participants initially identified individual-level factors, with little variety between high and low socioeconomic groups (taste preferences (FV), health considerations (FV+PA), lack of time (FV+PA), enjoyment (PA)). When asked about environmental characteristics specifically, perceived derminants differed between groups. Good accessibility of facilities (PA) and ample availability of fruits and vegetables (FV) were identified as promoters by people from advantaged neighbourhoods only, while social support (PA+FV), especially from the spouse, was an important promoter for both socioeconomic groups. Cost considerations (PA+FV), safety concerns (PA) and poor neighbourhood aesthetics (PA) were identified as barriers for low socioeconomic groups.
**Conclusions:** Perceived environmental determinants of FV and PA seem to differ between socioeconomic groups, and may contribute to socioeconomic inequalities in these behaviours.

## 3 - 50548 Age perceptions and health related habits among middle-aged men in three occupational groups

*Margareta Wandel - University of Oslo; Gun Roos - National Institute for Consumer Research*

**Purpose:** To explore how middle-aged men in different socio-economic groups and with different work experiences talk about progress in age and how they see age as a reason for pursuing or not pursuing health related habits.
**Methods:** Data were collected by personal interviews with 46 men (carpenters, engineers, drivers), aged 35 to 57, visits to work places and cafeterias, and group discussions. The analysis was based on the principles of Giorgi s phenomenologically-inspired method.
**Results:** Emerging themes related to the ageing body were for the carpenters: worry about decline in strength, feeling of uselessness, awareness of what the body can take; for the engineers: keeping the body in shape, ability to tackle stress. In addition to these themes, the drivers focussed on leaving the body as it is/taking age as it comes. Men in all three groups said they were thinking more about health and disease with age. Even though many talked about becoming more sedate, there were also some who maintained being more physically active with age. The emphasis and the reasons for being more physically active were different in the three groups, and involved aspects such as health, strength, pleasure, social milieu, warding off personal problems. Age was used as a reason both for being and not being physically active.
**Conclusion:** The data will be discussed in relation to Bourdieu s theories on the production and conversion of physical capital, and will contribute to the understanding of what inspires men to become physically active.

## 3 - 50554 Participation of health professionals and community in advising of obese persons to change their nutrition and physical activity habits

*Vytautas Vaisvalavicius, Janina Petkeviciene, Jurate Klumbiene - Institute for Biomedical Research*

**Purpose:** Effective management strategies of overweight require the common efforts of health care services and community. The aim of our study was to assess the participation of health professionals and family members in advising obese people to change their health behaviors in Lithuania.
**Methods:** In 2004 the cross-sectional survey was carried out within the international Finbalt Health Monitor project. A national random sample of 3000 inhabitants of Lithuania aged 20-64 has been taken out of National Population Register. The study material was collected by mailed questionnaires. Response rate was 61.7%. The questions about

height, weight and advises to change lifestyle were included into the questionnaire.
**Results:** The prevalence of obesity (BMI>30) was 14.2% among men and 16.9% among women. Obese respondents were less physically active than those with normal weight were. Only 11.1% of obese men and 23.1% of obese women were advised by a doctor to decrease their body weight. Less than one fifth of obese persons were advised to change dietary habits, 17.4% of obese men and 26.1% of obese women - to increase their physical activity. Nurses were less active in advising obese persons than doctors. Almost half of obese men and 38,5% of obese women received advise to decrease body weight from family members. Men were more often advised to increase physical activity and to change diet compared to women.
**Conclusions:** The involvement of health professionals in management of obesity should be strengthened in Lithuania.

## 3 - 50563 Social cognitive development and children's food preferences

*Gertrude Zeinstra, Cees de Graaf - Wageningen University*

**Purpose:** The aim of this study is to examine the relation between children s social cognitive development and their food preferences.
**Methods:** Based on Piaget s classification of children s cognitive development (Roedder John, 1999) and the consumer socialization stages of Valkenburg (Valkenburg, 2001) three age groups were chosen (3-4, 7-8 and 11-12 years). Fruit and vegetable preferences were derived from data of the Dutch National Food Consumption Survey of 1997/1998 for the corresponding age groups.
**Results:** For the most popular fruit a shift was observed from apple without peel for children aged 3-4 years to apple with peel for children aged 11-12. The most popular fruit juice for the youngest children was apple juice. For the 7-8 year olds apple juice and orange juice were almost equally popular, whereas the oldest children definitely chose orange juice above apple juice.
**Conclusions:** An increase in complexity of perception and thought, together with the fact that young children prefer higher levels of sweetness then older children (De Graaf & Zandstra, 1999), could be an explanation for the shift in popularity from apple juice to orange juice when children get older. Apple juice is a sweet and simple product, while orange juice is more complex with higher sourness and pulp. Children s physical development of the jaw and the complexity of texture might explain the changes with age concerning apple preference. These results indicate that children s food preferences might be influenced by their social cognitive development.

## 3 - 50564 Effects of intra- and inter-personal factors on active school travel

*Sarah Ball, Kelly Evenson, Laura Linnan, Amber Vaughn, Dianne Ward - University of North Carolina*

**Purpose:** Active travel (AT) to and from school has declined by 40% over the past three decades. While distance is most often noted as the primary barrier, barriers exist to AT even for children attending neighborhood schools. The purpose of this study was to compare the barriers and facilitators of active school travel between children who use AT means and those who do not.
**Methods:** Fourth and fifth grade children (n=347) from 2 suburban elementary schools in North Carolina were recruited to participate, regardless of the distance they lived from school. Questionnaires assessed child perceptions of school travel as well as benefits, barriers, self-efficacy, and social support for AT. A daily travel instrument, administered over one school week, assessed travel mode. Active travelers were defined as those who used an AT mode to/from school at least one trip that week (possible 10 trips).
**Results:** Wilcoxon rank sum tests showed that active travelers (n=61) perceived significantly more benefits to active school travel (P=0.003), fewer barriers (P=0.01), had greater self-efficacy for AT (P<0.0001), and perceived an increased level of social support from friends (P<0.0001) and family (P<0.0001) for AT.
**Conclusions:** Results suggest that intrapersonal factors and positive interpersonal interactions are correlated with AT behavior. Future interventions targeting changes in the personal and social environment could be used as a means to change travel behavior. Further prospective studies are needed.

## 3 - 50567 E-health promotion: the state of the art and implications for future program development, implementation and evaluation

*Anke Oenema - Erasmus MC, University Medical Center; Jascha de Nooijer - Universiteit Maastricht; Gitte Kloek - Erasmus MC, University Medical Center; Hein de Vries, Nanne de Vries - Universiteit Maastricht; Johannes Brug - Erasmus MC, University Medical Center*

Although the Internet is considered one of the most promising channels for health communication, no systematic overview of the effectiveness of health promotion interventions through the Internet (E-health promotion) is currently

available. A study, consisting of a systematic literature review and expert interviews, was conducted to gain insight into the effectiveness of such interventions.
Literature was searched in PubMed, PsychInfo, WebOfScience and Central, from 1995 till October 2004. Experts were invited to complete an e-mail questionnaire about their opinions on current and future developments concerning design and evaluation of E-health promotion interventions.
Approximately 4,000 titles were identified and screened for eligibility. Nine studies met the criteria for inclusion in the review. These studies addressed nutrition and physical activity behaviors and were heterogeneous in study methodology and intervention design. The results of the studies were not consistently in favor of the E-health promotion interventions. The experts stressed the potential of the Internet to tailor information to the individual and the possibility of immediate feedback, and the difficulty of attracting and retaining people to a website.
The limited number of studies currently available for review and the variety of employed study methodologies is an insufficient basis to draw overall conclusions about the effectiveness of E-health promotion interventions. More robust evaluation studies are needed, as well as studies gaining insight in strategies that can be effectively implemented in E-health promotion interventions. Another important area of research is how to achieve sufficient exposure to an intervention website.

## 3 - 50568 Health visitors' knowledge and practice with regard to the introduction of solids and allergenic foods for infants

*Monique Raats, Sarah Rust, Victoria Sneyd, Jane Morgan - University of Surrey*

In the UK health visitors (HVs) are experienced nurses who have had extra training in the promotion of health and the prevention of ill health. They play an important role in the provision of health care for infants and children. It is therefore essential that they are aware of current evidence based recommendations with regard to infant feeding. This study investigates HVs' knowledge and practice with regard to the introduction of solids and allergenic foods for infants. Semi structured telephone interviews were conducted with 61 English HVs. A significant (P=0.015) number of HVs did not advise the correct optimal age to introduce solids according to the 2003 UK recommendations (not before six months). A statistically significant number of HVs advised the correct age to introduce wheat (P<0.001) and cows' milk as a drink (P<0.001). A statistically significant number of HVs advised the introduction of eggs (P=0.015), cows' milk as the main drink in the diet (P=0.007) and fish sometime between the ages specified in 1994 government recommendations (e.g. 6-9 months for eggs and fish; 6-12 months for cow's milk). Despite the lack of consistent recommendations regarding the optimum age to introduce allergenic foods, a significant number of HVs are giving parents the correct advice. Simple food-based nutritional messages seem to be more widely accepted than complex messages (e.g. timing of "solids"). Therefore, recommendations need to be straightforward and easy to convey to the public.

## 3 - 50571 Effects of a health at any size intervention on eating behaviors and appetite ratings in pre-menopausal overweight women

*Véronique Provencher, Catherine Bégin, Angelo Tremblay, Sonia Boivin, Simone Lemieux - Laval University*

**Purpose:** Eating behaviors have been related to obesity status and may be modified by weight loss interventions. The aim of this study was to assess the effects of a "health at any size" intervention (HAAS) on eating behaviors and appetite ratings in 50 pre-menopausal overweight women.
**Methods:** Women were randomly assigned to one of the 3 groups studied: 1) HAAS group (N=20); 2) social support group (N=20); 3) control group (N=10). Interventions were conducted over a 4 month-period and measurements were taken before and after this period. Eating behaviors (flexible and rigid restraint, disinhibition and susceptibility to hunger) were evaluated by the "Three-Factor Eating Questionnaire". Appetite ratings were assessed by visual analogue scales before and after a standardized breakfast (601kcal).
**Results:** In group 1, flexible restraint (1.3 ± 0.4; p=0.005) increased while disinhibition (-1.5 ± 0.7; p=0.03) and susceptibility to hunger (-2.1 ± 0.8; p<0.0001) decreased. Rigid restraint (0.8 ± 0.4; p=0.05) increased and disinhibition (-1.6 ± 0.5; p=0.01) decreased in group 3 whereas no changes in eating behaviors were observed in group 2. Prospective food consumption following the standardized breakfast ("How much food do you think you could eat?") was lower after than before the intervention in group 1 (p<0.05).
**Conclusions:** These results suggest that a HAAS intervention could have significant effects on eating behaviors and appetite ratings in pre-menopausal overweight women.

## 3 - 50575 The effects of giving causal information about diet and disease

*Monique Raats - University of Surrey; Paul Sparks - University of Sussex; Moira Geekie – unknown; Richard Shepherd - University of Surrey*

Slusher and Anderson (1995) found causal arguments produced greater belief change with effects mediated by explanation availability. This study assesses the effect of informational content (causal versus non-causal evidence) on people s beliefs about diet and disease relationships. Participants were randomly allocated to groups receiving causal (n=92); non-causal (n=90) or no information (n=92). Belief statements were rated pre- and post information. Other measures included the Need For Cognition (NFC) scale; reactions to the information and behaviour. Belief item were analysed with 3 (information) x 3 (NFC) ANOVAS. Reducing my fat intake in the future would assist in reducing my blood pressure" revealed a main information effect ($p<0.01$); the non-causal group reporting increased ratings. "Reducing ... reduce my cholesterol level" revealed a main information effect ($p<0.01$) with those receiving information reporting increased in belief ratings. "Reducing ... reduce my risk of heart disease" revealed a main NFC effect ($p<0.05$); those with lower NFC scores (i.e. less enjoy and engage in exerting mental effort) reporting decreased ratings. "Reducing ... make me be able to perform physical activities better" also revealed a main NFC effect ($p<0.01$). Those having read a text were more likely to exhibit "healthy" behaviour. There is no clear pattern of effects of different types of information on people's established beliefs about the relationship between fat intake and health."

## 3 - 50576 European trends in physical activity and tv watching 1985-2002

*Oddrun Samdal - University of Bergen; Jorma Tynjälä - University of Jyväskylä; Chris Roberts - Welsh Assembly; James F. Sallis - San Diego State University; Bente Wold - University of Bergen*

**Purpose:** The aim is to study trends in physical activity and TV-watching in 7 European countries in the period 1985-2002.
**Method:** The data are collected through the survey Health Behaviour in School-aged Children. A WHO Cross-national study using nationally representative samples of 11, 13 and 15 year olds. Between 1985/86 and 2001/02, a standard set of items was used to measure vigorous physical activity and TV watching in the study. Austria, Finland, Hungary, Norway, Scotland, Sweden, and Wales used these measures in all surveys.
**Results:** Between 1985/86 and 2001/02, there was a slight increase in the proportions reporting to undertake vigorous physical activity 4 or more times a week, particularly for girls. Across all surveys boys were more likely to report regular vigorous physical activity than girls and vigorous activity declined with age. No clear pattern emerges when examining trends over time in TV watching. Boys reported spending more time watching TV than girls in the same age groups. Older adolescents reported watching TV less than younger students. The correlation between the two behaviours at the 1986 and 1998 measurement points was non-significant.
**Conclusion:** The finding that boys and the younger age-group are report more regular vigorous physical activity and TV watching confirms results of previous studies. The present study of 7 European countries generally indicates stability or a small increase in physical activity of boys and girls aged 11 to 15 from the mid-1980s to the early 2000s.

## 3 - 50577 Using the built environment to alter human energy expenditure

*Veronica Addison, Nadia Craig, Dawn Wilson-King, Wally Peters - University of South Carolina*

**Purpose:** This study compares the energy expenditures (EE) of three students with varying levels of physical activity (PA) in the built environment (BE) at the University of South Carolina (USC) during a semester.
**Methods:** A model was created to calculate the EE of three students, each with varying levels of PA: they exceed, meet, or fail to meet the daily recommended 30 minutes or more of moderate intensity PA. The model calculates the students' EE for navigation to and from classes and dining facilities with their dorm rooms as a "home" reference point. The dorm rooms, classes and dining facilities are all spatially located in the BE of USC. The students have the same beginning, intermediate, and final destination points during the day. Their activity levels determine how they will navigate the campus: for example, one student power-walks to and from classes for 15 minutes; the other two students walk and ride the bus with differing patterns of PA.
**Results:** The daily recommended 30 minutes of PA results in an expenditure of 200 kcal. The three students varying daily levels of PA resulted in varying amounts of EE: 981, 263, and 127 kcal.
**Conclusions:** Results from this preliminary study demonstrate that the built environment can be used as a tool to increase or decrease human EE in a quantifiable fashion. Future research will incorporate the use of Geographic Information Systems to model the BE and incorporate analytical features such as elevation change and rate variable EE.

## 3 - 50578 Can an active video game decrease sedentary screen time among children?

*Julie Marks, Ann Maloney, Terrence Bethea, Kristine Kelsey, Angela Rosenberg, Sadye Paez, Lin Sikich - UNC Chapel Hill*

**Purpose:** Time spent watching television is a major contributor to the sedentary lifestyles of youth. Little is known about whether video games that engage children in physical activity will decrease sedentary screen time. The purpose of this pilot study was to determine whether a dance simulation video game, Dance Dance Revolution (DDR), was effective for decreasing time spent watching TV or videos among a sample of 7 - 8 year old children in North Carolina (n= 60).

**Methods:** Participants were randomized to Control, Basic, or Enhanced conditions and followed over 11 weeks. The Basic (n=18) group received the DDR game, a PlayStation2 game console, and an initial instruction lesson. The Enhanced group (n=21) received the Basic treatment plus 6 weekly home visits for skill building and problem solving. The Control (delayed) group (n= 21) received the game and console at the end of the 11 week follow-up period. Screen time was assessed via parental self-report from a previously validated measure.

**Results:** Analysis of Variance showed that participants in the basic group decreased their TV and video viewing by 3.76 hours/week ($t=2.18$, $p<0.03$), and the enhanced group decreased 4.01 hrs/week ($t=2.41$; $p<0.02$), relative to the control group. There were no significant differences found between the basic and enhanced intervention groups.

**Conclusion:** This pilot study supports further investigation of active video games for decreasing sedentary screen time among children. Additional research is needed to evaluate sustainability over time, and to identify cost-effective alternatives to commercial video games.

## 3 - 50579 Does gender of the child affect the school transportation decision?

*Joanne Propst Finkle, Kathryn N. Ahlport, Laura A. Linnan - University of North Carolina; Amber Vaughn - UNC Center for Health Promotion and Disease Prevention; Dianne S. Ward - University of North Carolina*

**Purpose:** Research has shown that children need to be more physically active, and at all ages, girls are less active than boys. Active travel (AT) to school is one opportunity to promote an active lifestyle. The purpose of this study was to understand gender differences influencing transportation decisions.

**Methods:** Children in 4th and 5th grades (151 boys, 189 girls) from two NC elementary schools completed a daily travel survey and questionnaires over a 5-day period to understand personal, environmental, and social factors influencing transportation decisions.

**Results/Findings:** Results suggest no significant difference in the frequency of AT by gender (boys 19.3%, girls 17.8%). Girls more frequently than boys indicated that they enjoyed being active (boys 84.16%, girls 92.96%). When asked about things in the environment that would make them want to walk/bike to school, results suggest gender differences with 5th grade students not found in 4th grade. Compared to boys, 5th grade girls were more likely to report they would walk to school if accompanied by an adult (boys 50.77%, girls 67.90%) and if safety classes (boys 28.13%, girls 51.85%), crossing guards (boys 50.77%, girls 72.29%) and sidewalks (boys 67.69%, girls 81.93%) were more available.

**Conclusions:** Results suggest children, ages 8-11, enjoy being active. However, girls starting in the 5th grade may perceive a greater need for safeguards in their environment to feel secure. This suggests an opportunity for gender-specific approaches to promoting AT and the need for further prospective work that follows children through middle school.

## 3 - 50580 Arithmetic conversion of foods to nutrients overestimates accuracy of dietary reports: further analyses of data from a study of effects of reporting-order instructions on children's dietary reporting accuracy

*Albert F. Smith - Cleveland State University; Suzanne Domel Baxter, Michele D. Nichols, Angella Y. Eanes, Caroline H. Guinn - University of South Carolina*

**Purpose:** One approach to analyzing data from validation studies of dietary reports involves converting reference and reported food items to nutrients, and then comparing means, or assessing correlations, of reference and reported values. Such analyses do not distinguish between matches - reported items in the reference set - and intrusions - reported items not in the reference set - and so may overestimate reporting accuracy.

**Methods:** We extended analyses of data collected from 121 fourth-graders stratified by gender and race (Black, White): Each was observed eating two school meals on each of two days separated by >4 weeks, and interviewed the morning after each observation day about the previous day. Each child was interviewed twice, once per order (forward, reverse). Observed and reported items were arithmetically transformed to kilocalories, protein, carbohydrate, and fat.

**Results:** Correlations between observed and reported nutrients were 0.33, 0.37, 0.34, and 0.38 for kilocalories, protein, carbohydrate, and fat, respectively (all p's < .0001); these might be interpreted as indicating moderate

reporting accuracy. However, for each nutrient, match rate (matched/observed) was significantly lower than report rate (reported/observed); all p's < .0001. Original analyses of items found a significant order by gender interaction on omission rates (observed but not reported/observed): for boys, this was lower in reverse- than in forward-order interviews; for girls, there was no order effect. This result was found for all omitted nutrients.
**Conclusions:** Conclusions about the validity of dietary reports from analyses that arithmetically convert foods to nutrients without distinguishing between matches and intrusions may be misleading.

## 3 - 50585 Better off being poor but active and Body positive? body image, physical self-worth and sociodemographic influences on UK adolescent physical activity

*Anne Haase, Kate Markey - University of Bristol*

To understand the impact of body image and self-worth on adolescents' physical activity participation, this study investigated relations between body-related cognitions and affect (perceived body image (PBI), social physique anxiety (SPA), perceived self-worth (PSW)) and total activity participation in (TAI) and out (TAO) of school, along with the moderating effects of gender and socio-economic status.
From five UK schools, 294 adolescents completed questionnaires on PBI, SPA, PSW and physical activity (SPARKS). Past final exam grades determined SES for schools.
Results indicated boys participated in more activity ($t_{1,233}=4.38$, $p<0.001$) and have lower SPA levels ($t_{1,275}=-7.453$, $p<0.01$) and higher PSW levels ($t_{1,251}=4.14$, $p<0.01$) when compared to girls. Adolescents from lower social classes did more activity both in ($F_{2,76}=4.06$, $p<0.05$) and out ($F_{2,77}=5.03$, $p<0.01$) of school and had lower SPA ($F_{2,92}=9.08$, $p<0.01$) than those from higher SES schools. PSW, SPA and PBI predicted TAO for the whole population (SPA, $R2=.135$, $p<0.01$; PSW, $R2= .07$, $p<0.05$; PBI, $R2=.05$, $p<0.05$)}, while SPA determined TAI for girls ($R2=.11$, $p<0.01$).
Girls in higher SES groups were less active with more physique anxiety and lower PSW, possibly due to increased levels of social comparison in the higher SES groups. Promoting activity for girls from higher SES needs to be a primary focus through creating environments supportive of positive physical self-worth and healthy body image.

## 3 - 50593 Linking service and nutrition research: an aproach to community engagement in community based participatory research

*T. Elaine Prewitt - University of Arkansas for Medical Sciences; Beverly McCabe-Sellers, Earline Strickland, Margaret Bogle - United States Department of Agriculture; Edith Hyman - University of Arkansas at Pine Bluff; Bernestine McGee - Southern University and A&M College*

**Purpose:** This paper outlines how community service activities can evolve as a mechanism to identify and initiate community-based participatory research projects in diet/healthy eating.
**Background:** The Delta Nutrition Intervention Research Initiative (NIRI) is sponsored by the United States Department of Agriculture, Agricultural Research Service, to address nutritionally responsive problems of lower Mississippi Delta communities in Arkansas, Mississippi and Louisiana. The community-based participatory research (CBPR) model is the guiding framework for carrying out the Delta NIRI mission. Partnerships between academic institutions and community organizations in each state are conducting intervention research to address eating patterns, physical activity, nutritional health and chronic disease risk in rural communities. CBPR requires a strong academic-community partnership and, in particular, active involvement of the community in all phases of the research process. As part of initial efforts to broaden outreach and community awareness about healthy eating, the Arkansas NIRI initiated healthy eating service activities as a strategy to benefit the community.
**Methods/Key Points:** Service activities identified by community partners around healthy eating afforded shared learning, community capacity building, the identification of mechanisms for sustainability and a platform to initiate community-wide nutrition education campaigns. Taken together, service activities also provide foundation for community empowerment in nutrition research, including the design, implementation and dissemination of culturally appropriate evidence-based nutrition interventions in the community.
**Conclusions:** In the context of CBPR, service-related activities can be important in building requisite support for nutrition intervention research that potentially can be translated to benefit overall nutritional health of the community.

## 3 - 50596 Mapping the emergence of obesity in Scotland: a comparison of dietary intakes in 1902 and 2002

*Annina Burns - Oxford University*

**Purpose:** Obesity has become a major health concern in Scotland since nearly one-fifth of Scots are currently classified as obese (BMI>30). The purpose of this study is to understand how changes in diet and lifestyle have contributed to rising rates of obesity in the past century.
**Methods:** Food intake records for 15 Edinburgh families in 1902 were adapted to produce a modern dietary analysis, which was compared to food intake questionnaires of 622 Scots conducted by the UK government in 2002. Changes in food costs between 1900-2000 were tracked as possible explanations for dietary changes.
**Results:** The primary finding was that in 1902 the Scottish working-class consumed nearly twice as many calories as the average Scottish resident consumes today, an additional 1,500 calories. The second major finding was that the 1902 diet had half the amount of fat as the modern-day diet. Finally, qualitative evidence suggested that physical activity allowed a working-class man to consume 3,500 calories a day without gaining weight. In contrast, the average 2,093 calories consumed today are excessive given a sedentary lifestyle.
**Conclusion:** A historical understanding of dietary patterns and life habits may shed light as to why obesity has emerged. The preliminary findings of this study oppose the hypothesis that growing portion sizes have led to an emergent obesity epidemic in Scotland. Caloric consumption is lower today, but so is caloric expenditure, and fat intakes are higher, a combination which may produce higher rates of obesity.

## Notes

## Friday, June 17 – 15.30-18.00 – 2nd Balcony Grote zaal

## Poster session 4

Session/Nr:

### 4 - 50557 Assessing physical activity in adolescents with type 1 diabetes

*Ronald Iannotti, Tonja Nansel, Denise Haynie, Bruce Simons-Morton - National Institute of Child Health and Human Development; Leslie Plotnick, Loretta Clark - Johns Hopkins Medical Center; Linda Zeitzoff - Mt. Washington Pediatric Hospital*

**Purpose:** Physical activity (PA), one of four aspects of successful management of type 1 diabetes, is given insufficient consideration in assessments of diabetes self-management adherence (DSMA). The reliability and validity of parent and youth report of moderate (MPA) and vigorous PA (VPA), as assessed in a measure of DSMA, was examined.
**Methods:** The Diabetes Self Management Profile was administered to 168 parents and youths ages 10 to 16 with type 1 diabetes. A subsample of 23 youths ages 11 to 16 wore an accelerometer for two weekdays and a weekend day.
**Results:** Parent-child consistency on the self-report measure was greater for report of youth VPA than MPA. In the accelerometer subsample, twelve of the 23 youth engaged in MPA for 30+ min/day; nine of these youth engaged in 20+ min/day of VPA. Parent reports of frequency of youth MPA and VPA were significantly related to corresponding accelerometer counts of MPA and VPA, while the validity of youth report of VPA was marginally significant. Parent and youth report of team sport participation was associated with higher accelerometer counts. Youth report of VPA was associated with better glycemic control (HbA1c) in the larger sample; however, contrary to expectations, accelerometer-assessed MPA was associated with poorer glycemic control in the subsample.
**Conclusions:** Self-report of VPA appears be more valid than MPA. The relationship of PA to glycemic control may be complex. The importance of accurate assessment of PA in youth with diabetes is discussed.

### 4 - 50597 Personality, a determinant of physical activity and diet?

*Lando LJ Koppes - VU University Medical Center; Jan Snel - University of Amsterdam; Han CG Kemper - VU University Medical Center*

**Purpose:** This study is to investigate the relationships between seven personality characteristics and physical activity and dietary saturated fat intake in a non-clinical population.
**Methods:** In the participants of the Amsterdam Growth and Health Longitudinal Study, Personality (Dutch Personality Inventory, DPI), physical activity, and dietary intake behaviors were assessed twice, at the age of 32 and 36 years. Cross-sectional and longitudinal linear regression analyses were performed with the seven DPI sub-scales (Inadequacy, Social Inadequacy, Rigidity, Hostility, Self-sufficiency, Dominance, and Self-esteem) as determinants of physical activity (MET-min/week; assessed with a structured interview), and saturated fat intake (proportion of total energy intake; assessed with a structured interview).
**Results/Findings:** At age 32 years, the DPI sub-scale Self-esteem was positively related with the level of physical activity in men and women, whereas in women inverse relationships with physical activity were observed for the sub-scales Inadequacy and Social Inadequacy. Furthermore, in women only, a small but statistically significant positive relationship was observed between the sub-scale Rigidity and saturated fat intake. For the other DPI sub-scales no significant cross-sectional relationships were found. In contrast with the cross-sectional findings, none of the four-year changes in the DPI sub-scales were related to the four-year changes in physical activity or diet.
**Conclusions:** Self-esteem and, in women, (Social) Inadequacy are related to the level of physical activity. Rigidity is related to saturated fat intake (only in women). The absence of significant longitudinal relationships may be caused by the relative stability of the personality characteristics at this period in life.

### 4 - 50598 An application and extension of the theory of planned behaviour for understanding exercise intentions among individuals with diabetes

*Francois Boudreau - Université du Québec à Trois-Rivières; Gaston Godin - Université Laval*

The purpose of this study was to examine the relevance of the Theory of Planned Behaviour in understanding intentions to exercise among diabetic individuals (n = 489). The additional predictive utility of few psychosocial predictors was examined. The independent variables were entered in three successive blocks: (1) age and gender; (2) attitude, subjective norm, and PBC; and, (3) moral norms, role beliefs, anticipated regret, and descriptive norm. Controlling for age and gender (n.s.), the results of the hierarchical regression showed that attitude and perceived behavioural control explained 66% of the variance of intention ($P < 0.001$). Also, moral norms (Beta = 0.33) significantly increased the explained variance ($R2 = 0.06$, $P < 0.001$), the other determinants being attitude (beta = 0.17) and perceived behavioural control (beta = 0.49). In designing effective heath education interventions for diabetic individuals, health professionals should first favour the development of a sense of control over the behaviour.

## 4 - 50600 Representation and attachment of risk to others: a qualitative study of obese women's understanding of the health risks of obesity

*Jacqui Butt, Anne Haase - University of Bristol*

Raising awareness of obesity-related health risks is a key strategy in attempts to encourage people to change potentially damaging lifestyle behaviours. However, there is little evidence that knowledge of risk, as embodied in health education, influences the way in which the public perceives and responds to the risk associated with their lifestyle.

A qualitative study, based broadly on a phenomenological approach, was conducted to explore the health risk perceptions of obese women. In semi-structured interviews, ten women gave an insight to how their experiences, beliefs and attitudes give meaning to health risks. The interview method facilitates location of the findings within the social and cultural context in which they were understood and negotiated.

The main outcome of the study was that it failed to find an active risk assessment process. Knowledge of diseases linked to obesity was limited and confused. Importantly, none of the participants considered themselves obese or at risk of serious ill health. The term obesity was disliked and only attached to very fat people, whose lifestyle was characterised by greed and sloth. This obese 'Other' was deemed to be 'at risk'. In contrast, the participants' self-image and lifestyle had facilitated the construction of an identity of an overweight but safe 'Self', which made health warnings about obesity seem irrelevant.

It was concluded that health education campaigns based on risk threats are likely to perpetuate the stigmatisation of obesity and increase perceptions of invulnerability in people who are at risk.

## 4 - 50603 Community resource assessment: building community capacity for nutrition and physical activity intervention research

*Earline Strickland, Beverly McCabe-Sellers - United States Department of Agriculture; Edith Hyman - University of Arkansas at Pine Bluff; Bernestine McGee - Southern University and A&M College; T. Elaine Prewitt - University of Arkansas for Medical Sciences; Margaret Bogle - United States Department of Agriculture*

**Purpose:** To describe the methodological process used to access the availability and knowledge of nutrition resources in the rural delta communities.

**Methods:** Three rural communities, one each in Arkansas, Louisiana, and Mississippi, joined in a consortium with Agricultural Research Service (ARS) and ten university partners. Community-based nutrition programs and services were identified by the type and were available by sectors in each community. A General Organization Questionnaire and a Program Questionnaire were developed and used to solicit information on the availability of nutrition services in the communities they served. The Program Questionnaire was structured to obtain information on the type of nutrition programs and kinds of services provided in the community. Descriptions of kind and type of services were drawn from interviews.

**Results:** One hundred and thirty-eight organizations and agencies were surveyed. Seventy-eight service providers were interviewed and completed questionnaires describing the kind and type of nutrition services available. All three communities had one or more nutrition programs and services available, but these may not be well recognized within the community.

**Conclusion:** In the Delta NIRI intervention research, the information will be used to identify community assets, opportunities for nutrition interventions, and to monitor community changes over time. The information can be used by the community to build their assets, strengthen community resources, and build capacity to promote health through nutrition and physical activity interventions.

## 4 - 50604 Youth evaluation - web-based tools, data collection and impact reports for nutrition education & PA education programs

*Wells Willis - USDA, CSREES*

**Purpose:** To develop a standard set of age-appropriate evaluation tools that could be used to measure nutrition and physical activity knowledge, skills & behavior changes of youth receiving education programs on these topics.

**Methods:** Multi-state university teams identified the key-learning concepts to be included in the overall nutrition education programs, and developed evaluation tools to measure knowledge gained & behaviors changed as a result of the educational intervention. Tools were subjected to a variety of tests during formative development, followed by pilot testing in multiple states and for multiple delivery & implementation strategies. Testing included sample groups who did not receive the intervention compared to those who did.

**Results:** Sets of instruments have been developed and tested for use with pre-school and early elementary school-aged children, which can be used in group settings, or for individuals.

**Conclusion:** A web-based respository has been created, which allows users to search for relevant tools, review tool

development documentation, download the tool, and then capture the results from students, compute & print impact reports. The end-product will be demonstrated. Broad use of this resource will facilitate comparisons between various programs and allow for the inclusion of additional tools for other ages, programs and countries.

## 4 - 50605 A picture is worth a thousand words for describing eating patterns

*Jeff Gossett, Pippa Simpson, Chan-hee Jo – UAMS; Kathy Yadrick – USM; Cathy Champagne – PBRC; Margaret Bogle - USDA ARS*

**Purpose:** To show how new graphical capabilities in available software impact investigation of interrelationships of nutrients and foods.
**Background:** A summary table of many nutrients and foods of interest for several different demographic groups can be difficult to digest. The information in the new graphical representations possible today is much easier to swallow. Edit checks, checks of model assumptions and displays of eating habits can be concisely summarized in a graph that is easy to understand.
**Methods:** Since nutrition data is multivariate, we need creative ways to display data simultaneously to visualize interrelationships. We show how trellis plots help to identify data entry errors and outliers in one survey. We display the Healthy Eating Indices in a survey and the percentage that meet the Dietary Reference Intakes (DRI) for 12 different nutrients and overlay the results of different subgroups (black-vs.-white, low-vs-medium-vs-high income, male-vs.-female, and so forth).
**Conclusions:** Although modeling allows adjustment for other variables, checking assumptions of modeling and understanding relationships with the aid of graphs is an essential component to truly describing eating patterns.

## 4 - 50607 Québec's model to curb the obesity epidemic

*Lyne Mongeau - Institut national de santé publique du Québec*

**Purpose:** This paper describes the intervention framework developed by the public health sector of the province of Québec, Canada. This model was derived from the socio-political model of action implemented in Québec for tobacco control.
**Background:** Obesity is growing in Québec as it is elsewhere. Considering obesity's potential burden on health services, the public health sector needs to implement a vigorous action plan to curb this growing prevalence. Due to the success of the tobacco control coalition in the introduction of a law, we have examined ways to adapt the tobacco model to obesity.
**Methods/key points:** The Association pour la santé publique du Québec, a non-profit organization, carried out a project which comprised the following steps: 1- A mapping of three sectors: agri-food, built environment and socio-cultural (media, publicity, fashion) 2- focus groups and interviews with informants from these sectors 3- process analysis. This material and discussions with the anti-tobacco sector resulted in a socio-political model of action based on the synergy of several constituents: the public health sector, a coalition of grassroots organizations, and individuals. Very precise mechanisms and conditions have to be implemented for this model to work efficiently and to strive towards success. The tobacco crisis and the obesity epidemic share many similarities but present several differences that have to be considered in the development and application of the model.
**Conclusion:** The model has yet to be implemented and evaluated but its innovative features are useful to be shared with other countries.

## 4 - 50609 Perceptions of the public, public health actors and society's decision-makers towards environmental interventions for the prevention and reduction of weight related problems in Québec, Canada

*Marie-Claude, Lyne Mongeau - Institut national de santé publique du Québec*

**Purpose:** This study sought to explore perceptions regarding environmental interventions of the public, public health actors and decision-makers from diverse sectors of society (business, municipal, community, and education). Three areas were explored: perceptions of the causes of obesity, perceptions of its importance, and perceptions of environmental interventions. While some studies have explored perceptions of obesity, few focused on adult obesity, explored specific interventions, or included decision-makers.
**Methods:** This study used a quantitative survey and forums inspired by citizen participation approaches. A representative sample of Québecois (n=1000) were surveyed. The questionnaire included a total of 22 questions of which 15 focused on specific interventions. The forums were held in five regions of Québec, the participants (15-50 per forum) originated from public health departments, school boards, agri-food sector, municipal. The forums sought to inform participants on obesity and on environmental interventions, and to collect participants' opinions though small group discussions. Discussions were taped and content analysed.

**Results/Findings:** Data suggest that obesity is perceived about equally as an individual and as a collective issue. However, questionnaire responses and discussions reflect inconsistencies between people's perceptions of the problem and the solutions proposed. People's stance that obesity is a collective issue did not directly translate into their support for environmental interventions. As could be expected, greater support was shown for interventions that targeted children and that offered greater options rather than restrictions, while less support was found for legislation and taxation.
**Conclusion:** More research and conscientization is needed before environmental interventions can be implemented successfully.

## 4 - 50610 Scientific sampling in small rural community participatory research

*Pippa Simpson, Chan-hee Jo, Jeff Gossett – UAMS; Ross Santell - Alcorn University; Beverly McCabe-Sellers, Margaret Bogle - USDA / ARS*

**Purpose:** To adapt and modify scientific sampling appropriately in a community participatory setting.
**Background:** Choosing a sample is governed by feasibility and purpose. Feasibility in turn is affected by the available sample, the personnel, time and cost constraints and how collection of the sample might affect interventions. In small rural communities it may not be possible to collect a random sample which is representative of the whole community and acceptable to the community. Exclusion of volunteers may impact recruitment.
**Methods/key points:** Possible adjustments to traditional sampling methodologies are discussed, including a mixed sampling strategy of random sampling and convenience sampling of interested community participants. The pros and cons of sampling schemes are given covering recruitment, involvement, cost, time and analysis. Communities in the Lower Mississippi Delta are used to illustrate the constraints that exist in participatory research.
**Conclusions:** Throughout design of a study the interrelationship of objectives, methods and analysis needs to be considered. In community participatory research these interactions become more complex due to the multi-interventional components and the changes in the community over time. We will show that modifications to sampling techniques should be used.

## 4 - 50611 Attitudes, treatment practices, and public policy concerns regarding obesity: a survey of rural and urban Louisiana physicians

*Catherine Champagne, Donna Ryan, Raymond Allen - Pennington Biomedical Research Center; Margaret Bogle - USDA/ARS/ Delta NIRI*

**Purpose:** The purpose of this study was to survey physician knowledge, attitudes and treatment practices regarding obesity and its control.
**Methods:** Primary care physicians (PCPs) were surveyed in one urban and 13 rural parishes in Louisiana. Of 993 mailed questionnaires, 218 were returned. Of PCPs, 74% were male. Mean reported BMI was 26 (range 16.6-42.1) for males and 24.5 (range 17-42) for females. There were 55% urban, 84% Caucasian and 84% with annual income >$100,000.
**Results/Findings:** Almost 90% of PCPs asserted obesity as a major risk factor for chronic disease and the leading cause of preventable death and 84% agreed that obesity was a disease like hypertension or diabetes. However, 41% did not find current guidelines for obesity management practical or useful and 39% did not encourage the use of the Food Pyramid or Dietary Guidelines for Americans. Treatment practices for obesity rarely included use of meal replacements (2%). FDA-approved medications were never used by 32% and only routinely used by 15%. Strong agreement was voiced by 49% for policies targeting school snack concessions, by 44% for regulating food ads, and by only 18% for taxing unhealthy foods. Most striking was the physicians' lack of support for government involvement in obesity discrimination (6% strongly agreed) and extending disability to the obese (13% strongly agreed).
**Conclusions:** Our findings point to the need for continuing education for PCPs in assessment and intervention for obesity. If physicians are to support policy measures to fight obesity, their supportive attitudes must be strengthened.

## 4 - 50612 Tracking of physical activity, diet and body weight

*Lando LJ Koppes, Jos WR Twisk - VU University Medical Center*

**Purpose:** Tracking is the general term to indicate the (relative) stability of a factor in time. Each year, several publications about tracking of cardiovascular risk indicators such as physical (in)activity, diet and body weight appear. This study is to investigate tracking of physical activity, dietary intake, and body weight in a non-clinical population, and to use these findings to discuss the validity of used interpretations of tracking findings.
**Methods:** In the men and women of the Amsterdam Growth and Health Longitudinal Study, physical activity,

dietary intake, and body weight were assessed eight times between the age of 13 and 36 years. In these extensive longitudinal data, correlation coefficients and the proportion of subjects remaining in the high-risk quartile are calculated for the three variables of interest.

**Results:** Tracking coefficients for physical activity and dietary intake were much smaller than those for body weight.

**Conclusions:** The smaller tracking coefficients for physical activity, dietary intake are not only caused by the greater stability of body weight, but also by the smaller measurement error for body weight. Differences in measurement error should therefore be taken into account when interpreting tracking coefficients. The relatively low stability of physical activity and dietary intake should not be interpreted in a way that improvements in these behaviors can be achieved. Something unstable may not be changeable at all. Findings of tracking research, however, can be used in designing intervention studies, and in estimating the chances for an individual to have risk values in the future.

## 4 - 50613 Lessons learned - how to implement a successful nutrition education program that achieves behavior changes in low income audiences

*Wells Willis - USDA, CSREES*

**Purpose:** To share the key features of the Expanded Food and Nutrition Education Program (EFNEP) which has achieved remarkable behavior change related to dietary quality, physical activity, food resource management and food safety for 36 years.

**Background:** A strong research base provides the foundation for, and maintains the quality and integrity of the experiential education program. Using many educational theories and implementation designs, including Social Cognitive Theory, Stages of Change, Facilitated Discussion and experiential learning within the context of an integrated curriculum and reinforced messages have been instrumental in its success.

**Key points:** This program, which is funded at a level of approx. $60 million/year, has reached millions of low income youth and adults thru peer educators and volunteers. The multi-lesson series allows for the introduction of key skills, with opportunities to practice them in the class setting and at home. Subsequent lessons reinforce the learning, and add new concepts. An evaluation component is integral to the program, providing feedback to clients and measuring impact, thus assuring accountability and continued improvements over time. As a result, adult graduates achieve the following impacts: 84% improve food resource management, 88 % improve nutrition practices, 67 % improve food safety and 9% improve diet quality.

**Conclusion:** This program can be adapted for use in other countries. Curricula already exist in multiple languages, adapted for the food culture of the participants. Short video clips will illustrate the key components of the delivery and accomplishments of participants.

## 4 - 50615 Effects of a school-community walking intervention on year-long walking and biking to school

*Dianne Ward, Sarah Ball, Kathryn Ahlport, Laura Linnan, Kelly Evenson, Diane Catellier, Amber Vaughn - UNC*

**Purpose:** Healthy People 2010 objectives include recommendations on increasing walking and biking to school. This study compared children s active travel (AT) to school after an intervention which was either participation in National Walk to School Day (WTS) or WTS Day participation along with a local coalition that sponsored walking events and safety trainings (WTS+).

**Methods:** Two North Carolina schools participated in a 2-year feasibility study examining the effects of a behavioral/environmental intervention on rates of AT to school. Travel to and from school were assessed through a week-long, daily travel instrument administered in September 2003 (N=347) and again in March 2004 (N=344) to 4th and 5th grade students. Children were classified based on their travel mode during the week: no active travel (no AT), occasional AT (1 trip/week), frequent AT (2 to 5 trips/week) or regular AT (>5 trips/week).

**Results:** McNemar s test for significance showed a difference in AT patterns at follow-up ($p<.0001$). The no AT group decreased by 32% (153 vs. 104) in the WTS+ school and 5% (130 vs. 123) in the WTS school. The number children classified as frequent or regular AT users increased 2-fold in the WTS+ school (10 to 20) compared to 18% in the WTS school (34 to 40) at follow-up.

**Conclusions:** Preliminary results indicate that modest efforts by a school-community group to promote safe walking may have a significant impact on the number of children using AT modes to/from school. More intervention research on promoting active travel to school is needed.

## 4 - 50619 Who walks to school and why?

*Natalie Colabianchi, Jacqueline Charvat, Erika Trapl, Elaine Borawski - Case Western Reserve University*

**Purpose:** Walking to and from school has been promoted as a way to increase physical activity. However, little is known about which students walk to school and why. In order to increase the number of students who walk or bike to school, we must understand the barriers that prohibit students from doing so.
**Methods:** Students enrolled in three diverse urban middle schools were included (N=1432). Cross-sectional information about the walking behavior of 7th and 8th grade students was collected using Personal Digital Assistants.
**Results:** On average, 45% of students walked to school and 57% walked home from school. Statistically significant differences existed by race/ethnicity. A dislike for physical activity was rarely cited as a reason for not walking to school. Rather, lack of time and lack of parental permission accounted for more than 50% of the reasons given for not walking to school. Those that walked or biked to school had different concerns than those who traveled to school by other means (e.g., bus, car). For example, distance and danger from cars were more likely to be reported as a concern by students who current do not walk to school. Weather was frequently mentioned as a barrier regardless of whether or not the student walked to school.
**Conclusions:** Although several of the barriers of walking to school are not modifiable (i.e., weather), other barriers could be addressed. Modification of such barriers may result in an increased prevalence of students walking and biking to school.

## 4 - 50620 Considering the influence of friendships in physical activity participation among Thai adolescents

*Randy Page, Jerry Taylor, Len Novilla - Brigham Young University; Jiraporn Suwanteerangkul - Chiang Mai University*

**Purpose:** The influence of friendships is a neglected area of investigation in studies of youth physical activity. This study investigated the degree to which three friendship variables (ability to make friends, level of involvement with friends, perceived friends involvement in exercise/physical activity) was associated with physical activity participation in a sample of Thai adolescents.
**Methods:** Students in ten secondary schools in Chiang Mai Province, Thailand (n= 2,519) completed a health survey which included items assessing ability to make friends, level of involvement with friends, and perceived friends involvement in exercise/physical activity. The survey also included measures of self-reported physical activity and sports team participation.
**Results:** Results showed that overall participation in physical activity was lowest among adolescents who said that making new friends was difficult, who were less involved with friends, and who reported that no or only some of their friends participated in exercise/physical activity. Conversely, adolescents who said that making new friends was easy, who were more involved with friends, and who reported that most or all of their friends were physically active were more likely to engage in physical activity themselves. Although physical activity participation among girls was lower than boys, the association between the three friendship variables and participation in physical activity was found for both boys and girls.
**Conclusion:** The results of this study suggest that behavioral scientists should give serious consideration to including friendship skill-development strategies in the mix of strategies currently used to improve participation in physical activity.

## 4 - 50623 Initiating physical activity in the face of challenging lifestyle change: a post-natal exercise intervention to encourage adherence

*Anita Gardner - University of Waterloo, Lawrence Brawley - University of Saskatchewan*

**Purpose:** While post-natal exercise is encouraged for health, mothers face challenging, new behavioural patterns reflecting major changes in their daily schedules. Sleepless nights, unregimented feeding, and physical changes potentially constrain exercise among committed participants (Godin et al, 1989). While recent post-natal exercise studies demonstrate promising physical outcomes, few examine theoretically-based cognitive-behavioral exercise interventions addressing post-natal challenges. We compared programs of short-term, usual care post-natal exercise (SE) to a group-mediated cognitive behavioral exercise (GMCB). The GMCB was framed in social-cognitive theory and group dynamics.
**Methods:** This two arm, randomized eight-week intervention study compared GMCB and SE treatments on changes in outcomes of weekly minutes of physical activity and self-regulatory (scheduling) efficacy. Fifty-seven post-natal women were randomized to treatments, then engaged in four weeks of intensive, group-led exercise followed by four weeks of independent home-based activity. Outcomes were assessed using the 7 day physical activity recall and a published measure of scheduling efficacy.
**Results:** ANCOVA using baseline scores as covariates revealed that the GMCB had superior minutes of activity

post-intensive and post home-based phases (p<.05). ANOVAR revealed a time by treatment interaction (p<.05) for scheduling efficacy. Efficacy for GMCB mothers was sustained while that of SE mothers declined.
**Conclusion:** Providing post-natal women exercise training plus GMCB counseling about exercise self-regulatory skills enhances independent exercise adherence and sustains planning/scheduling efficacy beliefs more than usual care post-natal exercise. GMCB intervention generalizability for post-natal and special populations is discussed.

## 4 - 50631 Testing theory based physical activity interventions for older adults at congregate mealsites

*Paul Estabrooks - Kaiser Permanente; Mike Bradshaw, Stacy Toner - Kansas State University*

**Purpose:** To determine the potential impact, using the RE-AIM framework, of two physical activity (PA) programs.
**Methods:** Six congregate mealsites for seniors were randomized to receive a 3-month group dynamics (GD) or standard care social cognitive (SC) PA intervention. Participants (n=122) completed social cognitive measures and the CHAMPS PA survey at baseline, post intervention, and 6-months follow-up.
**Results:** Adoption-All eligible sites contacted participated in the study. Reach-three quarters of the seniors completed baseline assessments and 54% attended at least one intervention session; those who did not were more likely to be men but did not differ on other study variables. Effectiveness-GD elicited higher attendance (54%; $F(1,121)=5.43$, $p<.05$) than SC (38%). Group cohesion partially mediated GD effects on attendance ($R2=.13$, $F(3,95)=4.61$. $p<.01$). Intention to treat analysis demonstrated no time or condition effects on energy expenditure. Implementation was operationalized as participant receipt of intervention contacts and by completing a repeated measures ANOVA on participants who attended at least 1 intervention or control session we found a significant time effect indicating participants in both conditions significantly increased weekly energy expenditure ($F(1,86)=8.64$, $p<.01$). Further, the proportion of sessions attended was significantly related to increased energy expenditure ($r=.28$, $p<.05$). Maintenance-The time effect was not sustained 6 months following intervention completion. GD did not show a relative advantage over the SC and in each case effects were not sustained over time. The data also suggest a potential dose-response related to exposure to intervention sessions.

## 4 - 50632 Consistency of self-determined motives for exercise in a sample of active young women

*Geeta Vadgama,Wendy Rodgers - University of Alberta*

**Purpose:** This study examined the consistency motives and their relationship to self-reported exercise behaviour in a sample of physically active young women. Methods: Eighty-eight women (mean age 24.36) participated in a 12 week exercise program. They completed the behavioural regulation in exercise questionnaire - assessing motivation based on self-determination theory - at the beginning, in the 6th and 12th week of the program. They also reported on their overall activity levels. Results: The mean reported activity levels increased at each time point (ES=.18). Motive levels also changed significantly over the program, with non-linear patterns of external and introjected regulation and non-significant increases in identified and intrinsic motivation. Exercise levels (mets) were positively predicted by intrinsic motivation ($R2=.24$) at the outset and negatively by extrinsic motivation ($R2=.12$)at week 12. Conclusions: Specific motivation for exercise appears to shift in this sample of active women, though remain largely supported by a strong indication of internal self-regulation, consistent with self-determination theory.

## 4 - 50633 Changes in antioxidant and free radical capacity of middle-aged men after a physical conditioning program and vitamin supplementation intervention

*S.J. Moss, F.H. van der Westhuizen, S.J. Herbst, Rumada Nel - North-West University*

**Purpose:** The purpose was to determine changes in antioxidant and free radical capacity in males with a physical conditioning and vitamin supplement intervention. This study will contribute to resolving the mechanism/s through which physical activity and nutrition prevents cardiovascular diseases.
**Methods:** A randomised, placebo-controlled, blinded crossover study design was used. Men between 45 and 60 years were recruited (n=75). The subjects were randomly equally assigned to one of 4 groups (A, B, C or D). Three of the groups were crossed over according to the Latin square design and group D as the control group. Measurements were taken before and after each intervention, after which a 6-week washout period followed. Dietary vitamin intake was determined by a food frequency questionnaire. Free radical capacity and antioxidant capacity was measured in the blood. The physical conditioning intervention consisted of a 12-week cardiovascular program of 20 - 30 minutes of aerobic activity at 70 - 80% of VO2max. The vitamin supplement intervention consisted of tablets containing 12,5µg vitamin B12 and 200 µg folic acid.
**Results:** The baseline results indicate that the oxidative stress of the subjects is very high according to Diacrom International. Results of the intervention indicated slight changes in the oxidative stress due to physical conditioning

with the best results obtained in the combination of vitamin supplementation and physical conditioning.
**Conclusion:** Men aged 45 to 60 years with three ore more coronary risk factors are in a pro-oxidant state. Supplementation of vitamins helps reduce this state. When vitamin supplementation is combined with a physical conditioning program, the outcome is enhanced.

## 4 - 50636 Prevalence of physical activity and sports team membership among Texas 4th, 7th, and 11th graders

*Steven Kelder, Deanna Hoelscher, Cristina Barroso - University of Texas Health Science Center at Houston*

**Purpose:** To examine the Texas statewide prevalence of physical activity and sport team membership among representative samples of 4th, 8th, and 11th grade children.
**Method:** The Survey of Physical Activity and Nutrition (SPAN) was designed as a surveillance tool for states to monitor BMI, physical activity and nutrition at 3 grade levels. Probability sampling ensured adequate representation by gender and race. In Texas, demographic and physical activity data were collected using a validated survey instrument in 2000-2002. Probabilistic sampling weights were computed with a post-stratification sampling weight adjustment based on gender/race distribution in Texas. The sample included 15,173 children in grades 4 (mean age = 9.7 years, n = 6,235), 8 (mean age = 13.7, n = 5,362) and 11 (mean age = 16.7, n = 3,576).
**Results:** At 4th grade, in the past day, 83% engaged in vigorous PA, 53% in moderate PA, 55% attended PE 3+ days per week; 75% played on 1+ school sport teams; 24% watched 3+ hours of TV. At 8th grade, 80% reported 3+ days/week vigorous PA, 55% moderate; 66% attended PE 3+ days per week; 52% played on 1+ school sport teams; 49% watched 3+ hours of TV/day. At 11th grade, 71% reported 3+ days/week of vigorous PA, 55% moderate; 35% attended PE 3+ days per week; 51% played on 1+ school sport teams; 32% watched 3+ hours of TV/day.
**Conclusion:** Results indicated considerable room for improvement in physical activity behaviors and large variation by race and gender within and across grades.

## 4 - 50637 Food consumption patterns of children in 4th, 8th and 11th grades in Texas

*Deanna Hoelscher, Adriana Perez, Henry Shelton Brown, Steven Kelder - University of Texas School of Public Health*

**Purpose:** The purpose of this study was to examine differences in self-reported food consumption at various grades/age groups in a stratified multistage probability sample of school children in Texas (the School Physical Activity and Nutrition survey).
**Methods:** Demographic and food pattern data were collected using a validated survey instrument in 2000-2002. Probabilistic sampling weights were computed with a post-stratification sampling weight adjustment based on gender/race distribution in Texas. The sample included 15,173 children in grades 4 (mean age = 9.7 years+0.028, n = 6,235), 8 (mean age = 13.7+0.028, n = 5,362) and 11 (mean age = 16.7+0.051, n = 3,576). Odds ratios were computed and trends by grade level determined using multivariate logistic regression.
**Results/Findings:** Increasing statistically significant ($p<0.05$) linear trends for grade (i.e., intakes greater for 11th grade students compared to 4th and 8th grade students) were noted for hamburgers/meats; gravy; cheese; breads/buns/rolls; beans; and sweet rolls, while decreasing linear trends were found for peanuts/peanut butter; milk; yogurt; cereal; fruit; and frozen desserts. Increasing significant quadratic trends were found for French fries; decreasing quadratic trends were noted for rice/pasta. No significant differences by grade were found for fried meats and vegetables. No significant differences were found for breakfast consumption, meals consumed, or vitamin intake by grade, although there was an increasing trend for snack consumption.
**Conclusions:** Interventions in children should reinforce or introduce different food messages depending on the age of the child.

## 4 - 50642 Development and evaluation of an instrument to measure psychosocial constructs in an osteoporosis prevention study for adolescent girls

*Deanna Hoelscher, R. Sue Day, Steven Kelder - University of Texas School of Public Health; Albert Hergenroeder - Baylor College of Medicine; Jerri Ward - University of Texas School of Public Health*

**Purpose:** This paper describes the development and evaluation of an instrument to assess psychosocial constructs related to calcium consumption and physical activity in adolescent girls.
**Methods:** Constructs measured by the questionnaire included: calcium knowledge; PA/osteoporosis knowledge; stages of change for milk consumption and jumping activity; PA self-efficacy; self-efficacy for consumption of calcium-rich foods; expectations for consumption of calcium-rich foods; and PA expectations. The instrument was evaluated for reproducibility using 6th grade girls (92% White, n= 93), with duplicate administration of questionnaires 11 days apart. Reproducibility was evaluated using percent agreement or Spearman correlations.

**Results/Findings:** For knowledge, agreement ranged from 60.9 to 90.2%; correlations ranged from 0.31 to 0.63. For staging questions, agreement ranged from 62.5% to 85.4%, with correlations from 0.44 to 0.70. Correlations for expectation items for calcium-rich foods ranged from 0.42 to 0.70, while items for PA ranged from 0.42 to 0.67. Self-efficacy items had lower overall correlations (0.14 to 0.82) compared to other questions. Evaluation of the PA self-efficacy and calcium consumption self-efficacy scales using 718 girls from baseline IMPACT found Cronbach s alpha values of 0.87 and 0.65, respectively.
**Conclusion:** This instrument has demonstrated reproducibility and validity for assessing intervention changes in psychosocial constructs in studies to increase calcium consumption and weight-bearing PA.

## 4 - 50643 Do Bangkok school children face the problem of hyperlipidemia ?

*Chutima Sirikulchayanonta, Suwat Srisorachat - Mahidol U*

**Purpose:** 1.To determine serum lipid profile among Bangkok primary school children. 2.To identify risk factors and their association with child lipid profiles.
**Methods:** The cross-sectional study was carried out in 4 primary schools in Bangkok Metropolitan from July 22 - August 2,2004. Fasting blood samples were collected and sent for lipid profile analysis by enzymatic methods. Food frequency questionnaires were taken.
**Results :** There were 1,028 children, aged 6 - 12 years old, voluntarily participated in the study. The proportion of male and female were 52 and 48%. The nutritional status of normal , over and under were 55.6,41.2 and 3.1% respectively. The mean Total cholesterol (TC) = 194.8 +/- 27.7, Triglyceride (TG) = 86.5 +/- 31.5 , Low density lipoprotein cholesterol (LDL-C) = 125.9+/- 26.3 and High density lipoprotein cholesterol (HDL-C) = 51.6 +/- 8.4 mg/dl. There were 39% that had hypercholesterolemia (TC >/=200 mg/dl) as well as 40% had high LDL-C level (>/=130 mg/dl).High TG ( >/= 150 mg/dl) were 5.4%. There was no association between lipid profiles and age, gender as well as nutritional status except higher TG level were found among obesity children than others (P< 0.05). The most popular high fat diet was fried chicken , sausage and cakes respectively.
**Conclusion:** Build up discipline in healthy eating habits, food choices and physical exercise should pave the way to healthy Thai kids with better quality of life.

## 4 - 50647 Screening for physical activity in family practice: evaluation of two brief assessment tools

*Ben J Smith - University of Sydney; Alison L Marshall - University of Queensland; Nancy Huang - Victorian Council on Fitness and General Health*

**Purpose:** This study addressed the need for an efficient and accurate assessment to identify patients in need of physical activity interventions in family practice.
**Methods:** 28 physicians assessed the physical activity of their patients using either a two (2Q) or three-question (3Q) assessment. This was administered again 3 days later by an exercise physiologist to evaluate inter-rater reliability. Concurrent validity was evaluated by comparison with the Active Australian Questionnaire, and criterion validity by comparison with 7-day accelerometer counts.
**Results:** 509 patients were recruited with 467 (91.7%) completing a repeat assessment or accelerometer monitoring. The brief assessments had moderate inter-rater reliability (2Q k= 58.0% (95% CI 47.2-68.8%), 3Q k=58.0% (95% CI 46.8-69.2%)), fair to moderate concurrent validity (2Q k=46.7% (95% CI 35.6-57.9%), 3Q k=34.9% (95% CI 22.7-47.1%)) and poor to fair criterion validity (2Q k=18.2% (95% CI 3.9-32.6%), 3Q k=31.4% (18.4-44.4%)) for identifying patients as sufficiently active. Median minutes of physical activity measured by accelerometer increased significantly across a 4 level of index of physical activity derived from the assessments. THe assessments took 1-2 mins to complete.
**Conclusion:** Both assessment tools were feasible to use in family practice and were suitable for identifying the least active patients. Each assessment had reasonable agreement with a longer physical activity questionnaire, but compared with an objective measure their ability to correctly classify patients as sufficiently active was modest.

## 4 - 50650 Dietary diversity and school age nutrition in north western Morocco

*Youssef Aboussaleh, Ahmed Ahami - Ibn Tofail University; larbi Alaoui - IAV Hassan II*

**Purpose:** Morocco is undergoing nutrition transition while children are still suffering from a heavy burden of many micronutrient deficiencies and stunting and the risk of chronic diseases.Dietary diversity is used alternatively for the assessment of diet quality and food security. The aim of this work is to assess dietary diversity and its relationship to anemia and stunting in school age children in the province of Kenitra.
**Methods:** Overall 263 pupils were administred a food frequency questionnaire ( FFQ). A health team evaluated the anthropometric status and blood haemoglobin levels.Dietary diversity was estimated by a dietary score ( DDS) based

on the number of food categories consumed over week, and a weekly frequency index ( WFI) whiche express the whole frequency of food intake.
**Results:** Both indexes are significantly associated with severe anaemia. The risk of stunting is greater in rural areas when undesirables foods ( sweeties) are excluded from the SDA index. Milk is a major predictor od dietary divesity. Moreover both dietary diversity indexes are associated with mother and father education.
**Conclusion:** Children diversify globally their food intake but the nutrition quality lacks at most.School nutritional educational programms based on nutrition guidlines are needed in Morocco.

## 4 - 50654 Some but not all sedentary leisure time activities predict overweight/obesity in US children and adolescents; findings from NHANES IV, 2001-2002

*Iris Lee - Univesity of Illinois; J. Michael Murphy - Massachusetts General Hospital*

**Purpose:** The current paper explores the link among overweight/obesity, self reported caloric intake, daily physical activity, and sedentary leisure activities by using the most recent National Health and Nutrition Examination Survey (NHANES IV, 2001-2002).
**Methods:** Information was gathered from interviews with 1275 6-11 year old children and 1982 12-18 year olds who participated in the NHANES IV.
**Results:** Overweight/obesity showed a significant positive linear relationship to total caloric intake in children aged 5-11 but not in adolescents 12-18. For TV and/or video watching however, the relationship was positive, linear, and statistically significant for teens with a non significant trend in the same direction for younger children. Adding in hours of computer time made the patterns unclear and non significant. In the sample, physical activity data were available for teens but not younger children. Physical activity data showed an even more mixed and highly divergent pattern than computer/video data, with opposite curvilinear relationships for moderate and vigorous activities.
**Conclusion:** The data from the current study do not provide much support for the eat less, exercise more recommendations of the CDC and other health authorities. Only TV/video watching showed a significant relationship to overweight obesity in younger children and a trend in the same direction for teens.

## 4 - 50655 Hunger and food insecurity in children attending a low-income neighborhood health center: validation of a single question screening tool

*Ronald Kleinman - Massachusetts General Hospital/Harvard Medical School; Kristin Wieneke, Sheila Desmond - Massachusetts General Hospital; Andrew Schiff - Project Bread/The Walk for Hunger; Jennifer Gapinski - Massachusetts General Hospital; J. Michael Murphy - Massachusetts General Hospital/Harvard Medical School*

**Purpose:** To examine the validity of a brief screen for hunger, administered in a primary health care setting, as the first step in an intervention to reduce the prevalence of hunger in low-income children.
**Methods:** A single question screen to identify families experiencing recent hunger was created and offered to the parents of all patients seen in an urban neighborhood pediatric clinic over an eleven-month period (1847 screens). In-depth personal interviews asking standardized questions about hunger, food program use, food intake, and health were completed with 137 parents.
**Results/Findings:** The brief hunger screen had a high and statistically significant degree of accuracy when compared to the USDA Food Security Measure (83% sensitivity, 80% specificity). The hunger screen also showed significant time-to-time reliability (75%). Of the families identified as hungry" approximately only 50% used Food Stamps, 70% were enrolled in WIC, 60% used school meals, and 50% accessed community-based food resources. At the end of the demonstration project the clinic staff expressed satisfaction with and recommended the continuation of hunger screening.
**Conclusions:** A brief screen for hunger can be incorporated relatively easily into a primary care pediatric setting. The single question screen has good sensitivity, specificity, and reliability. Among families screened as hungry, no food programs were fully utilized, suggesting that the prevalence of hunger could be reduced in this setting through increased use of existing programs. These findings suggest that screening for hunger could become an important addition to routine pediatric care in low-income areas.

## 4 - 50658 Early infant diet and risk of type 1 diabetes mellitus in Belgrade children

*Sandra Sipetic, Hristina Vlajinac - School of Medicine, Belgrade University*

**Purpose:** The aim of the study was to investigate whether infant diet is associated with the development of type 1 diabetes.
**Methods:** A case-control study was conducted in Belgrade during the period 1994-1997. A total of 105 recently onset diabetics (up to 16 years old) were compared with 210 controls chosen among children with skin disease (the first

control group). Cases and control were individually matched by age (+/- one year), sex and place of residence. Eighty-six diabetic children were also compared with their brothers/sisters (the second control group).
**Results:** According to univariate logistic regression analysis, when cases were compared with the first control group, the risk of type 1 diabetes was greater for children who were breast-fed for < 4 months (OR = 2.09, 95% confidence interval: 1.30, 3.36), and who received cow`s milk at < 5 months of age (OR= 3.39, 95% confidence interval: 2.04, 5.66). According to univariate analysis when cases were compared with their relatives, only early introduction of supplementary milk was associated with a higher risk for diabetes (OR = 5.75, 95% confidence interval: 2.91, 11.36). After adjustment for variety of confounding variables infant diet was not independently associated with diabetes.
**Conclusions:** The results obtained do not support the hypotheses that infant diet is related to the occurrence of type 1diabetes.

## 4 - 50662 Knowledge and conceptions of health behaviour in 12-year old Swedish schoolchildren impact of a health educational programme

*Li Lindberg, Lars Rydén, Agneta Ståhle - Karolinska Institutet*

**Background:** The Swedish Heart Lung Foundation initiated a program An adventure with Pelle Pump (APP), aiming to foster an active lifestyle, healthy food habits and non-smoking thereby preventing future ill-health in 10-year old Swedish schoolchildren. APP consists of a free of charge study kit offered to all fourth graders in Sweden. It comprises a teacher manual and booklets including theoretical and practical material on heart- lung function and healthy behaviour for the children. Since its initiation 4 years ago >300 000 children have participated. Aim To evaluate the impact of APP by comparing conceptions and knowledge on health behaviour in a sample of APP children, who participated 2 years earlier and an age matched cohort of non-APP serving as controls.
**Methods:** A questionnaire based on the APP material was answered by a random selection of 1 422 children from different social classes and living conditions (APP = 523; non-APP = 846). Moreover 16 children (APP = 7; non-APP = 9) were interviewed in depth on their conceptions of health behaviours.
**Results:** APP children had a higher level of knowledge. APP children considered a healthy behaviour important in order to avoid future risk whereas the behaviours of non-APP children rather were triggered by to get immediate advantages .
**Conclusion:** The program An adventure with Pelle Pump caused participating children to acknowledge the future importance of health and healthy behaviour and improved their knowledge on useful healthy habits.

## 4 - 50674 New candidate anthropometry indicator for cardiovascular risk factors in Thai adult

*Lakkana Thaikruea - Faculty of Medicine; Surangsri Seetamanotch, Wiwat Seetamanotch, Teeraporn Sodabunlu - Talang hospital*

**Purpose:** A new height indicator (HI; height in centimeter minus weight in kg) has been proposed to be used interchangeably with BMI due to its simplicity. We aim to examine the relationship between HI and cardiovascular risk factors (CVR) in Thai adults.
**Methods:** 126 out of 387 teachers at least 35 years of age residing in Phuket participated in the study. A self-administered questionnaire was completed, and physical examination, measurements of weight , height, and blood pressure, and blood drawn for lipid profile were performed.
**Results:** Cut-off levels of BMI and HI were e 23 kg/m2 and e 95, respectively. Correlation coefficient of BMI and HI were very high (-0.98: p-value < 0.001). The result showed that HI had significant correlation with high (e240 mg/dL) cholesterol (r = -0.28), high (e 200 mg/dL) triglyceride (r=-0.35), high ( > 0.5) total cholesterol to HDL ratio (r=-0.34) and high (> 90 mmHg) diastolic (r=-0.25). Based on multiple logistic regression, odds ratios (OR) of each model were calculated, adjusted for age (e 50 versus < 50 years) and gender. ORs of HI were significant in models of high cholesterol (OR =2.28), triglyceride (OR=3.15) and total cholesterol to HDL ratio (OR=3.15).
**Conclusions:** For health education, HI may be a candidate indicator for CVR among Thai adult because it is simple and correlate with CVR. It may be useful for self-screening. However, further study in other regions in Thailand and other population is needed to support this finding.

## 4 - 50676 Lay and expert interpretations of healthy eating and nutritional risks in Finland

*Sanna Piiroinen, Mari Niva - National Consumer Research Centre*

**Purpose:** In developed countries, nutrition education focuses on teaching consumers about the importance of variety, balance and moderation in eating. At the same time, functional foods with their targeted, designed health effects represent a novel idea of healthfulness. So far, there is only little information on how people perceive nutritional risks in this situation with contradicting messages about risk reducing strategies. The aim of the study is, firstly, to examine lay and expert understandings of healthy eating, nutritional risks and possibilities to reduce these risks.

Secondly, views and experiences of functional foods are analysed.
**Methods:** The data consist of eleven semi-structured interviews with dieticians and eight focus group discussions with 45 lay participants. The method employed is qualitative thematic analysis focusing on accounts of meanings of healthy eating and functional foods.
**Findings:** Both lay consumers and dieticians approach healthy eating from the perspective of weight management. Obesity and associated diseases are considered as alarming. While dieticians emphasise the diet as a whole as a cornerstone in healthy eating, lay notions are more diverse, based on individual strategies and experiences.
**Conclusions:** Our findings indicate a gap between expressed ideals of healthy eating and the realities of everyday eating. Lay consumers find it difficult to evaluate the credibility and usefulness of new health information and novel products. The meanings of functional foods are ambiguous. Both experts and consumers find them useful in specific conditions, but not a necessary part of healthy eating for the general public.

## 4 - 50678 Some dietetic and anthropometrical parameters among women according to level of physical activity

*Irena Keser, Zvonimir Satalic, Ivana Cecic, Irena Colic Baric - Faculty of Food Technology and Biotechnology; Zlatko Giljevic - Clinical Hospital Centre Zagreb*

**Purpose:** Physical activity improves body composition and plays a substantial role in the development of bone mass and maintains the structure of bone throughout life. The aim of the study was to determine the correlation between physical activity and some dietetic and anthropometrical parameters. Subjects and methods: The study was carried out among 477 young women, 446 women with low bone mineral density (BMD) and 139 women with normal BMD detected by DEXA. Mean age was 21.6, 64.7 and 59.8 years respectively. The specially designed questionnaire provided information on physical activity and dietary intake.
**Results:** Each group of subjects were divided according to level of physical activity: higher (jogging, riding a bicycle, tennis, aerobic) and lower (house works, walking, gardening). Daily calcium intake was significantly different among higher and lower physical active young women (1505,0 mg vs. 1378,7 mg) and women with low BMD (1484,9 mg vs. 1046,7 mg). A significant difference of dietary fiber intake was detected only among women with low BMD (20,0 g vs. 14,1 g) and a significant difference of body mass index only among women with normal BMD (23,7 kg/m2 vs. 26,2 kg/m2) according to activity level. A lower number of people with a higher level of physical activity were smokers.
**Conclusion:** People with higher levels of physical activity had higher daily calcium and fiber intakes, and lower body mass index than people with lower levels of physical activity.

## 4 - 50683 Perceptons of neighborhood environments and overweight among Portuguese girls

*Paula Santos, José Carlos Ribeiro, Mariana Almeida, Nuno Delgado, Jorge Mota - Faculty of Sport Science and Physical Education*

**Purpose:** Several studies have documented the association between perceived environmental attributes and physical activity in adults but fewer have examined that association in adolescents. Moreover, some studies found lower levels of physical activity in overweight or obese adolescents, while others observed any difference. The purpose of this study is to evaluate differences in physical activity levels between normal weight and overweight Portuguese girls and also to determine which, if any, neighbourhood perceived attributes were related to overweight.
**Methods:** The sample comprised 610 girls aged 14.7 ± 1.6 years-old of four urban middle schools in the north of Portugal. Girls were grouping into normal weight and overweight, using the international cut off points for body mass index (BMI). Physical activity was assessed by questionnaire that showed good reliability and acceptable validity. The Environmental Module of the International Physical Activity Prevalence Study (core and recommended items) was administrated to assess environmental variables.
**Results:** No significant differences were found in physical activity levels between normal weight and overweight girls. Logistic regression analysis pointed out that girls who agreed that there is so much traffic on the streets that it makes unpleasant to walk in the neighbourhood were more likely to be overweight (OR=1.78; 95% CI 1.10-2.89).
**Conclusion:** The study did not find any relationship between perceptions of the environment and overweight among Portuguese girls, except for perceptions of security for walk in the neighbourhood. More research is needed using objective measures of the neighbourhood to help clarify these relationships.

## 4 - 50684 Perceived neighborhood environments and physical activity in elderly

*Jorge Mota, Alexandra Lacerda, Paula Santos, José Carlos Ribeiro, Joana Carvalho - Faculty of Sport Science and Physical Education*

**Purpose:** The need to increase physical activity is a public health priority. There is a reason to believe that physical environments variables play an important role in physical activity (PA) because PA occurs in specific settings and psychosocial and socio-demographic variables explain limited variance in physical activity. Therefore, increasing

evidence is found for the importance of environmental variables in explaining physical activity. This study aims were: (i)-to evaluate differences in perception of the home and neighborhood environmental supports according to gender, and (ii) to determine which, if any, neighborhood environmental variable were associated with reported physical activity levels.

**Methods:** This is a cross sectional analysis of self-reported survey data. The sample comprised 181 elderly. A questionnaire using the Environmental Module of the International Physical Activity Prevalence Study (seven core questions) was administrated. Physical activity was assessed by Baecke questionnaire.

**Results:** Logistic regression analysis showed that Neighborhood Safety was related to total physical activity (OR = -0.233; p=0.007); the activity in leisure time (OR = -1.13; p=0.013) and sport activities (OR = -0.73; p=0.04). Males were also to be likely more active in leisure time (OR = -0.79; p=0.02) than females.

**Conclusions:** Neighborhood Safety attributes were found to be associated with level of physical activity in elderly showing a potential influence of environmental domain in physical activity.

## 4 - 50686 Physical activity, fruit and vegetable consumption and fat intake of older adults in Limburg

*Hilde van Keulen, Ilse Mesters, Marlein Ausems, Hein de Vries - Maastricht University*

**Purpose:** Regular physical activity, sufficient fruit and vegetable consumption and a moderate fat intake have a beneficial effect on blood pressure. The purpose of the study is to estimate the health behaviors of older adults in Limburg, the Netherlands. Physical activity, fruit and vegetable consumption and fat intake of those older adults will be compared to the Dutch health guidelines.

**Methods:** Patients (N=5000) in the age of 45-70 will be recruited from the database of General Practitioners in Limburg for a larger study. 50% of the research population has a high blood pressure. Participants will receive a questionnaire to measure the mentioned health behaviors, its determinants and demographic variables. This questionnaire includes the modified CHAMPS physical activity questionnaire, items of transport and leisure time physical activity of the International Physical Activity Questionnaire (IPAQ), the short Dutch questionnaire to measure fat intake and the Short Questionnaire to measure Fruit and Vegetable Questionnaire. The amount of older adults in the research population who meet the Dutch health guidelines will be described with descriptive statistics. Differences in age, sex, blood pressure status and socio-economic status will be presented for participants who meet the norm and those who don't.

**Results:** Data collection is in progress. The preliminary results will be presented in June 2005.

**Conclusions:** Conclusions will be drawn about how participants have performed on the life-style questionnaire. Recommendations will be made for further studies for instance on how to motivate older adults to meet the Dutch health guidelines.

## 4 - 50687 The development, implementation and evaluation of a tailored based physical activity intervention for the over fifties

*Maartje van Stralen, Lilian Lechner, Aart Mudde, Catherine Bolman - Open University of The Netherlands; Hein de Vries - Maastricht University*

**Purpose:** The purpose of this study is to develop, implement and evaluate two tailored based interventions to raise awareness and stimulate initiation and maintenance of physical activity among the over fifties.

**Background:** This study has several innovations: First, the study focuses on the over fifties, a large and growing group, which represents the most sedentary segment of the adult population. Two individualised computer-tailored interventions will be developed that intervene on the unique barriers of this population. Furthermore, the second tailored based intervention will additionally tailor on environmental determinants and will partly work according to community-based approaches. Third, the study will integrate findings and knowledge of existing effective intervention studies and new theoretical insights on awareness and on initiation and maintenance of physical activity. Finally, the study will focus more on moderate intensive physical activity in stead of high intensive exercise.

**Methods:** Different methods will be used for the development of the project:

A literature review, a Delphi study among the experts and focus group interviews among target groups will be done to gather, review and explore different determinants of physical activity among older adults.

Based on the research on determinants, two interventions will be developed and pre-tested. Finally, the two interventions will be implemented and evaluated in different regions, using a longitudinal prospective cohort study design.

**Conclusions:** The project will result in several well-documented products that can be useful for further research as well as for the health education practice.

## 4 - 50688 From couch potato to physically active: the desire for individual advice and buddies

*Marielle Jans, Heleen de Kraker, Marieke Verheijden, Vincent Hildebrandt - TNO*

**Purpose:** Many people intend to increase their physical activity level. However, this does not mean they really change their physical activity. What do people need to increase their physical activity?
**Methods:** Data of the National Health Check (Nationale Gezondheidstest) of 2004 were used. Participants were Dutch adults, who signed up for the test. We investigated which activities they would choose when they would get the strong advice to increase their physical activity, how they would make time for these activities, and which factors would be stimulating for them to become more active. This paper is restricted to participants who were overweight or insufficiently physically active (n=1897).
**Results:** Respondents most frequently chose cycling (83%), walking (77%), household work (76%) and recreational sport (66%) as options to increase physical activity. To make time for physical activities respondents would reduce the time spent watching television (60%) or using a computer (37%). The main stimulating factors for increasing physical activity were individual advice on suitable moderate-intensive and intensive activities (70-78%) and buddies to be active with (72%).
**Conclusions:** Interventions to increase physical activity should focus on cheap and easy activities that can be done at any moment. Advice from health professionals and health checks with individual advice can contribute to people's interest in information on suitable physical activities. Finally, more attention should be paid to setting up buddy systems on internet, on the work site, or by organizations offering physical activities.

## 4 - 50690 The short-term effect of a lifestyle intervention program on adiposity, blood pressure and total cholesterol level among a Dutch overweight working population

*Caroline Dekkers, Marieke van Wier, Geertje Ariëns - VU University Medical Center and Body@Work, Research Center Physcial Activity, Work and Health/TNOVUmc; Ingrid Hendriksen - Body@Work, Research Center Physcial Activity, Work and Health/ TNOVUmc and TNO Work and Employment; Nico Pronk – HealthPartners; Tjabe Smid - KLM Arbo Services and VU University Medical Center; Willem van Mechelen - VU University Medical Center and Body@Work, Research Center Physcial Activity, Work and Health/TNOVUmc*

**Purpose:** To evaluate biological effects of a lifestyle intervention program, aimed at enhancing physical activity and healthy eating in a sub-sample of a Dutch overweight (Body Mass Index [BMI] e 25kg/m2) working population.
**Methods:** Participants were a random sub-sample of 187 (71% male; mean BMI 29.4 ± 3.1 kg/m2; mean age 43.6 ± 9.0 years) of 1386 subjects participating in a large-scale lifestyle intervention study (RCT), for whom biological cardiovascular risk factors were available at baseline and 6 months later, after completion of the intervention program. At baseline participants were randomized into one of two intervention groups (phone-based: N=59; Internet-based: N=67) or a reference group (N=61). Participants in the phone-based group received the intervention program in a binder and were counseled by phone. Participants in the internet-based group followed the same program through Internet and were counseled by e-mail. Linear regression analysis was used to assess the effects of the intervention program in the two intervention groups on waist circumference, body fat percentage (£ four skinfolds), blood pressure, and total cholesterol level, while accounting for baseline level.
**Results:** No significant effects of the intervention program on the cardiovascular risk factors were found. However, in the phone-based group a positive trend was observed for waist circumference, systolic blood pressure and total cholesterol level, and in the internet-based group for waist circumference and total cholesterol level.
**Conclusion:** Our results suggest no intervention effect on biological cardiovascular risk factors, independent of intervention strategy. However, several positive trends were observed in the expected direction, mainly and most strongly pronounced in the phone-based group.

## 4 - 50692 Validation of the school physical activity environment survey (SPACES)

*Jennifer Robertson-Wilson, Lucie Lévesque; Ronald R. Holden - Queen's University*

Evidence linking school physical activity (PA) environment with youth PA involvement is based on objective measures of school PA environment (McKenzie et al., 2000; Sallis et al., 2001). Objective assessments may differ from students perceptions of school PA environment (Bauman et al., 2002) which could translate into different patterns of association with youth PA involvement at school. PURPOSE: To develop a survey of students perceptions of their school environment (e.g., programs, facilities, staff interactions) in relation to youth PA at school. METHOD: Twenty-eight items about students school PA environment were generated from the literature and focus groups. Items were rated on 4-point scales (strongly disagree to strongly agree). The survey was administered to 244 grade 6, 7, and 8 students (mean age = 11.82 years, SD = .88) in nine schools of varying demographics. Principal axis factoring with varimax rotation estimated the final structure. Number of factors was determined by principal components analysis (scree plot) and Velicer s MAP. RESULTS: Two factors were extracted with initial eigenvalues of 8.73 and 1.79,

respectively. Twelve items loaded saliently on Factor 1 (Physical Environment) and 8 items loaded saliently on Factor 2 (Social Environment). Scales from these factors had alpha coefficients of .86 (Factor 1) and .81 (Factor 2). One-week test-retest reliabilities (n = 85) were .78 and .72 for Factor 1 and 2 scales, respectively. Conclusions: SPACES reliably captures youth perceptions of the school PA environment. Future work could compare SPACES with objective assessments of school environment and with patterns of PA involvement.

## 4 - 50694 Neighbourhood deprivation and the 'fast-food' environment: the location of McDonald's restaurants in England and Scotland

*Laura McKay – MRC; Steven Cummins - Queen Mary, University of London; Sally MacIntyre - MRC*

**Background:** Features of the local fast-food environment may contribute to the rising prevalence of obesity and diet-related ill-health in deprived neighbourhoods. However few studies have investigated whether fast-food outlets are more likely to be found in poorer areas, and those that have are local case-studies. In this paper, using national level data, we examine the association between neighbourhood deprivation and the density of McDonald's Restaurants in small areas in Scotland and England.

**Methods:** Data on population, deprivation and the location of McDonald's Restaurants were obtained for 38,987 small areas in Scotland and England (6,505 Data zones in Scotland and 32,482 Super Output Areas in England). Density measures of McDonald's restaurants per 1000 people for each area were calculated and areas were divided into quintiles of deprivation. Associations between neighbourhood deprivation and outlet density were examined using one-way analysis of variance (ANOVA) in Scotland, England and both countries combined.

**Results:** Statistically significant positive associations between neighbourhood deprivation and mean number of McDonald's outlets per 1000 people for Scotland ($p<0.001$), England ($p<0.001$) and both countries combined ($p<0.001$) were found. These associations were broadly linear with greater mean numbers of outlets per 1000 people occurring as deprivation levels increased.

**Conclusions:** Ecological associations between the local fast-food environment and neighbourhood deprivation in national level data provide further support for environmental explanations for the higher prevalence of obesity and diet-related ill-health in poor neighbourhoods.

## Notes

## Saturday, June 18 – 11.00-14.00 – 2nd Balcony Grote zaal

## Poster Session 5

Session/Nr:

### 5 - 50695 Perceived environment and physical activity involvement in a northern-rural, Aboriginal community

*Allison M. Kirby, Lucie Lévesque - Queen's University;Virgina Wabano - Community of Moose Factory; Jon Salsberg, Ann C. Macaulay - Kahnawake Schools Diabetes Prevention Project*

Type 2 diabetes disproportionately affects Aboriginal peoples in Canada. Aboriginal leaders, health care professionals and health promotion researchers are turning their attention to primary prevention through increased physical activity (PA) and healthy eating. This is seen by many as the only solution to a foreseen public health disaster. Before effective interventions can be designed and implemented, needs assessment must identify primary targets for PA intervention.

**Purpose:** To investigate the relationship between perceptions of the community environment and PA patterns of adults living in a northern-rural, Aboriginal community.

**Methods:** Two hundred and sixty three residents (133 women, mean age= 35.6years, SD=12.3 and 130 men, mean age =37.2years, SD= 13.1) from Moose Factory Island were asked about personal, social and environmental factors related to their PA involvement. Survey items were drawn from standardised, validated questionnaires. Bivariate relationships between perceived environmental variables (e.g., aesthetics, and safety from crime) and PA were examined by conducting chi-square analysis (p< .05). Descriptive statistics (means, standard deviations, frequencies, percentages) were calculated.

**Results:** Results indicated that 30.4% (n=80) of respondents were sufficiently active (e30 min of moderate to vigorous PA 5 times per week, or e60 minutes of light activity 5 times per week). Chi-square analysis revealed that more men than women reported being physically active (P < 0.01). No environmental variables were significantly associated with activity status.

**Conclusions:** Environmental perceptions were not significantly linked to PA status. Future research should investigate relationships between actual and perceived PA resources and examine whether these relate differently to PA patterns.

### 5 - 50697 Log on rate and baseline characteristics in a web based program promoting healthy eating behaviors to parents/guardians of 8-12 year old African American girls

*Debbe Thompson, Karen Cullen, Kathy Watson, Ariella Haggard - Baylor College of Medicine*

**Background:** In web-based programs, log on rate (LOR) determines program dose. Little is known about factors influencing LOR. Computer self-efficacy (CSE) and personal characteristics are likely influencers.

**Purpose:** To examine relationships between LOR, CSE, and baseline characteristics of participants in an 8-week web-based program promoting healthy eating habits.

**Methods:** Baseline data and LOR from 67 participants were examined. All participants were female parents/guardians of African-American girls. LOR was the total number of weeks the participant logged on to the program web site, divided by 8. The relationship between LOR and CSE was examined using Pearson s correlation. One-way analyses of variance were employed to investigate the relationship between LOR and parental education, homeownership, and computer-related characteristics.

**Results:** A significant relationship (r=.33, p=.006) was observed between LOR and CSE. Longer computer (p<.001) and Internet use (p=.008); and higher maternal (p=.016) and paternal education (p=.003) were significantly related to higher LOR. Computer experience and homeownership were not related to LOR.

**Conclusion:** A significantly positive and moderate relationship was observed between LOR and CSE, significant relationships were also observed between LOR and several demographic characteristics. Women with > 3yrs computer/Internet use had >30% higher LOR than those with < 3yrs. College graduates had >20% increased LOR than non-degreed participants. Future web-based interventions should include sufficient computer and Internet training to ensure satisfactory LOR.

## 5 - 50698 Promoting physical activity and healthy diet among high school students

*Mauro Barros - Universidade de Pernambuco; Markus Nahas, Elusa Oliveira, Simone Barros, Mathias Loch - Universidade Federal de Santa Catarina*

**Purpose:** There is evidence of a high proportion of adolescents exposed to inactivity and poor diet in Brazil. The objective of this study was to assess the effect of a 13-week, randomized, school-based intervention tailored to enhance nutrition and physical activity among adolescents.
**Methods:** Six high-schools (three intervention - 452 respondents; and three control - 300 respondents) were randomly selected in Florianópolis, SC. The intervention was based on the WHO Health Promoting Schools' philosophy, using a pre-post design, with self-report as measurement of behavior. Activities focused on environmental and organizational changes, health education, and personnel involvement. Data analysis included descriptive procedures, Chi-square, McNemar tests, the GLM repeated measures, Poisson, and Logistic Regression.
**Results:** It was verified a low participation rate (below 20% in some activities). Positively, between 40 to 60% of the participants reported improvements in knowledge, and that they were more likely to change health-risk behaviors. The impact was just moderate and only a few outcome variables were significantly affected. The effects were observed in relation to knowledge and barriers for healthy eating, but not for eating behaviors. Barriers for physical activity and the number of activities reported were affected by the intervention.
**Conclusions:** Despite some limitations, it can be concluded that the intervention design seemed to be well accepted by the students, who consider it as a source of information and an opportunity to change behavior. Future research should include a longer period of intervention and follow-up measures, including objective physical activity monitoring.

## 5 - 50700 Is a high fitness level in childhood associated with a high level of physical activity as an adult?

*François Trudeau, Louis Laurencelle - Université du Québec à Trois-Rivières; Roy J. Shephard - Faculty of Physical Education and Health, and Faculty of Medicine*

**Purpose:** The purpose of this study was to verify the hypothesis that childhood physical fitness may influence physical activity level in adulthood.
**Methods:** We used longitudinal data from the Trois-Rivières Growth and Development Study to correlate childhood (10-12y) physical fitness measurements with adult (35y) physical activity (PA) level and some psychosocial correlates.
**Results:** We found no significant relationship between childhood physical fitness and adulthood PA. However, some variables of adulthood physical fitness were associated with adult PA level. At 35 y, PWC170/kg and frequency of PA as a mean of transportation were correlated ($r = 0.26$ for all subjects, $P<0.05$; $r = 0.56$, $P<0.01$ for men). For all subjects and for females only, a larger PWC170/kg was inversely correlated with barriers to exercise ($r = -0.31$, $P<0.05$; $r = -0.33$, $P<0.05$). More active female adults had larger scores in the sit-ups test ($r = 0.40$, $p<0.05$), while females with a higher BMI had a lesser intention to exercise ($r = -0.28$, $P<0.05$). PWC170/kg at 35 y was inversely associated with BMI at 35y ($r = -0.41$, $P<0.001$; $r = -0.37$, $P<0.05$ and $r = -0.49$, $P<0.05$ for all subjects, female and males respectively) but also with BMI in childhood ($r = -0.51$, $P<0.0001$; $r = -0.47$, $P<0.01$ and $r = -0.53$, $P<0.01$ for all subjects, females and males).
**Conclusion:** Our data suggest that the level of physical fitness in childhood has no measurable impact on adult habitual PA.

## 5 - 50702 Physical activity interventions among the elderly: the effects of a fitness versus lifestyle program on physical and psychological self-esteem

*Filip Boen, Yves Vanden Auweele, Christoph Delecluse, Hanne Swerts, An Nijs - K.U.Leuven; Joke Opdenacker - U.Gent*

**Purpose:** The aim of this study was to examine the effects of two types of physical activity interventions on the physical and psychological self-esteem of elderly participants: an intensive centre-based fitness program and a less intensive home-based lifestyle program.
**Methods:** Participants were 120 sedentary Flemish volunteers who were older than 60 years and motivated to increase their physical activity. They were randomly divided into one of two intervention conditions. Participants in the fitness condition ($n = 60$) followed a supervised exercise program (90 min) three times weekly. Participants in the lifestyle condition ($n = 60$) were encouraged to include more physical activity in their daily lives. They were offered practical information on home-based exercises and signed a physical activity contract with a distance coach who followed their progress by telephone on a less than weekly basis. The effects of these two interventions were compared with a control condition ($n = 66$).
**Results:** After 6 months, participants in both the fitness and lifestyle condition showed a significant increase in self-perceived endurance and body image, while participants in the control condition showed no change. These effects did not differ between the fitness and lifestyle conditions. Moreover, participants in the lifestyle condition showed a

significant increase in global self-esteem, whereas participants in the fitness and control conditions did not.
**Conclusions:** The results of this study suggest that the self-esteem benefits of a home-based lifestyle physical activity intervention are at least as strong as those of a more intensive and expensive structured exercise intervention.

## 5 - 50708 Sleeping hours, tv watching, computer use and sport participation among children referred for obesity treatment

*Peter Clarys, Nathalie Duvigneaud, Katleen Hermans, Peter Deriemaeker, Eric Vandenabeele, Jean De Schepper - Vrije Universiteit Brussel*

**Purpose:** The aim of this study was to investigate the relationship between anthropometric indicators of adiposity and physical (in) activity variables such as sleeping hours, TV watching, computer use and sport participation among overweight or obese children.
**Methods:** In total, 78 male and 92 female ambulant overweight or obese patients, aged 4 to 15 years, were included. Different anthropometric indicators of adiposity were measured: BMI, waist circumference and body fat percentage (BIA). Information concerning sleeping hours, TV watching, computer use and sports was recorded with a self-made questionnaire.
**Results:** Waist circumference increased with age, from 71.2 (±5.3 cm) till 92.6 cm (±14.8 cm) and from 64.5 (±7.3 cm) till 92.0 cm (±11.3 cm) in boys and girls respectively. While the sleeping hours decreased, TV watching was substantial and increased with age, from 17 h/week (±7,8 h/week) till 22,1 h/week (±8,1 h/week) in boys and from 12,9 h/week (±5,8 h/week) till 21,6 h/week (±12,2 h/week) in girls. In boys 12-15y, waist circumference was correlated positively with TV watching ($r=0.43$; $p<0.05$) and negatively with hours of sports ($r=-0.45$, $p<0.05$). In the oldest girls, a positive correlation was found between waist circumference and computer use ($r=0.54$; $p<0.05$).
**Conclusions:** Sedentary behaviours tended to increase with age, while sport participation remained stable. Significant correlations between physical activity variables and adiposity measurements were scarce and rather weak.

## 5 - 50709 Weightco@ch: computer-tailored weight management program at the workplace

*Annette Stafleu - TNO Quality of Life; Pieter Helmhout - Ministry of defense; Marieke Op de Weegh, Linda van den Bosch - TNO Quality of Life*

Innovative technology, such as Intranet, offers good opportunities for the application of computer-tailored nutrition education at the workplace. Weigthco@ch is an interactive computer program developed for the Dutch Military aimed at weight management. Since June 2002, Weightco@ch is available on the intranetsite of the Military. An evaluation study took place to get insight into the use of the program by the target group and the effect of the program on change in attitudes, behavior and stages of change. Subjects filled out a pretest (n=147) and posttest (n=98) questionnaire. The questionnaire was based on the ASE-model and the Stages of Change theory. Attitudes, social influence, self-efficacy, intention, barriers and Stages of Change were asked towards weight loss, increased physical activity and lower fat intake. Differences in social psychological determinants, weight and middle circumferences between pre- and posttest were in the desired direction. Subjects evaluated Weightco@ch as a useful program. It can be concluded that computer tailoring is a promising tool in health education at the workplace.

## 5 - 50711 Big spenders - who are the adolescents spending much money on junk food?

*Nanna Lien, Margareta Wandel, Gerd Holmboe-Ottesen, Knut-Inge Klepp - University of Oslo*

**Purpose:** Is spending money on junk food related to socio-economic status (SES), unhealthy food choices or other health related behaviours?
**Methods:** A cross-sectional study using self-administered questionnaires about health and health behaviours was conducted among all 15-16 year olds in Oslo, Norway, in 2000 and 2001. A total of 7434 adolescents participated (88%). The analyses were limited to the 5510 adolescents with Norwegian ethnic background. Money spent on goodies , snacks, Coke/ fizzy drinks and fast food per week was assessed by 6 precoded answers (from less than 25NKr to more than 200 NKr). Food frequency questions on selected foods, drinks and meals were collected. Other health related behaviours were: smoking, physical activity and consumption of alcohol. Five indicators of SES were used; residential area, parental occupation, the adolescents' educational plans, parental education and income. Gender specific cross-tabulations and ANOVA assessed bivariate associations.
**Results/_ndings:** The boys spent more money on junk food than the girls, but the variations by the SES indicators were low. The proportion of adolescents consuming the main meals, fruit and milk daily and vegetables 4-6 times/ week or more decreased by increasing spending category, whereas the proportion of daily smokers and weekly consumers of alcohol increased. A higher proportion of boys spending much on junk food were physically active 3-4

times/week or more, whereas the opposite was found for girls.
**Conclusions:** Spending much money on junk food was independent of SES of the adolescents, but associated with several unhealthy behaviours. Further research is needed to develop appropriate interventions.

## 5 - 50713 An effective pilot weight management programme for Malay females in Singapore

*Yam YY, Syed Abu Bakar SN, Koh Colleen, Ng YL - Health Promotion Board; Chang AS - Alexandra Hospital*

**Purpose:** Among adult Singaporean females, obesity is most prevalent among the Malays (30.8% with BMI 25 to <30; 23.7% with BMI > 30). A study was conducted to assess the incremental contribution of diet intervention on BMI reduction among overweight Malay women who were already engaging in regular physical activity.
**Method:** The study participants were women of Malay ethnicity with BMI>25, recruited from 2 briskwalking clubs. They were split into intervention and control groups. Those in the intervention group were taught skills to select and prepare healthy meals through workshops and tours to supermarket by a dietitian, over a period of 8 months. Their BMI was monitored using standardized protocols. A questionnaire was administered before and after the intervention to assess changes in knowledge, attitude and practice. Analysis of Variance was performed.
**Result:** The 76 women in the intervention group were aged 29 to 64 years old (mean age= 47 years) and had >6 years of education (74%). Before intervention, 59% had BMI between 25 to 29.9 and 41% had BMI>30. The average BMI reduction (pre- and post-intervention) was 1.3 which was statistically significant ($p<0.0001$). Significant improvements in knowledge, attitude and practice towards healthy eating were also observed. In comparison, there was no significant reduction in BMI in the control group.
**Conclusion:** Regular physical activity without diet intervention did not result in significant BMI reduction. However, when combined with diet intervention, a significant reduction in BMI was demonstrated. Thus, effective weight management programme should include physical activity and diet intervention.

## 5 - 50715 Predictors of vegetable consumption among young men in the Norwegian national guard

*Solveig Uglem - University of Oslo; Wenche Frølich, Tonje Holte Stea - University of Stavanger; Margareta Wandel - University of Oslo*

**Purpose:** To assess determinants of vegetable consumption in a group of young men in the military.
**Methods:** A baseline study was carried out in 2004 as part of an intervention in the Norwegian National Guard. 589 male recruits (mean age 19.7 years) participated in the study. Data were collected with a food diary and an attitudinal questionnaire. The model included items on personal factors (attitudes, preferences, self-efficacy and knowledge), socio-environmental factors (social influence, socio-economic status, availability and habits) and behavioural factors (meal frequency in military mess and military canteen, number of hot meals, snack consumption, smoking/snuffing).
**Results:** The recruits' average consumption of vegetables (including potatoes) was 243 g/day (CI: 233-253). Overall, 34% of the variance in the recruits' reported consumption of vegetables was explained by the constructs included in our model ($p<0.001$). The most important predictors in the model were preferences for cooked vegetables ($b=0.16$, $p<0.05$), how often they ate vegetables when living at home ($b=0.15$, $p<0.05$), meal frequency in the military canteen ($b=0.13$, $p<0.05$), and number of hot meals for lunch and dinner ($b=0.41$, $p<0.001$).
**Conclusion:** Our results showed that both attitudes acquired at home (preferences and habits) and factors related to the situation in the military camp (meal frequency in the military canteen and number of hot meals for lunch and dinner) are important determinants of the recruits' intake of vegetables. This suggests that parents continue to influence their children's eating habits, also after they have left home.

## 5 - 50716 The effects of glycaemic index on blood glucose, appetite, mood and reaction time

*Anna Robins - University of Salford; Marion Hetherington - University of Liverpool*

Glycaemic index (GI) can affect mood, cognition, appetite and aerobic performance in isolation, although few studies have addressed the link between GI and these effects together. The effects of a low (Milo) and high (Lucozade) GI drink on blood glucose (BG), mood, appetite and reaction time (RT) were investigated in 30 physically active male subjects (Ss) who attended the laboratory on two occasions, having fasted from midnight. On arrival, all baseline measures were taken including BG, RT, ratings of mood (PANAS and visual analogue scale) and appetite. Ss consumed 350ml of Milo (LGI) or Lucozade (HGI) within 15 minutes (m), and then BG and appetite were measured every 15m, RT every 30m and PANAS at the start and end of each 90m trial. There was a significant time by condition interaction ($p < 0.01$) of the drink on BG. Ratings of appetite and mood changed in a similar way for both drinks (main effect of time; $p < 0.01$). RT was quicker after consumption of the LGI drink (main effect of condition; $p <0.05$). There was no effect of the drinks

on the PANAS scores. The LGI drink not only enabled quicker RT, it also maintained a more favourable BG range over the 90m trial, which is important for optimal glucose provision during cognitive and athletic performance. A longer term LGI dietary manipulation is suggested to further investigate the combination of cognitive and physiological improvements for overall gain in athletic performance.

## 5 - 50718 The role of physical activity in the prevention and treatment of obesity as an inflammatory condition

*Jeanine Beneke, Colette Underhay, Alta Schutte - Northwest-University*

**Purpose:** Review to point out obesity as an inflammatory condition and to explore the role of physical activity in prevention and treatment of obesity and the metabolic syndrome.
**Background:**Obesity has increased dramatically in the past decade and its consequences are a problem wordwide. Obesity is due to a complex interaction of genetics, diet, metabolism and physical activity levels and is strongly associated with low-grade systemic inflammation. Research reported measures of adiposity, such as BMI, total percentage body fat, WHR and waist circumference to be strongly associated with C-reative protein (CRP). CRP is an acute phase reactant and a marker for acute and chronic inflammation of diverse causes. Elevated CRP conditions can be ascribed to increased expression of interleukin-6 in adipose tissue, potentially inducing systemic inflammation in persons with excess body fat. This could explain the increased risk of chronic diseases in the obese.
**Methods:** The topic was reviewed by consulting the following databases: EBSCOhost, PUBMED, Medline,Science Direct, NEXUS and RSAT with articles published between 1995 and 2005.Key points:Obesity as inflammatory condition; Role of physical activity in prevention and treatment.
**Conclusions:** It is evident that low-grade, systemic inflammation occurs in obesity and that weight loss after intervention including physical activity may lower CHD risk. As shown by research, physical activity as a prospective predictor of inflammation is needed to establish the true anti-inflammatory role in CHD.

## 5 - 50719 School children's perception of the Pro Children intervention project in Norway

*Christina Hildonen, Mona Bjelland, Knut-Inge Klepp - University of Oslo*

**Purpose:** The Pro Children project is an intervention designed to increase the fruit and vegetable intake among 11-12 year old school children. As part of a larger process evaluation, this study looked at children's perception of the project and two of the main components: class room based work sheets (WS) and a computer tailoring program (CT) especially designed for this project.
**Methods:** Data are from the first post-intervention survey and collected through a self-administered questionnaire from students in the nine intervention schools in Norway (n= 241). Descriptive statistics and paired-samples t-test were used to detect overall perception of the project, the liking of WS and CT.
**Results/Findings:** Preliminary results: In eight schools 87-100% of the students stated that they liked the project, while 81-100% liked WS. In one school, 57% stated that they did not like the project and 50% did not like WS. In total, eight schools implemented CT as planned, and 90-100% of the students reported that they liked the program. In the school that viewed the project and WS most negatively, only 10% stated that they did not like the CT. Overall, there was a significant difference between student liking score for CT scores (M=2.52, SD=0.59) and WS scores (M=2,22, SD= 0.68), t(204)=6.18, p<.0005. For four schools the score was significant, with a tendency in three other schools.
**Conclusions:** Overall, the project and its components were well received by the students. Computer based activities were viewed somewhat more favourable than the WS.

## 5 - 50721 A study of physical activity in Greek adolescents: validation of the transtheoretical model

*Ioanna Tsamita, Polina Kontogianni, Konstantinos Karteroliotis - University of Athens*

**Purpose:** The Transtheoretical Model (TTM) is a theory studying behavioral changes, including physical activity behavior. Most of the published literature examining TTM and physical activity to date has been limited to adult samples. The present study examined the validity of the TTM scales in a sample of Greek adolescents.
**Methods:** The sample of the study consisted of 336 students aged 15-17 years (boys= 45.2%, girls=54.8%). Students physical activity was estimated in three consecutive days. Marcus et al. (1992) questionnaire was used to examine the stages of change of physical activity behavior. Also, decisional balance (pros and cons) and self-efficacy were assessed with shorter versions of the scales.
**Results/Findings:** The distribution of the sample into the stages of change was as follows: Pre-contemplation=17.2%, contemplation=27.4%, preparation=10.2%, action=14.5%, and maintenance=30.8%. An ANOVA showed that all TTM constructs and physical activity differed significantly by stage. Stage of change was positively related to pros (r=0.26)

and to self-efficacy (r=0.45), and negatively related to cons (r=-0.29). Also, a significant relationship was found between stage and the students physical activity level (r=0.34). Finally, physical activity, self-efficacy, and pros increased while cons decreased across the stages from pre-contemplation to maintenance.
**Conclusions:** The TTM scales demonstrated psychometric properties similar to those found in other adult populations and extend the model s applicability to the Greek adolescents population.

## 5 - 50728 An international study of physical activity and the environment in Taiwan

*Liou Yiing-Mei, LI Yi-Yu, Shen Li-Fen - National Yang-Ming University*

**Purpose:** The purpose of the study is to discover the correlation between environment variables and physical activities in Taiwan. We hope the result could benefit the whole coordinated cross-countries study.
**Background:** We began establishing the surveillance system of International Physical Activity Questionnaire (IPAQ) in Taiwan, and included a few environment-related questions in. We have developed and verified the validity and reliability of IPAQ-Taiwan long version about last seven days self-administered format in 2002-2003, and used the computer-assisted telephone interviewing system (CATI) completing the International Prevalence Study (IPS) in 2004. Therefore, this study will refer both IPAQ-Taiwan and the Neighborhood Quality of Life Study (NQLS), emphasizing how one s neighborhood influences his or her physical activities.
**Methods:** This September, a minimum of 500 Taiwan citizens coming from eight neighborhoods will be selected as samples. We will use the developed self-reported questionnaires and pedometers to record participants physical activities, and apply the Geographic Information System (GIS)-based technique to collect environment information of their surroundings, such as annual average temperature, humidity, rainfall, and the shortest distance to bus stop etc. Finally, a table divided by high/low walkability and high/low SES will be created to examine their relationships.
**Conclusions:** We look forward to the study could reveal the diversity or similarity of Taiwan s physical activity pattern, and benefit the environmental policy maker as promoting health concepts. We believe that only an appropriate policy, suitable for local customs, could effectively be accepted by community members.

## 5 - 50730 Attitudes and practices of health care providers regarding physical activity in Turkey

*Mine Yildirim, Gülgün Ersoy - Hacettepe University*

**Purpose:** The objective of this study is to investigate health care providers knowledge, attitude, practices relating to physical activity and examine the relationships between their own physical activity (PA) behaviour and suggestions about PA.
**Methods:** A questionnaire was developed and applied to 528 health care providers (doctors; n=136, others (dietitians, nurses)= 392). The questionnaire consisted of different parts about practices, barriers to do PA, attidutes and advices about PA. We also calculated BMIs of the participants.
**Results:** Analyses show that %33,1 of doctors and %27,8 of other health care providers do regular PA. Our data show %94,9 of doctors, %74,7 of other health care providers advice PA to their patient. It has been determined that, the reasons for not doing PA are working so much and chosing sedantary activities (i.e. watching TV, reading). Only %74,0 of health care providers ,not doing PA regulary, adviced PA, but ratio is %94,8 among health care providers, do PA regulary. The most important barriers to exercise counseling were not doing any exercise by health care providers and having enough time. According to the results, mean BMI value of doctors is 24,05, and it s 23,25 for the others.
**Conclusions:** Overall, the results of the present investigation indicate that the health care providers who exercise are more likely to counsel their patients to exercise. Inadequate time and knowledge, experience regarding exercise are the most common barriers to counseling identified.

## 5 - 50732 Tailoring nutrition education for low income audiences: differences by ethnicity

*Kim Gans, Patricia Risica, Leslie Strolla, Cynthia Davis, David Upegui - Brown University*

**Purpose:** Your Healthy Life/Su Vida Saludable (YHL/SVS) is testing the cost-effectiveness of different methods of tailoring bilingual written nutrition education materials to help low-income consumers increase fruit and vegetable (FV) and lower total fat consumption. This presentation compares baseline demographics, dietary habits and tailored choices of participants by ethnicity (Hispanics (H) vs. Non-Hispanics (NH)).
**Methods:** The macro- and micro-tailored intervention consists of 28 topics with multiple content sub-categories. Participants completed a baseline telephone survey including the Food Habits Questionnaire and the FV Frequency Questionnaire and psychosocial questions. Depending on their survey answers, participants were prompted to choose pages for their tailored packets.
**Results:** 1874 subjects enrolled in YHL/SVS (55% H; 85% female). H were younger, had lower education and income levels, and were more likely to be married and live with children, compared to NH. H had lower fat diets and ate more

fruit than NH. Vegetable intake did not differ by ethnicity. There were also significant differences by ethnicity on whether specific foods were eaten in the past month, as well in prevalence of specific fat-lowering eating behaviors. Barriers to eating healthier, situational self-efficacy, favorite FV, acceptable food behavior changes and special interests also significantly differed by ethnicity. The final presentation will display regression models indicating the relative contribution of ethnicity and other demographic variables on dietary variables and page choices.
**Conclusions:** This information can help in the future development of dietary assessment tools as well as the planning of effective tailored nutrition interventions for diverse low-income audiences.

## 5 - 50737 Physical activity, diet, and health promotion using technology and community portals

*Thuy Vu, Deborah Bowen - Fred Hutchinson Cancer Research Center*

**Purpose:** The Internet is being evaluated as a health communications and support medium. Home access to the Internet is not ubiquitous, and the "Digital Divide" disparity continues to prohibit people from getting health information. Community portals may be a valuable medium for providing access to health information.
**Methods:** We conducted a two-phase study to reduce breast cancer risk through health behavior change. Women over 40 without internet access, from the poorest neighborhood of a major US city were recruited by telephone to participate. Names were identified from a purchased list. Phase 1 offered training sessions on how to use computers and the Internet. Phase 2 was a randomized trial to increase interest in modifying eating, physical activity, and screening behaviors. A church basement served as the community portal for accessing the web-based intervention.
**Results:** Over half of the women approached participated in Phase 1. Eighty percent of the training sessions were attended; attendance was high. Seventy percent of Phase 1 participants were randomized (n=100) to the intervention or control group for Phase 2. Over 70% of the intervention sessions were attended; attendance at these was also high. Study outcomes included interest in eating and physical activity changes and increasing screening intentions.
**Conclusions:** This study shows that community portals can provide access to health information, and can help low income women learn how to use computers. Interest in learning about healthy eating and increasing physical activity was high, providing the groundwork for future interventions in this population.

## 5 - 50750 International physical activity and the environment network (IPEN): advancing and translating transdisciplinary research

*Jacqueline Kerr, James Sallis - Active Living Research; Neville Owen - Cancer Prevention Research Centre; Ilse De Bourdeaudhuij - Faculty of Medicine and Health Sciences; Thomas Schmid - Active Community Environments*

**Purpose:** Physical activity (PA) is a public health priority internationally. Environmental and policy strategies to increase PA levels in whole populations are being widely advocated but they need to be guided by research. While PA environments vary within countries, the greatest and most informative sources of variation may be between countries. IPEN seeks to stimulate and support systematic and rigorous studies of PA and the environment, in as many countries as possible.
**Methods:** Studies should adopt a common design and methodology now being used in the US and Australia: selecting neighborhoods based on their walkability and income from GIS and census data, surveying randomly selected participants with the Neighborhood Environment and Walkability Scale (NEWS), having participants wear an accelerometer for 7 days on two occasions 6 months apart, and assessing the local pedestrian infrastructure and park quality. There are different levels of involvement and support.
**Results:** There are over 80 members in 22 countries in IPEN. Twelve groups are applying for funding. Walkability measured by both perceived and objective measures is significantly related to PA in the USA. The NEWS has been translated and tested in Belgian and Portuguese and has been shortened to allow countries to develop their own additional items. A European collaboration has been established to do this.
**Conclusions:** The infrastructure and methodology for IPEN has been established and international studies and results are forthcoming. We would like more countries to join IPEN and encourage you to learn more by visiting this poster.

## 5 - 50756 Weight control practices and physical activity behaviours among Australian adolescents

*Vicki Deakin, Karen Cashel - University of Canberra*

**Purpose:** To describe the beliefs, attitudes and behaviours concerning weight control practices and physical activity (PA).
**Methods:** 215 adolescents (110 males, 115 females) aged 16-18 years from private college/high schools in Canberra

completed a self-reported questionnaire derived from similar questions in the National Nutrition Survey (1995). Weight and height were self-reported. Weight status was assessed using Cole s et al (2000) BMI classifications for adolescents. Data were analysed using Chi-Squared and descriptive statistics.

**Results:** Five percent of females and 22% of males were classified as overweight/obese; 22% of females were classified as underweight. Twenty percent of females and 11% of males considered themselves overweight. Yet 47% of females and 17% of males were trying to lose weight. Around one-quarter of females reported using at least one extreme dieting method (ie fasting, smoking, diuretics, laxatives, diet pills) in the last week compared to 5% of males. Low fat diets and PA were the most popular methods used to control weight in both sexes. There were no differences in the average time spent undertaking moderate and vigorous PA between sexes, although more females (71%) than males (46%) wanted to do more vigorous PA than current practice. Around 3% of the total sample reported doing no vigorous or moderate PA during the past week.

**Conclusion:** The prevalence of unhealthy weight control practices in females and in some males in combination with a distorted perception about weight in both sexes highlight the need for preventive programs in schools that are sex-specific and encourage appropriate weight control and PA behaviours.

## 5 - 50757 Does a low glycaemic index diet enhance the nutritional intervention in a cardiac rehabilitation program?

*Ginette Turbide - Institut de cardiologie et de pneumologie de l'Hôpital Laval; Vicky Drapeau - Université Laval; Louise Gagnon, Jean G Dumesnil, Paul Poirier - Institut de cardiologie et de pneumologie de l'Hôpital Laval*

**Purpose:** Obesity represents a growing concern in contemporary cardiology. A great proportion of patients in cardiac prevention/rehabilitation programs are either overweight or obese. The objective of this study was to evaluate the metabolic impact of a low glycaemic index diet compared to the AHA Step One diet on cardiovascular risk factors of patients enrolled in a cardiac prevention/rehabilitation program.

**Methods:** We observed the impact of a low glycaemic index diet as well as an intervention provided by a nurse combined with a dietician approach in 30 patients randomly assigned in three groups of 10 patients each with the following diet regiments: group 1- AHA Step One diet; group 2 - a low glycaemic diet with usual follow-up; group 3- same diet as in group 2 with a more intense dietary intervention in terms of follow-up (nurse and dietician). Anthropometric measurements, blood samples and questionnaires assessing satisfaction, compliance and satiety were evaluated.

**Results:** Body mass index and waist circumference decreased after 3 months and metabolic profiles (blood insulin, blood glucose, lipid profile and ApoB) improved in all groups without statistically significant differences between the three groups. The lowest diet compliance throughout the study was 57%. Although not significant, there was a trend toward better satisfaction regarding the dietary approach in group 3.

**Conclusions:** Each diet approach reduced body weight and improved metabolic profile of patients in the same order of magnitude. Compliance is probably the most important variable in weight management of patients in a cardiac prevention/rehabilitation setting.

## 5 - 50758 A randomized controlled trial of behavioral weight control based on self-determination theory (SDT) in women

*Marlene Silva, Paulo Vieira, Claudia Minderico, Margarida Castro, Pedro Teixeira - Faculdade de Motricidade Humana*

**Purpose:** The goals of this study were to describe an obesity treatment program for women based on Self-Determination Theory (SDT) and report on its initial impact on several theory-driven mediators.

**Methods:** 104 women (age, 36.9±7.6 y; BMI, 31.2±4.2 kg/m2) were assigned to intervention/control groups. Controls received a general health education curriculum while the intervention group attended 16 weekly sessions designed to follow SDT, with a special emphasis on promoting intrinsic, self-regulated sources motivation for exercise and weight control. Psychometric assessments included general causality orientations, perceptions of treatment climate (autonomy- vs. control-supportive), and several SDT variables adapted to the exercise domain (motivation characteristics, causality orientations, behavioral self-regulation).

**Results:** At 4-months, compared to controls (79% retention), women in the intervention group (96% retention) perceived the intervention as being more autonomy-supportive ($p<.001$) and reported higher exercise perceived competence ($p=.007$). Women attending the SDT program also displayed more psychological motives for participating in physical activities (particularly in the enjoyment ($p=.036$) and challenge ($p<0.001$) dimensions), higher scores on body- and fitness-related motives ($p<0.05$), and higher levels of introjected ($p=.005$), identified ($p=.018$), and integrated ($p=.005$), but not external ($p=.133$) types of exercise self-regulation. No group differences were observed for exercise locus of causality ($p=.134$).

**Conclusions:** Results offer empirical support to the effectiveness of the intervention in impacting central SDT mediators such as enjoyment, competence, and an internal, more autonomous type of self-regulation. Further

investigation will evaluate longer-term results and assess the association of SDT-based predictors with exercise and eating behaviors, weight loss, and psychological well-being.

## 5 - 50759 Physical activity and time spent in motorized transport moderate the association of neighborhood walkability and BMI

*Jacqueline Kerr, James Sallis - Active Living Research; Lawrence Frank - Lawrence Frank and Company; Brian Saelens - Cincinnati Children's Hospital Medical Center; Terry Conway – SDSU; Kelli Cain - Active Living Research*

**Purpose:** The obesity epidemic is challenging health professionals from many fields. From the urban planning and transportation literature, there is growing evidence of a relationship between the built environment and obesity in adults. Studies have shown that physical activity levels, time spent in the car and neighborhood walkability are related to body mass index (BMI) in adults. No study has included all these variables in a multivariate analysis.
**Methods:** Sixteen neighborhoods were selected in Seattle and King County, Washington that varied in walkability and income, based on Geographic Information System (GIS) and census data. A total of 1218 randomly selected adults aged 20-65 years were recruited. Average daily minutes of moderate to vigorous physical activity (MVPA) were derived from 7 days of monitoring with Actigraph accelerometers. Age, gender, education, BMI and time spent in motorized transport were assessed by standardized surveys. Walkability of the neighborhood within 1 km of each participant s home was measured objectively using GIS-based data.
**Results:** An initial linear regression indicated neighborhood walkability was significantly related to BMI ($p<.001$). A second regression showed that both MVPA ($p<.001$, $R2$ .04) and time spent in motorized transport ($p < .01$, $R2$ .005) were significantly related to BMI. Age, gender and education were also significant. In this model, walkability was no longer significant. This model accounted for 10% of the variance in BMI.
**Conclusions:** The association between walkability and BMI is fully mediated by physical activity and time spent in automobiles. Built environment and its behavioral effects account for a substantial proportion of variance in BMI.

## 5 - 50760 Perceived barriers to healthy eating among Bulgarian adults - demographic and socio-economic variations

*Krassimira Stoeva, Nevyana Feschieva, Stoyanka Popova, Klara Dokova - Medical University of Varna*

**Purpose:** To examine the behaviour and percieved barriers to healthy eating among Bulgarian adults and how these varied by demographic and socio-economic status in order to develop relevant and specific strategies for promotion of healthy eating.
**Methods:** In April -June, 2003 a total sample of 530 adults aged 40 - 75 years, selected randomly from the GP lists of urban and rural areas of North -East Bulgaria were recruited to participate in a survey. Face-to-face structured interviews were used to obtain information on socio-demographic factors, perceived and actual health status; healthy behaviours and dietary pattern;
**Results:** 56.3 % of the participants have never made an attempt to follow a healthy diet. The rural citizens, men, elderly (aged over 65 years), less educated and unemployed participants are less prone to keeping healthy diet. The most common perceived barriers to healthy eating encountered by adult Bulgarians are related to cost (30.6 %); lack of personal will and motivation (28,4 %); insufficient knowledge (18,2 %). Perceived barriers differ by place of residence, gender, educational and socio-economic status.
**Conclusions:** Public health policy should take into account the specific perceived barriers to healthy eating faced by adult Bulgarians, particularly cost, lack of motivation and information on healthy dietary behaviour. Health education needs to be targeted at men, rural citizens and those of lower educational and socio-economic status, not just the population or country as a whole.

## 5 - 50762 Association between obesity and self-rated health with focus on gender and age differences: evidence from a representative sample of Bulgarians

*Krassimira Stoeva, Feschieva Nevyana, Stoyanka Popova, Klara Dokova, Natalya Usheva - Medical University of Varna*

**Purpose:** Recent scientific evidence reveals significant inverse association between BMI and self-rated health, which tend to be age and gender specific. This relationship is not studied for the Bulgarian population to date. Our purpose is to analyse the association between obesity and self - rated health with focus on gender and age differences of the Bulgarians.
**Methods:** A random sample of 530 persons aged 40 - 75 years old from two regions in North-East Bulgaria was drawn from the GP lists. Face-to-face interviews were used to obtain information on subjective health status, socio-demographic and lifestyle factors. Anthropometric measurements were made using standardised instruments.
**Results:** 40.5 % of the total sample is overweight and 33.8 % is obese. In total 55.4 % of the participants evaluated their

health as satisfactory or bad. The proportion of subjects reporting good health tended to decrease with increasing level of obesity and age. A pronounced difference in self-rated health exists between BMI and self-rated health for women but not for men (P<0.05). The associations differed slightly between the age groups and were most pronounced in the age group of 40-54 years old. When controlled for possible confounders, the associations have not changed significantly.

**Conclusion:** The results of this study provide evidence that obesity has a negative impact on self-rated health among Bulgarians. The inverse association between self-rated health and obesity was most pronounced among middle-aged women. There is a need of adequate strategies for obesity prevention among these at-risk population groups in Bulgaria.

## 5 - 50763 Increasing physical activity in children: a pedometer and reward-based intervention

*Charlotte Hardman, C. Fergus Lowe, Pauline J. Horne - University of Wales Bangor*

**Purpose:** Previous research shows that a peer-modelling and rewards intervention leads to long-term increases in children s fruit and vegetable consumption. The current research aimed to evaluate the effects of a new intervention to increase physical activity, based on the same behavioural principles.

**Methods:** During the intervention, 9- to 11-year-old children wore pedometers to monitor their daily activity, were introduced to highly active fictional role models (the Fit n Fun Dudes), and received rewards each day they achieved target increases in their pedometer counts. In Study 1, the intervention was implemented in a school setting. Participants were 89 boys and girls from two schools that were randomly assigned to experimental or control conditions. In Study 2, the intervention was implemented by parents at home and participants were 29 girls, assigned to experimental or control groups. In both studies, pedometers were used to measure child physical activity during an 8-day baseline phase, the 8-day intervention, and at 12-week follow-up. In Study 2, measures of parental physical activity were additionally taken.

**Results/Findings:** In Study 1, the intervention brought about substantial increases in physical activity in the experimental school compared to the control school, which were maintained at follow-up. In Study 2, experimental girls significantly increased their activity during the intervention and remained more active than control girls at follow-up. Parents showed evidence of increased activity on weekend days.

**Conclusions:** These results will inform the future development of an intervention for children that targets both physical activity and fruit and vegetable consumption.

## 5 - 50764 Kindergarteners' obesity associated with low fiber and high meat intakes in Hong Kong

*Tracy Wing-Sze Lo, Georgia Sue Guldan - The Chinese University of Hong Kong*

**Purpose:** To examine Hong Kong kindergarteners' fiber and meat intakes and their relationships with childhood obesity and parental fruit and vegetable consumption frequencies.

**Methods:** Hong Kong kindergarteners (n=187) aged 3 and 4 years and one parent each were surveyed for the children's dietary intakes from three 24-hr dietary recalls and for parents' fruit and vegetable consumption. Descriptive analyses revealed the children's daily fiber and meat intakes and their parent's reported vegetable and fruit consumption. Relationships between child intake variables and childhood obesity, and the parental intake variables were examined using X2 and independent sample t-tests.

**Results:** The children consumed a mean of 126.6(±66.17)g meat, 69.4(±49.18)g vegetable and 126.9(±99.23)g fruit per day, and the prevalence of overweight and obesity was 12.4%. Although only 18% of parents were concerned about low fruit and vegetable consumption among their children, nearly 1/3 of children did not meet recommended fiber consumption of age plus five grams and none reached the DRI fiber recommendation (14g/1000kcal), with the mean consumed only 7.2±2.65g/day. The mean fiber consumption/1000kcal was significantly lower (5.9g vs. 4.2g; P<0.001) and the mean g meat consumed significantly higher (118.9g vs. 146.1g; P=0.045) in overweight/obese children than healthier weight children. The children's vegetable, and combined fruit and vegetable intakes were significantly higher for parents who had adequate fruit and vegetable daily consumption (P=0.020 and P=0.017, respectively).

**Conclusions:** Kindergarteners'parents need effective education about healthy diets.

## 5 - 50765 Explaining older people's food procurement patterns

*Wendy Hunter, Monique Raats, Margaret Lumbers - University of Surrey*

Much of the current understanding of older people's reasons for making particular food choices is based on quantitative and qualitative studies in which participants are asked to reflect on and account for past behaviour. Data from the UK sample (n=43) of a pan-European study of older people's food choices were analysed using the Ecological Framework

(EF) and Social Exchange Theory (SET). EF distinguishes microlevel factors (e.g. health) and macrolevel (e.g. food quality), both can be used to explain food choice. Overlaying SET allows for comparisons of relative costs and rewards during food selection. Data were collected by questionnaire followed by interviewer observations and an interview during an accompanied shopping trip. Inductive content analysis was used. Justifications for food choices provided by questionnaire and whilst shopping were compared using Chi-square tests. Significant differences were observed for seven of 10 factors studied. At the point of purchase (POP) significantly more participants based choices on the microlevel factor habit, and macrolevel factors price and brand then when asked in the questionnaire. The reverse was found for the factors taste, ease of storage, ease of preparation and ease of chewing. At the POP older people's choices appear to be more influenced by macrolevel factors and participants may exchange values such as environmental concern for the reward of lower cost food. The discrepancy between what is said and what is done highlights the importance of recognising the limitations of data collection methods and their influence on conclusions drawn.

## 5 - 50766 Effect of exercise training programs of different intensity but equivalent energy expenditure on overweight women

*Claude Lajoie, Caroline Guimond, Olivier Serresse, Line Tremblay - Laurentian University*

We hypothesized, that a high intensity training program would be more beneficial to change body fatness and other physiological outcomes than a low intensity training program of equivalent energy expenditure (EEE). Subjects were overweight women (21-44 yrs) with a BMI over 25 kg/m2. Two 16 week walking training programs of EEE that elicit an individualize 38500 kcal deficit were designed; one in which the exercise bout varied (VID) in intensity and duration (n = 11), and one in which the exercise bout remained at a constant (CID) intensity and duration (n = 8). Daily energy intake was estimated by using a dietary food record while daily energy expenditure was estimated by 24-h recording of heart rate. Outdoor walking bouts were supervised and oxygen consumption was frequently monitored using a portable gas analyzer. Body fatness was estimated using hydrostatic weighing. Fasting blood samples were analyzed for serum high-density-lipoprotein (HDL) and triglycerides (TG). Preliminary results showed that fat mass decreased ($p=0.05$) and fat-free mass increased ($p<0.05$), but no difference was seen between the groups. The VID group showed a decrease in TG ($p<0.05$) and an increase in HDL ($p<0.05$), however the CID group did not. A negative correlation ($r=-0.74$; $p<0.05$) was found between the energy consumed and expended during a 24 hr period in both groups. High intensity exercise may be more efficient for weight loss per unit of time, as well as beneficial for health, since high levels of TG and low levels of HDL are risk factors of heart disease.

## 5 - 50767 The role of peer and family support on physical activity in underserved adolescents

*Dawn Wilson, Karin Pfeiffer, Alexandra Evans - University of South Carolina*

**Purpose:** The present study examined the role of peer and family support on increasing physical activity (PA) in underserved (minorities, low SES) adolescents during an after-school intervention program.
**Methods:** Twenty-eight students in the intervention school were matched (on race, percentage on reduced lunch, gender, age) with 20 students from another school that did not participate in after-school activities (total sample=30 females, 18 boys; ages 10-12 years; 83% African-American). The intervention was consistent with Self-Determination Theory and Social Cognitive Theory in that it emphasized increasing intrinsic motivation and behavioral skills for PA. Intervention adolescents took ownership in selecting PA activities that were fun and generating their own coping strategies for engaging their friends (having a PA sleepover) and family members in PA. Participants completed measures of peer and family support for PA. PA was measured over five consecutive days at baseline, during a PA sleepover (n=13), and post-treatment using ActiGraph accelerometers.
**Results:** Repeated measures analyses, controlling for sex and BMI showed significant increases in time spent in moderate PA, moderate-to-vigorous PA, and vigorous PA from baseline to week 4 for the intervention (vs. comparison) group ($p<0.05$ for all). Linear regression analyses demonstrated that social support from peers ($R2$ change= 0.61) was a significant predictor of vigorous PA during the sleepover (controlling for baseline PA and BMI; $R2 = 0.72$, $p<0.05$). No effects were demonstrated for family support.
**Conclusions:** These preliminary findings suggest that peer support for PA may be instrumental for increasing vigorous PA in underserved adolescents.

## 5 - 50769 A walkability index and its application to the neighborhood quality of life study: the urban form methods for IPEN

*Lawrence Frank - University of British Columbia; James Sallis - San Diego State University; Brian Saelens - University of Cincinnati; Lauren Leary - LFC, Inc; Kelli Cain, Terry Cain - San Diego State University; Paul Hess - University of Toronto; Jacqueline Kerr - San Diego State University*

**Purpose:** A research design and methodology is presented that enables comparative assessments of objectively measured physical activity across walkability and income in 32 neighborhoods in Seattle - King County and Baltimore regions.
**Methods:** Walkability includes land use mix, residential density, street connectivity, and a measure of building floor are / lot size. Walkability provides the basis for contrasting physical activity and body mass index between neighborhoods with similar income but differing urban forms when matched with Census data on income. Sixteen neighborhoods were selected in Seattle - King Count that varied in walkability and income. A total of 1218 adults aged 20-65 years were recruited. Census journey to work data helps validate the walkability index.
**Results:** The percentage of King County workers who walked to work was 3% - 6% higher in high walkability than in low walkability neighborhoods. The low walk / high income neighborhoods had 4%, who rode transit and 80% who drove to work. Respondents in high walk / high income neighborhoods had a mean BMI of 25.5 compared to 26.5 for respondents in low walk / high income neighborhoods. Rrespondents in high walk / low income neighborhoods had a mean BMI of 25.5 as compared to 27.5 in low walk / low income neighborhoods (F = 7.18 / P = 0.008).
**Conclusions:** Walkability is associated with work related travel patterns and significantly associated with mean BMI for both low and high income neighborhoods. Differences in BMI across levels of walkability are greater in lower income neighborhoods.

## 5 - 50770 Relationship between dosage of PACE+ intervention and dietary and physical activity outcomes in adolescents

*Kevin Patrick, Gregory Norman – UCSD; Jacqueline Kerr - Active Living Research; Karen Calfas – SDSU; James Sallis - Active Living Research*

**Purpose:** We conducted a randomized, controlled trial of a multimodal intervention to improve diet and physical activity (PA) behaviors in adolescents.
**Methods:** Adolescents aged 11-15 were recruited through primary care providers. Participants were randomized to the PACE+ intervention or a Sunsmart control condition. In addition to computer-assisted behavior assessment and action planning followed by tailored provider counseling, 11 extended stage-matched phone calls were scheduled throughout the 1-year intervention period. Low dosage was considered 0-8 calls and high dosage 9-11. Meeting national guidelines for PA, hours of television and dietary intake were measured by accelerometer, self report and 24 hour recall, respectively. Logistic regression models controlling for age, ethnicity, BMI and baseline status were conducted in boys and girls separately.
**Results:** Compared to the control group, girls who completed 9-11 phone calls (n=140) were significantly more likely to meet guidelines for % calories from saturated fat (OR: 1.62, 95% CI: 1.03-2.55), fruit and vegetable servings (OR: 1.77, 95% CI: 1.03-2.92) and hours of TV viewing per day (OR: 1.91, 95% CI: 1.05-3.47). Boys who received both a low (n= 73; OR: 3.10, 95% CI: 1.70-5.67) and high (n= 125; OR: 1.80, 95% CI: 1.10-2.95) dose intervention were significantly more likely to meet PA guidelines than the control group.
**Conclusions:** More frequent stage matched phone counseling may be required to improve diet and PA behaviors in adolescents. Previous unsuccessful interventions may have had insufficient contact with participants.

## 5 - 50771 Walking during lunch break

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**Purpose:** To determine whether walking during lunch break is attractive, feasible and effective to stimulate employees in sedentary work to be physically more active.
**Methods:** The effect of a campaign to stimulate walking during lunch break on the amount of physical activity of employees has been studied in a controlled study with a pre-post-test design and a one-year follow-up. The intervention group consisted of two companies where the campaign has been run (N=1150) and two other companies served as a control group (N=370). To determine the effect of the company environment this project is performed in companies with a 'green' or 'grey' surrounding. At the start and at the end of the year questions were asked about physical activity in general, the way of spending lunch time, and factors that promote or hinder walking during lunch time. Employees of the intervention companies were asked monthly about their walking activities during lunch time.
**Results:** Although the campaign was well received and our participation goal was achieved the improvement in frequency of walking during lunch break was small and not significant different from the results of the control group. However, physical activity in leisure time significantly increased in the intervention group compared to the control group. The company environment does not seem to have an influence on the results.

**Conclusion:** The campaign was not effective in promoting walking during lunch break, but it did result in a higher amount of physical activity in leisure time.

## 5 - 50773 The validity of walk test fitness estimates in obese and morbidly obese is challenged by hope trial findings

*Mace Coday, Grant Somes, Sara Perry - The University of Tennessee Health Science Center; Mary O'Toole - Washington University*

**Purpose:** The Rockport One Mile Walk Test provides an acceptable measure of estimated fitness validated for use in overweight populations. Use of Walk Testing in an ongoing RCT indicates that estimation of fitness levels may lack validity in physically deconditioned obese-morbidly obese (BMI >30 and BMI >40 respectively) participants.
**Methods:** 361 obese-morbidly obese patients (avg. BMI=37; 25% BMI>40) were randomly assigned to Usual Care (exercise facility), Peer Support (facility plus peer), or Provider Support (facility plus provider) to increase physical activity. Rockport estimated fitness (estimated V02Max), BMI, perceived health, and efficacy to perform walking were obtained at baseline and six months following intervention. Findings from chi-square and correlation analyses are presented.
**Findings:** 9% obtained invalid V02Max scores (negative values) at baseline versus 5% at follow up. No proportional difference amongst groups in negative responders was found at baseline (p= .5765) or 6 months (p= .6163), nor was the decrease in negative scores greater by group. Of 257 participants with pre-post V02Max, more than half (55.3%) improved fitness 10% following intervention. No improvements were significant amongst three groups using Pearson x2 test with 2 d.f. (UC=52.2%; Peer=56.2%; Provider=57.5%). Correlation of baseline BMI with V02Max was -.57 (p<.0001) and BMI with reported health status was .17 (p<.01). Perceived performance efficacy correlated negatively with BMI (r=-.42, p<0001) and positively with V02Max (r=.24, p<.001) following intervention.
**Conclusions:** Walk Testing may be an invalid measure of fitness in extremely overweight, deconditioned persons suggesting the need for validation of measures to account for possible difficulties exerting.

## 5 - 50775 Determinants of bycicle use by college students in 4 Spanish universities

*Carmen Guillen-Grima, Ines Aguinaga-Ontoso, Francisco Guillen-Grima - Public University of Navarre*

**Fundament:** The use of bicycle riding by college students in cities is desirable because reduces environmental pollution, as well as traffic jam, and increases fitness
**Material and methods:** The study was performed in four universities: Public University of Navarre (UPNA), University of Murcia (UM), University of Navarre, and Cartagena Polytechnic University, in 3 cities Pamplona, Murcia and Cartagena. There is not bicycle lane in any of them. A sample of 1951 students was selected using cluster sampling. A ques-tionnaire that asked for bicycle use in the city, and intention to use bicycle in case bicycle lanes were created was used.
**Results:** A 6,9%, of students usually rides a bicycle while 12,8% does occasionally. Bicycling as mean of transportation was higher in men, 11,8% than in women 4,2%. With an OR of 3,68 (95% CI 2,45-5,54), Occasionally use was also higher in men with an OR of 3,86 (95% CI 2,41-5.66) than in women. There were also difference by social class , 40% of women whose parents has no education used bicycle daily versus a 4% of those whose parents have college degrees. 37,6% of the students said that they would use bicycle as mean of transportation if there were a bicycle lane that drived to their university. There were differences in the intention to use bicycle by universities 45,5% of students from UPNA would use bicycle, versus 24,4% of those of UM.
**Conclusion:** the installation of bicycle lanes, driving toward UPNA will increase bicycle use.

## 5 - 50776 A fruit and vegetable delivery program during breast cancer treatment affects personal and environmental factors of intake, and quality of life (QOL)

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**Purpose:** Increasing fruit and vegetable (F&V) intake may improve QOL during breast cancer treatment and prevent recurrence. Effects of an intervention to improve F&V availability during treatment were measured on personal and environmental (availability) factors associated with intake and QOL.
**Methods:** A convenience sample of women with breast cancer was recruited from treatment clinics in a Toronto hospital from July to November 2003. F&V were delivered to participants' homes weekly for 6 months. Questionnaires at baseline, 6, and 12 months measured changes in F&V intake, preferences, readiness to change, self-efficacy, availability, QOL and social support, during and after food delivery.
**Results:** Of 51 women recruited, 48 completed questionnaires at baseline (94%), 33 at 6-months (65%) and 31 at 12-

months (61%). All underwent treatment during food delivery, and most (94%) had finished by 6 months. At 6 months there was an increase in F&V intake (using a single-item question), and fruit and total F&V availability. Many (48%) shifted their readiness to consume more F&V, with 75% progressing to a higher level. Psychological well-being also increased. At 12 months there was an increase from baseline in F&V intake, but not in availability. Shifts in stages of change were the same as at 6 months. Psychological well-being increased as did social well-being and total QOL.
**Conclusions:** A F&V delivery program designed to address personal and environmental factors of consumption may increase F&V availability, intake, readiness to change, and QOL during cancer treatment, and effects may continue 6 months after intervention and treatment are finished.

## 5 - 50777 Parents' and daughters' television viewing and family meal patterns

*Lori Francis, Leann Birch - Penn State University*

**Purpose:** To examine links between parental television (TV) viewing and daughters' TV viewing, weight status and frequency of eating meals with family.
**Methods:** Participants included 176 11-year-old girls and their parents. Parents self-reported their TV viewing patterns; mothers' and fathers' average hours of TV viewing were combined to create a parental measure of average TV viewing. Mothers reported girls' TV viewing patterns. Three 24-hour recalls were used to assess daughters' meal patterns. Parents' and girls' body mass index (BMI) was calculated from measured height and weight.
**Results:** Parents' and girls' TV viewing were highly linked ($r = 0.50$, $p < .001$). Parents' TV viewing was positively linked to girls' BMI z-score ($r = 0.14$, $p < .05$). Parents' TV viewing was also positively linked to daughters' eating during TV viewing ($r = 0.44$, $p < .001$), and negatively linked with the frequency with which daughters ate meals at the table with family members ($r = -0.35$, $p < .001$). Girls with higher BMI z-scores ate fewer meals with family members ($r = -0.18$, $p < .01$). The best predictors of daughters' frequency of eating meals with family members were girls' TV viewing, parents' TV viewing, and mothers' BMI.
**Conclusions:** Parents' own TV viewing influences daughters' TV viewing and family meal patterns. These findings suggest that one approach to reducing TV viewing in children may be to focus on reducing parents' TV viewing.

## 5 - 50779 A wellness intervention program (DHS) for corporate employees in Mexico

*Elizabeth Noriega, Francisco Ysunza - Deporvida Alto Rendimiento, S. C.*

An ongoing intervention program (DHS) was established for employees of a brand-name sport beverage company in Mexico. Health risk factors and behavior on eating, physical activity and other health related habits were determined from a written questionnaire, 3-day self-recorded log of food intake and activity, submaximal cardiorespiratory fitness evaluation, body mass index (BMI) and body composition (whole-body tetrapolar bioelectrical impedance analysis, BIA). Workshops on nutrition, physical activity and other behavioral health-related topics were conducted in two group sessions. A series of five sessions for personal counseling were completed through 21 weeks. BMI and BIA evaluations were repeated up to three times. A total of 92 different types of newly acquired and modified habits for 44 office employees (21 females, 23 males) were recorded (68% related to eating, 11% to physical activity and 21% to other health related habits). Measurements of 39 of these participants (females=19, males=20, age=31.5±6.5, initial BMI=23.7±4.7) showed initial health risk in 15 cases for BMI and in 16 cases for body fat. Favorable changes were found in 10 cases for BMI (all of initial risk), 22 cases for body fat (10 of initial risk), and 36 cases for increased muscle mass. Most frequent self-reported benefits at 21 weeks showed improvements in stress, sleep, fatigue, gastric upsets, headaches, mood, fitting of clothes, hunger, and anxiety. Intervention with group education along with personal counseling in the workplace is viable for development of a variety of health related behaviors that reduce risk and improve wellness of office employees in Mexico.

## 5 - 50783 Variability in behavioural and physiological responses to imposed exercise in obese females: why do some people fail to lose weight?

*Phillipa Caudwell, Marrissa Martyn St-James, John Blundell - University of Leeds; James Stubbs - Rowett Research Institute*

**Purpose:** Evidence suggests that there is either no or partial compensation for exercise interventions lasting 2-14 days (King et al, 1997; Stubbs et al, 2004). This study forms part of a project to identify characteristics of individuals who display resistance or susceptibility to the beneficial effects of 12 weeks of exercise on body weight.
**Method:** Six females (BMI = 34 ±3.6 kg/m2; age = 44 ±5.2 yrs) exercised 5 times/wk at 70% max HR for 4 weeks under supervised conditions in the research unit. Mean duration, heart rate and energy expenditure of each exercise session were 60 ±5 min, 135 ±8 bpm and 526 ±62 kcal respectively. Body weight, body composition, and resting metabolic rate (RMR) were measured on probe days during weeks -1 and 4. Total energy intake (EI) was also measured using ad libitum test meals administered in the research unit during probe days.

**Results:** Mean (1.1 ±1.2 %) reduction in % body fat approached significance (t=2.34, p=0.061), however there was a large inter-individual variability (-3.1 to + 0.2 %). Mean change in body weight (-1.58 ±2.41 kg) and RMR (98 ±212 kcal) failed to reach significance, however, the variability was also large (- 6.0 to + 0.9 kg and - 214 to + 415 kcal respectively). The increase in EI (442 kcal) was significant, with all volunteers compensating at wk4 compared with wk-1 (t=2.70, p<0.05).
**Conclusion:** These results provide evidence that the same volume of imposed exercise induces variability in physiological responses, but a consistent (partial) compensatory increase in EI.

## 5 - 50789 A longitudinal confirmatory factor analysis of self-efficacy for middle school youth physical activity

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**Purpose:** The purpose of the study was to examine whether self-efficacy and proxy efficacy measures for physical activity were stable across developmental periods in middle school youth.
**Methods:** Participants were 1284 students (586 boys and 698 girls) enrolled in 16 middle schools located in rural, urban, and suburban areas of a Midwestern state. The measures were administered to students in groups of 20-25 in the Spring semesters of 2000, 2001, and 2002 when students were in the 6th, 7th, and 8th grade, respectively. Self-efficacy and proxy efficacy for physical activity were measured with a sixteen-item scale which consisted of four separate but correlated factors. The routine of longitudinal factorial invariance involved testing and comparing a series of multi-sample models using confirmatory factor analysis (CFA) with full-information maximal likelihood (FIML) estimation.
**Results/Findings:** Preliminary single group analyses indicated an acceptable four-structure baseline model for both self-efficacy and proxy efficacy for physical activity measures at the three times of assessment. Furthermore, the results of the progressive application of constraints (equality of factor loadings, factor variances/covariances, and item uniquenesses) in the analyses indicated that the scores for the four subscales exhibited longitudinal structure invariance over the period of the three years.
**Conclusions:** The findings of this study support the longitudinal factorial invariance of the self-efficacy and proxy efficacy for physical activity measures. Strong longitudinal factorial invariance demonstrates that the means and standard deviations of the factors of the scale are comparable across the developmental periods in middle school youth.

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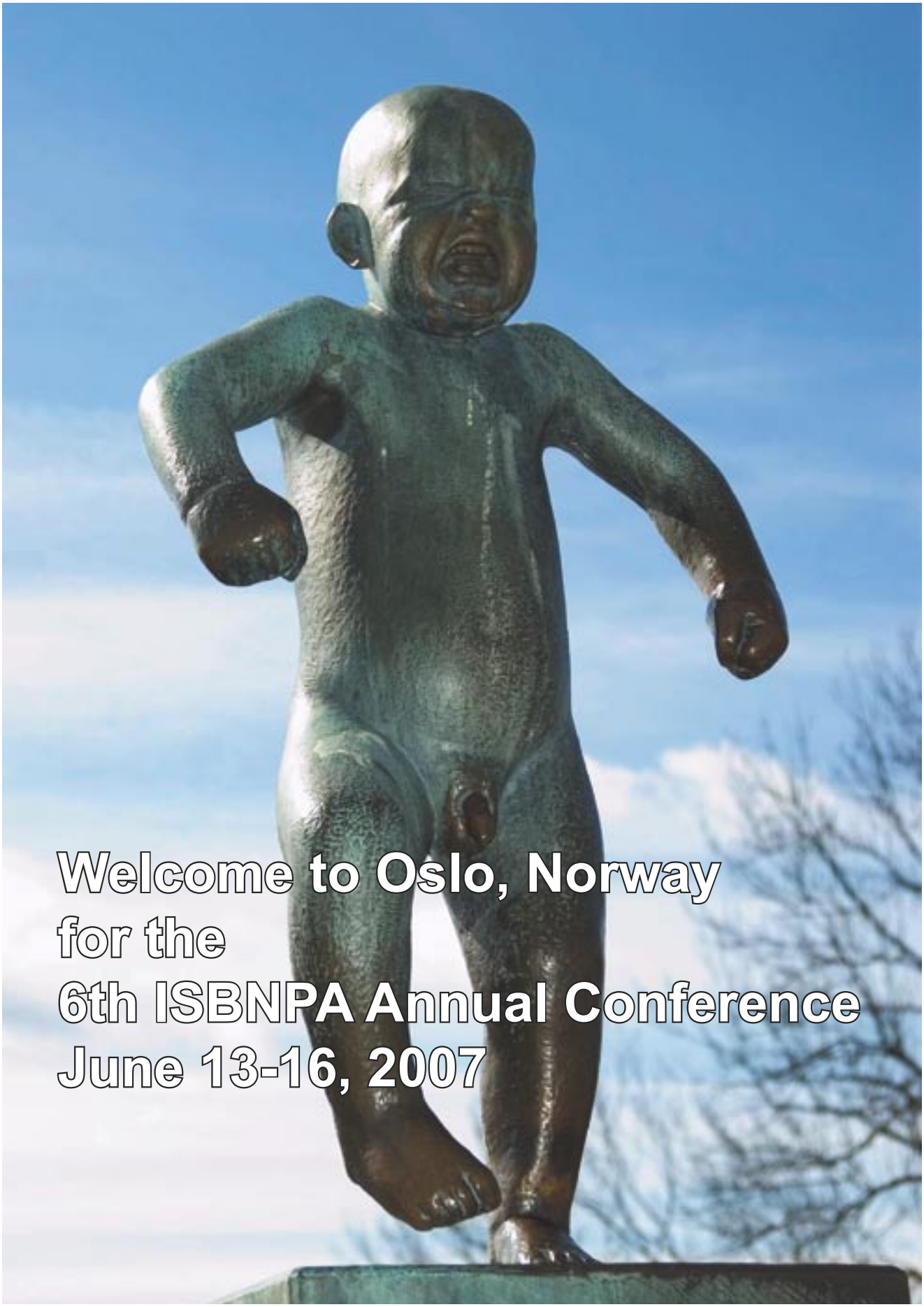
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