Program

October 9th
18:45 Bus departures from BSÍ (Reykjavík Bus terminal) to Welcome reception in Laugar
19:00 – 20:15 Welcome reception and registration (World Class, Laugar)
20:30 Bus departures from World Class, Laugar, to the Conference hotel in Selfoss, Hotel Selfoss

October 10th
07:30 – 08:30 Registration at conference venue Hotel Selfoss
08:45 – 09:00 Opening remarks: Kristín Ingólfsdóttir, Rector, University of Iceland (Room: Aðalsalur)
09:00 – 09:45 Introductory lectures. Chair: Erlingur Jóhannsson, University of Iceland
   Elizabeth Waters (University of Melbourne, AUS): Developing, evaluating, and translating community and population level interventions to address childhood obesity
09:45 – 10:30 Ellen Evans (University of Illinois, USA): Inerdisciplinary translational Approaches to Enhance Weight Management in the Child to Young Adult
10:30 – 10:45 Break
10:45 – 12:30 Oral presentations: Interventions and longitudinal studies (Room: Aðalsalur)
   Chairs: Ingibjörg Gunnarsdóttir, University of Iceland & Ulf Ekelund, MRC Epidemiology Unit, Cambridge, UK
12:30 – 13:15 Lunch
13:15 – 14:30 Poster presentations (Room: Suðursalur). Chairs: Erlingur Jóhannsson, University of Iceland & Sigurbjörn Árni Arngrímsson, University of Iceland
14:30 Bus departs for Laugarvatn - Gullfoss - Geysir
17:00 – 17:45 Introductory lecture. Magnús Scheving – Lazytown
20:00 Hótel Geysir – Dinner (A bus to Hotel Selfoss will be provided after dinner)

October 11th
08:30 – 09:15 Introductory lectures (Room: Aðalsalur). Chair: Sigurbjörn Árni Arngrímsson, University of Iceland
   Joey Eisenmann (Michigan State University, USA): Physical Activity, Fitness and Metabolic Syndrome in Children and Adolescents
09:15 – 10:00 Ruth Loos (MRC Epidemiology Unit, Cambridge, UK): Physical Activity – Where Do Genes Fit In?
10:00 – 10:15 Break
10:15 – 12:00 Oral presentations: Prevention and Public Health (Room: Aðalsalur)
   Chairs: Anna Sigríður Ólafsdóttir, University of Iceland & Chris Riddoch, University of Bath
12:00 – 13:00 Lunch/ Poster presentations
13:00 – 13:45 Introductory lectures (Room: Aðalsalur). Chair: Þórólfur Þórlindsson, University of Iceland.
   Angie Page (University of Bristol, UK): Social, Environmental, and Behavioural Determinants of Children’s Health
13:45 – 14:30 Inga Dórsdóttir (University of Iceland, ICE): Nutrient Intake Among Children and Adolescents: From Science to Practice
14:30 – 14:45 Break
14:45 – 16:30 Oral presentations: Epidemiology (Room: Aðalsalur).
   Chairs: Þórarinn Sveinsson, University of Iceland & Lars Bo Andersen, Norwegian School of Sport Sciences
16:30 – 16:45 Final remarks. Karsten Froberg, University of Southern Denmark
17:00 Bus departures from Hotel Selfoss to BSÍ
Abstracts

Oral Presentations
Oral Presentations – **Interventions and Longitudinal Studies**

October 10th, 2008 10:45-12:30, Room: Aðalsalur (Banquet 1)

**Chairs:** Ingibjörg Gunnarsdóttir, *University of Iceland.*  
Ulf Ekelund, *MRC Epidemiology Unit, Cambridge, UK.*

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1 October 10th 10:45 – 11:00

**Longitudinal associations between active commuting to school, physical activity and fitness**

Ashley Cooper¹, Lars Andersen², Niels Wedderkopp², Angie Page¹, Karsten Froberg². ¹University of Bristol, Bristol, United Kingdom. ²University of Southern Denmark, Odense, Denmark.

**Background**

Observational studies have shown that young people who walk or cycle to school are more active than those travelling by car. Cycling to school has also been associated with higher cardiorespiratory fitness (CRF). However, these observations are limited by the cross-sectional nature of the studies and would be strengthened by identifying whether change in travel mode was associated with changes in physical activity or CRF. This study investigates this issue within two cohorts measured at two time points.

**Method**

Associations with CRF were investigated in the European Youth Heart Study. Participants were 384 children who participated in the study in 1997 and who were followed up six years later. CRF was assessed by a maximal cycle ergometer test. Associations between change in travel mode to school and objectively measured physical activity (Actigraph GT1M) were investigated in participants in the PEACH project, a longitudinal study investigating the personal and environmental determinants of physical activity across the transition from primary to secondary school in English primary school children.

**Results.**

In the EYHS, higher CRF was significantly associated with cycling to school in children and adolescents of both sexes. Longitudinal regression models showed that a change in travel mode from non-cycling to cycling was a significant predictor of CRF at follow-up (p<0.001) after adjustment for potential confounders. Preliminary analyses from the 197 children who provided follow-up data to date within PEACH indicate that physical activity was significantly lower (P=.047) in those children who changed from active to passive travel to school compared with those using active travel at both time points.

**Conclusion.**

Longitudinal changes in travel to school are associated with changes in physical activity and CRF, supporting the observation that active travel to school may contribute to higher physical activity and cardiovascular fitness in young people.

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2 October 10th 11:00 – 11:15

**Cardiorespiratory fitness and clustered cardiovascular risk**

Geir K. Resaland¹, Sigmund A Anderssen², Lars B Andersen². ¹Sogn og Fjordane University College, Sogndal, Norway. ²Norwegian School of Sport Sciences, Department of Sports Medicine, Oslo, Norway.

**Background**

Recently, it was shown that low cardiorespiratory fitness (fitness) is a strong predictor for clustering of cardiovascular disease (CVD) risk factors in children (Anderssen et al., 2007), and that fitness are independently associated with clustered metabolic risk in children (Ekelund et al., 2007). Still, limited research exists on nine-year-old children, and therefore the association between fitness and clustering of CVD risk factors remains uncertain.

**Methods**

We examined the association between fitness and clustering of CVD risk factors in 111 boys and 116 girls (mean age 9.3±0.3) in a representative sample of healthy, rural Norwegian children. VO2peak was directly measured during a continuous progressive treadmill protocol. To determine the level of total risk, five CVD risk factors were selected: HOMA score, waist circumference, triglycerides, systolic blood pressure and total cholesterol to HDL ratio.

**Results**

One-way ANOVA analysis including a Tukey post hoc test showed that for both sexes the children in quartile 1 (the least fit children) had significantly higher risk of clustered CVD risk than the children in all other quartiles.
Conclusion

Low fitness was a strong predictor for total CVD risk factor level, and children in the least fit quartile had significantly poorer CVD risk factor values than all of those in the other quartiles. These results support the hypothesis that fitness is an important health marker in children. Additionally, the results indicate that fitness status could define target populations for intervention; therefore it should logically be part of the definition of the metabolic syndrome in the same way as fatness is. Finally, the strong association between fitness and CVD risk factors adds to the argument for increasing health-related fitness testing among children.

The county of Svendborg in Southern Denmark has decided to start 6 ‘sport schools’, where the pupils will receive 3 X 2 physical education lessons per week, in contrast to the normal 1 X 2 lessons per week. This has given us the opportunity to investigate the effect of increased physical education on childhood health. Four studies have been started, and the pupils will be followed for three years. The studies will investigate the differences between the sport schools and the control schools.

The focus will be on:
Risk factors of CVD, NIDDM and metabolic syndrome
Risk of injuries
Risk of back problems
Development of motor skills.

Increased physical activity is known to improve the metabolic profile of both children and adults. Study 1 will investigate the effect on total physical activity and known risk factors of life style diseases.

Overweight has been shown to increase risk of injuries and the severity of the injuries in schoolchildren. Study 2 will look at the effect of the extra physical education on injury incidence. The children will be contacted once a week to check if they have had an injury.

Back problems has been shown to emerge in childhood. Study 3 will, as the first study, investigate the incidence of back problems in children, and the effect of different sports on the incidence of back problems.

Motor skills develop at different pace in different children. Study 4 will investigate whether increased physical education will provide better motor skills and more talents for sports.

770 pupils from the sport schools and 744 pupils from four control schools aged 5 to 11 years have been sampled and asked to participate. Baseline data were collected during September. The studies will be presented and, if possible, base line data presented.

A school-based physical activity program improves health and fitness in school children (KISS): a cluster-randomized trial

Susi Kriemler1, Lukas Zahner4, Ursina Meyer4, Helge Hebestreit2, Willem Van Mechelen3, Jardena Puder5. 1University of Basel, Basel, Switzerland. 2Children's University Hospital, Wuerzburg, Germany. 3VU University Center, Amsterdam, The Netherlands. 4Division of Endocrinology, Diabetes and Metabolism, University of Lausanne, Lausanne, Switzerland.

BACKGROUND

Obesity and physical inactivity are increasing dramatically worldwide with detrimental effects on physical and psychological health at all ages. Schools provide an ideal setting for preventive interventions. However, most school-based prevention programs have been ineffective. We therefore conducted a randomized controlled trial to determine whether an intense multi-component school-based physical activity program during a full school-year improves physical and psychological health in young schoolchildren.

METHODS

Twenty-eight classes were randomly allocated to the intervention (16 classes, n=297) and control (12 classes, n=205) group. The intervention included daily physical education (i.e. two additional lessons per week), short activity breaks during academic lessons, and physical activity homework. Primary outcome measures included
RESULTS
Compared with controls, children in the intervention group showed statistically significant decreases in the sum of four skinfolds (adjusted difference –1.78mm; 95%-CI -3.38 to -0.19), BMI (adjusted difference –0.22; 95%-percent confidence interval [CI] -0.38 to –0.05), BMI z-scores (adjusted difference -0.09; 95%-percent confidence interval [CI], -0.18 to -0.003), and significant improvements in aerobic fitness z-score (adjusted difference 0.22; 95%-CI, 0.01 to 0.42). There was also a significant improvement of the cardiovascular risk score (adjusted difference -0.18; 95%-CI, -0.30 to -0.05). Overall daily physical activity and quality of life did not change.

CONCLUSIONS
Our findings show that a stringent multi-component school-based physical activity intervention can improve physical fitness and reduce adiposity and cardiovascular risk factors in children.

5 October 10th 11:45 – 12:00

Free breakfasts in primary schools: a cluster randomised trial of a Government Policy Intervention

Laurence Moore1, S Murphy1, G Moore1, K Tapper1, R Lynch1, C DeSousa1. 1Cardiff University, Cardiff, United Kingdom

Objective To assess the 12-month effects of the Free School Breakfast Initiative in Wales
Design Cluster randomised controlled trial
Setting Primary schools in nine local education authority areas
Participants 4,350 students aged 9-11 in 111 schools
Intervention A healthy breakfast provided free of charge to students on school premises prior to the start of the school day
Main outcome measures Primary: the proportion of students consuming two breakfasts over two days; episodic memory; number of healthy food items consumed at breakfast and number of unhealthy food items consumed at breakfast. Secondary: attitudes towards eating breakfast; rest of day healthy food items; rest of day unhealthy food items; scores on the hyperactivity/inattention scale of the teacher-reported strength and difficulties questionnaire, and parental reports of frequency of eating breakfast at home and at school
Results Students in intervention schools reported significantly higher numbers of healthy food items consumed at breakfast (+0.23, 95% CI: 0.09, 0.37) and more positive attitudes towards breakfast eating than students in schools that were not part of the Free School Breakfast Initiative. Parents of students at intervention schools reported significantly higher rates of students’ consumption of breakfast at school, with a correspondingly lower proportion of students reported by their parents to be eating breakfast at home. No other significant differences were found.
Conclusions: The intervention was associated with an improvement in children’s nutritional intake at breakfast time but did not increase overall food consumption and had no significant impact on concentration or behaviour.

6 October 10th 12:00 – 12:15


Thrudur Gunnarsdottir1, Anna Olafsdottir1, Urdur Njardvik1, Ragnar Bjarmason2. 1University of Iceland, Reykjavik, Iceland. 2Landspitali, University Hospital, Reykjavik, Iceland.

Background: Obese children and adolescents often face stigmatization and discrimination in their lives. The effects thereof can have a profound impact on their psychological well-being.
Aims: The aim of this study was to assess the effectiveness of a family-based behavioral treatment program in a clinical setting in Iceland. Psychological and behavioral measures were among those collected before and after treatment.
Methods: Participants were 84 obese children aged 7-13 years (BMI > 2.5 SD) and one participating parent for each child. Treatment consisted of 12 weeks delivered over 18 weeks. The children were tested at baseline with the Strength and Difficulties Questionnaire (SDQ), Children’s Depression Inventory (CDI), Multidimensional Anxiety Scale for Children (MASC) and The Piers-Harris Self Concept Scale (Piers-Harris).
Results: Psychological and behavioral problems were prevalent at baseline according to SDQ, CDI, MASC and Piers-Harris. Of the 84 families who started treatment 60 families completed post-treatment measures. There were no significant differences in psychological outcomes at baseline between children who completed treatment and those who dropped out prematurely (p > 0.05). All psychological measures improved significantly from pre
treatment to post treatment (CDI mean pre treatment; 48.33 vs. 44.9 post treatment; p < 0.01, MASC; 53.09 vs. 49.93; p < 0.05, Piers-Harris; 56.85 vs. 60.38; p < 0.001). The only pre treatment outcome that correlated significantly with decreases in children’s BMI was outcome on the MASC with higher scores (more anxiety) leading to greater improvements in their BMI value post treatment (p = 0.016).

Conclusions: Prevalent difficulties at baseline had mostly non significant effects regarding treatment withdrawal and efforts to decrease children’s BMI, with the exception of more anxiety predicting better outcomes in terms of decreased BMI. Further analyzing remains to be done on the possible relationship between the children’s nutritional profiles, physical fitness and exercise and psychological well-being.

7 October 10th 12:15 – 12:30

**Lifestyle of 7-9 year old – Intervention towards better health – Design and methods**

Kristján Pór Magnússon¹, Ingvar Sigurgeirsson², Hannes Hrafnkelsson¹,², Ása Guðrún Kristjánsdóttir¹,³, Ínга Þórsdóttir¹,³, Erlingur Jóhannsson¹,⁴, University of Iceland, Reykjavik, Iceland. ²School of Education. ³School of Health Sciences. ⁴Center for Research in Sport and Health Sciences.

Increasing number of children is experiencing excessive weight gain during early childhood. As an attempt to increase awareness and emphasize the importance of physical activity and healthy dietary habits among elementary school students, a two year school-based intervention program was executed. Overall objective of the study was to investigate the effect of the intervention on an array of physical attributes and on healthy lifestyle awareness. The two main goals of the intervention were to 1) better integrate physical activity into the daily routine at school aiming towards at least 1 hour of physical activity for every child in the participating grade. 2) To promote healthy food habits e.g. by introducing new learning materials for the participating age-group focusing on improving nutritional knowledge. The two-year intervention was evaluated with a cluster-randomized trial. Study participants were 7 years old at study entry, from six elementary schools in Reykjavik, Iceland. Three schools comprised the intervention group and three schools served as controls. All students in the participating intervention schools (N = 300) partook in the program throughout the study period, but approx. 80% of total participants underwent all/some aspects of the pre/post measurements. The main outcome measures were BMI, sum of skinfolds, fitness, physical activity, cardiovascular risk factors in blood, bone density, and dietary intake. All measures were conducted pre- and post intervention. Process measures included teacher, pupil and parental evaluations of the different methods used to achieve the primary goals of the intervention. Participation, appreciation and satisfaction with the program were also evaluated.

This intervention program is unique for its wide array of outcome measures in combination with a two-year long program including a young age group. School-teachers may play a pivotal role in reversing the trend of excessive overweight and obesity among young children.
Effects of new nutritional recommendations on Icelandic infants

Asa Vala Thorisdottir1, Inga Thorsdottir1, Gestur Palsson2. 1University of Iceland, Reykjavik, Iceland. 2Children’s Hospital, Landspitali-University hospital, Reykjavik, Iceland.

Objectives: Icelandic recommendations for diet in infancy were revised in 2003. A study on infant nutrition 1995-97 showed low iron status and high protein intake. The aim of this study 2005-07 was to investigate the effects of the recommendations on the diet and iron status by comparison to earlier results. Furthermore, to analyze the effect of socioeconomic factors on compliance to public health recommendations.

Methods: A randomized sample of Icelandic 4-month-old infants was selected by Statistics Iceland. Dietary history was used to evaluate food intake from 0-4 months and monthly information about the diet was collected by 24h food records at 5-8 and 10-11 months and by 3 day food records at 9 and 12 months (n=250). At 12 months parents answered a questionnaire on social background (n=202) and blood samples were collected and iron status evaluated (n=140).

Results: In the present study there were no anaemic children (Hb<105g/L, s-ferritin<12µg/L, MCV<74fl); 4.3% were iron deficient (s-ferritin<12µg/L, MCV<74fl) and 5.8% had depleted iron stores (s-ferritin<12µg/L) vs. 2.7%, 20% and 41% respectively in the previous study. The main dietary changes were in line with the new recommendations, i.e., a lower consumption of unmodified cows’ milk which was replaced by iron-fortified follow-on milk. Other dietary changes were e.g. increased consumption of porridges and fruits. Duration of exclusive breastfeeding was longer in the present study compared to the former study, 4 vs. 3 months (median). Furthermore, protein intake has decreased significantly since 1995-97. The socioeconomic factors influencing infant’s diet significantly were age, education and family income.

Conclusion: Recommendations 2003 and comprehensive changes in infant feeding have improved iron status of Icelandic 12-month-olds. Socioeconomic factors influence compliance to public health recommendations, thus it’s important to find ways to reach the parents of lower socioeconomic status for better nutrition for all children.

Dietary intake and physical activity of Icelandic 3- and 5-year-old children, in relation to public recommendations and association with socioeconomic factors.

Tinna Eysteinsdóttir4, Ingibjörg Gunnarsdóttir1, Inga Þórsdóttir1. 1University of Iceland, Reykjavik, Iceland.

Objectives: Gathering information on food consumption and physical activity of Icelandic 3- and 5-year-old children, compare gathered information to public recommendation and assess association with sociodemographic factors.

Design: Estimated food recording of 3 consecutive days, and a questionnaire on physical activity and socioeconomic factors.

Setting: Capital area of Iceland.


Results: The 3- and 5-year-old children’s average intake of fruits (112g/d) and vegetables (32-44g/d) was low and far from meeting recommendations. Parents education and family’s income was positively correlated to children’s fruit and vegetable intake. Average fibre consumption (12-13g/d) was below recommendations and was positively correlated to family’s total income. Children’s average fish consumption (42-49g/d) was in line with recommendation as was average milk and dairy consumption (2.3 portions/d). Average intake of micronutrients was in line with public recommendations, except for vitamin D where only 30% of participating children received the recommended level of intake (10µg/d). Average weekly consumption of sweetened drinks was 427ml and 609ml for the 3 and 5-year-olds respectively. Added sugar in the children’s diet provided 7.6E% and 9.1E% for the 3- and 5-year-old children respectively. The children reached recommended levels of physical activity.
approximately six days out of seven on average and physical activity levels were negatively correlated to time spent in front of a TV/computer.

Conclusion: The average diet appeared nutritious though certain aspects need further improvements. The diet of Icelandic children seems to have improved over the last years, as reflects in the higher average consumption of fruits and vegetables and lower intake of sweetened drinks and added sugar. Healthier choices, concerning food and physical activity, were generally linked to higher social status which indicates that certain groups may need more or alternative guidance to heighten their awareness on the importance of healthy lifestyle choices.

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<td>10 October</td>
<td>10:45 – 11:00</td>
<td><strong>Food and nutrient intake of 7-year-old children in Iceland-</strong>&lt;br&gt;<strong>Adherence to food based dietary guidelines</strong>&lt;br&gt;&lt;br&gt;<strong>Asa Gudrun Kristjánsdóttir</strong>, Inga Thorsdóttir. ¹University of Iceland, Reykjavík, Iceland. ²Unit for Nutrition Research, Reykjavík, Iceland.&lt;br&gt;&lt;br&gt;Objective: To evaluate the diet of 7-year-old children by comparison with food based dietary guidelines and recommended nutrient intake.&lt;br&gt;Design: A cross-sectional study was conducted, weighed 3-day dietary records were used to analyse food and nutrient intake. Height and weight was measured.&lt;br&gt;Setting: The sample (n=265) consisted of children from second grade in six randomly selected schools, in Reykjavík capital of Iceland.&lt;br&gt;Results: 216 returned dietary records (82%). Average intake of fruits was 140g/d for girls and 124g/d for boys and for vegetables it was 37g/d and 43g/d respectively. 46% of the girls and 59% of the boys met the recommendation to eat fish twice a week. 35% of the girls and 47% of the boys met the recommendation to use fish liver oil. Mean energy intake was 7.25MJ per day. The mean energy from saturated fat was higher than recommended and from MUFA lower than recommended. Mean energy intake from added sugar was higher than recommended and intake of fibre was lower than recommended. Median intake exceeded the reference nutrient intake for most of the micronutrients, except for Iodine and Vitamin D.&lt;br&gt;Conclusions: Interventions promoting fish, fruit and vegetable consumption among Icelandic children are needed, as well as to ensure the compliance to the recommended vitamin D intake.</td>
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| 11 October | 11:00 – 11:15 | **The development of guidance to support the delivery of the Health, Efficiency, Access and Treatment (HEAT) target for Child Healthy Weight Interventions**<br><br>**Michael Craig. NHS Health Scotland, Glasgow, United Kingdom.**<br><br>Introduction<br>Childhood unhealthy weight is a major concern for public health in Scotland. The Scottish Government has set a Health, Efficiency, Access and Treatment (HEAT) target for the National Health Service (NHS) to achieve agreed completion rates for child healthy weight interventions programme by 2010/11. This presentation will outline the process of developing the guidance to support this HEAT target.<br>Objectives<br>• To develop guidance which sets out the components of an “approved child healthy weight intervention programme”<br>• To provide a tool to assist NHS Boards in Scotland in developing, procuring and/or re-configuring existing child healthy weight interventions<br>Method<br>The process of developing the guidance required to take place within a three month period. This started with gathering review level evidence, in particular, NHS Health Scotland’s Commentary on National Institute for Health and Clinical Excellence (NICE) Clinical Guideline 43 Obesity: guidance on the prevention, identification, assessment and management of obesity in adults and children (2007) and Scottish Intercollegiate Guidelines Network (SIGN) 69; Management of obesity in children and young people(2003). Drafting and development of the guidance was supported by an expert reference group convened by NHS Health Scotland, which included specialists from NHS Boards in nutrition, public health and physical activity.
Results
It was recognised that there is a paucity of evidence on the effectiveness of weight management interventions for children. With this in mind the expert reference group took an evidence informed decision making process in developing the guidance.

Conclusion
This process was found to be an effective way to develop guidance in an area where there is a limited evidence base.

12  October 11th  11:15 – 11:30

**Competences of the Physical Education teacher to realize a health policy at school with focus on physical activity**

Kristine De Martelaer¹, Inge Bogaert.¹ ¹Vrije Universiteit Brussel (VUB), Brussel, Belgium.

Over the last decade the school is considered as an important contributor in the eco-holistic approach of health promotion, using concepts such as health promoting school (HPS), coordinated school health programs (CSHP), living school. PE teachers, as stimulators of an active life style, lie at the heart of the expertise of health promotion among children and youth. Therefore PE teachers can be considered as key agents of change in school setting with the focus on physical activities (PA). The aim of this contribution is to compare our data on the different phases of the health policy cycle at school (Bogaert & De Martelaer, 2008) with competences required for the occupation of PE teachers in general. Key stakeholders were interviewed at two levels: those responsible for (national/Flemish) health policy and people working at local level in one or more schools. All 14 in-depth interviews were tape-recorded and transcribed in full text. Data were subsequently analysed by Atlas-Ti. These data are the basis for the comparison with PE teachers' competences as described in the literature and the AEHESIS findings (www.aehesis.com). The European PE area research group of AEHESIS adopted the ‘6-step methodological approach’, which was framed in a multi-method approach to data collection. They came to a ranking of 22 specific competences and 10 categories of standards for PE teachers. The data of the Flemish sample on tasks in the health policy cycle were compared with the European standards on competences of PE teachers. From the Flemish sample emerged four phases of the health policy cycle at school: (P) preparation, (D) developing action plan, (I) implementing an action plan and (E) evaluation. These results reveal a broader need / attention to phases P and E concerning specific managerial knowledge and skills in comparison with the prescribed AEHESIS-competences.

13  October 11th  11:30 – 11:45

**Adolescent Health Behavior, Contentment in School, and Academic Achievement**

Álfgeir Kristjánsson¹, Inga Dóra Sigfúsdóttir¹, John P Allegrante², Ásgeir R Helgason³.¹Reykjavik University, Reykjavik, Iceland. ²Columbia University, New York, USA. ³Karolinska Institute, Stockholm, Sweden.

Studies have shown that healthy lifestyle among children and adolescents is positively related to cognitive functioning. The objectives of this study was to examine the association between health behavior indicators, school contentment, and academic achievement among Icelandic adolescents. Structural equation modeling with 5810 adolescents is used to reveal the potential association between BMI, physical activity and sedentary lifestyle, and school contentment and academic achievement, while controlling for gender, family structure, parental education and psychological well-being. Results: Our model explained 36% of the variance in academic achievement and 24% in school contentment. BMI and sedentary lifestyle were negatively related to school contentment and academic achievement, but physical activity was positively related to school contentment and academic achievement (P < .01). School contentment was strongly related to academic achievement but only a weak mediator of the health behavior indicators. Conclusion: Findings may inform the efforts to improve academic achievement and the health status of youth.
Comparison of strategies for summarising accelerometric physical activity data

Soren Brage¹, Ulf Ekelund¹. ¹MRC Epidemiology Unit, Cambridge, United Kingdom.

Background: Accelerometry is widely used for assessing habitual physical activity, a latent variable. The method generates a time-series of biomechanical intensity information for each individual which must be reduced into few analysable quantities on the population level. Main stages in this process are a) identification of ‘non-wear time’, b) summarising participant / cluster level data, and c) censoring of clusters for summarising on population level. Decisions made may impact on the inference on the latent activity level.

Aim: To compare different summation strategies for accelerometry data.

Methods: A subsample (n=515) of activity data from the SPEEDY study was used. Activity in 9-10yr-old children was measured by uniaxial accelerometry (Actigraph, GT1M). Time resolution for accelerometer counts and steps was 5sec (epoch), from which acceleration was derived (m·s⁻²).

Epoch-by-epoch time-series data were flagged for non-wear time using a >10-min zero activity string length criteria. Data were then summarised in five different ways, using:
1) all individual time-series data un-flagged (raw).
2) all non-flagged individual time-series data (un-weighted),
3) all hours of the day (across days) weighted equally
4) weekday and weekend data weighted 5/7 and 2/7, respectively, and
5) all schools weighted equally.

Results: A total of 72,792hrs were analysed, of which 50% was flagged as non-wear. Mean(SD) raw acceleration was 0.141(0.041)m·s⁻² and corresponding flagged but un-weighted estimate was 0.244(0.076)m·s⁻². Allowing all hours in the day to be equally represented yielded a value of 0.226(0.074)m·s⁻² and the weekday/weekend weighted estimate was 0.243(0.074)m·s⁻² with the latter stemming from 487 children. Requiring at least 1500min of registered time reduced the sample size further to 495 and 485 children, respectively but also reduced the SD.

At the school level (n=26), mean(SD) acceleration was 0.234(0.026)m·s⁻².

Conclusion: Flagging of wear time has greatest impact on activity estimates, whereas subsequent summation strategies yield comparable results.
Prevalence and correlates of the metabolic syndrome in a population based sample of European youth

Ulf Ekelund¹, Sigmund Anderssen², Lars Andersen³, Chris Riddoch⁴, Luis Sardinha⁵, Karsten Froberg³, Soren Brage¹. ¹MRC Epidemiology Unit, Cambridge, United Kingdom. ²Department of Sports Medicine, Norwegian School of Sport Sciences, Oslo, Norge. ³Institute of Sport Science & Clinical Biomechanics, University of Southern Denmark, Odense, Denmark. ⁴School for Health, University of Bath, U.K., Bath, United Kingdom. ⁵Faculty of Human Movement, Technical University of Lisbon, Portugal, Lisbon, Portugal.

Background: Until recently there has been no unified definition of the metabolic syndrome (MetS) in youth. Therefore, the prevalence of the MetS and its association with potential correlates are largely unknown.

Objectives: To quantify the prevalence, to identify correlates and to examine the independent associations between potential correlates with the MetS.

Methods: Population based cohort study in 10 and 15-year-old youth from Estonia, Denmark and Portugal (n=3193). The MS was defined according to the International Diabetes Federation. Correlates included maternal socio-economic status, BMI, hypertension and prevalent diabetes, and maternally reported child’s birth weight and duration of breast feeding. Data on sexual maturity, objectively measured physical activity, cardio-respiratory fitness, self-reported sport participation, TV viewing, and regular play were collected in children.

Results: The prevalence of the MetS was 0.2% and 1.4% in 10 and 15-year-olds, respectively. Cardio-respiratory fitness (Standardised OR=0.33, 95% CI; 0.15; 0.75), physical activity (Standardised OR=0.40, 95% CI; 0.18; 0.88) and maternal BMI (Standardised OR=1.61, 95% CI; 1.11; 2.34) were all independently associated with the MetS after adjustment for sex, age group, study location, birth weight, and sexual maturity. An increase in daily moderate intensity physical activity by 10% to 20% was associated with a 33% lower risk being of categorised with the MetS.

Conclusions: High maternal BMI, low levels cardio-respiratory fitness and physical activity independently contributes to the MS and may be targets for future interventions. Relatively small increases in physical activity may confer a significant risk reduction of the MetS in healthy children.

High waist circumference give enhanced low grade systemic inflammation and leptin levels in youth

Jostein Steene-Johannessen¹, Elin Kolle¹, Janne E Reseland², Sigmund A Anderssen¹, Lars B Andersen¹. ¹Norwegian School of Sport Sciences, Oslo, Norge. ²Institute for Clinical Dentistry, Oslo, Norway.

Background: Increased inflammation seems to play a pivotal role in the relationship between obesity and atherosclerosis. As this relationship is less clear in childhood the aim was to investigate markers of inflammation in youth with high waist circumference, and their possible relation with metabolic risk factors. Methods: Cross-sectional analysis of data from 2299 Norwegian 9- and 15-year-olds participating in the study “Physical activity among Norwegian children”. For the current study we selected ten participants from each sex and age group with the highest waist circumference (HW) (n=40), and a random sample from the rest of the study cohort as controls (n=40). We measured waist circumference, and serum levels of CRP, leptin, adiponectin, glucose, insulin, apolipoprotein A-1 (ApoA-1), apolipoprotein B (ApoB), high density lipoprotein cholesterol (HDL-c) plasminogen activator inhibitor-1 (PAI-1), tumor necrosis factor-alpha (TNF-α) resistin and interleukin 6 (IL-6). Results: HW youth had significantly higher concentrations of CRP (g/L) (2.14 95% CI; 1.11-3.17 vs 1.55 95% CI; 0.33-1.37), PAI-1(pg/mL) (141.3 95% CI; 124.3-158.4 vs 108.2 95% CI; 93.1-123.3) and leptin (ng/mL) (27.68 95% CI; 22.6-32.8 vs 5.63 95% CI; 3.5-7.7) compared to controls. Levels of adiponectin, IL-6 and TNF-α did not differ significantly between the two groups. After adjustment for sex and age, CRP showed positive correlation with
waist circumference, ApoB, and triglycerides, and correlated negatively with ApoA-1 and HDL-c. Leptin was positively correlated with waist circumference, HOMA, triglycerides and PAI-1 and negatively correlated with ApoA-1, HDL-c and resistin. Conclusions: These results show increased levels of CRP, PAI-1 and leptin among HW youth compared to controls, correlating with a range of variables of metabolic syndrome. However, we were not able to detect any differences in other known pro-inflammatory cytokines such as TNF-α, IL-6, resistin or the anti-inflammatory adipocytokine adiponectin.

October 11th 15:15 – 15:30

**Adipokines Play a Role in Insulin Resistance among Children from the European Youth Heart Study I and II**

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Context: Primary mechanisms of the early development of obesity and cardio-vascular disorders are not clear. Objective: To study associations between insulin resistance (IR) and the cytokines: adiponectin, leptin, interleukin 8 (IL-8), and human growth factor (HGF). Further, to study the interrelationship of fatness and fitness on these associations. Design: Cross-sectional and prospective analyses from the European Youth Heart Study I and II. Material and methods: Randomly selected girls and boys from third and ninth-grade in 25 primary schools in Odense, Denmark. Insulin, glucose, and cytokines were analysed in blood samples taken in the fasting state. IR was estimated on a continuous scale, using the homeostasis model assessment. Overweight/ obesity were defined according to the International Obesity Task Force standard for children. Tertile cut-off-points, according to sex and maturation, were used to define high and low levels of cytokines, fatness (age and sex-matched Z-scores of BMI, waist-to-height-ratio, hip-to-height-ratio and body-fat-percentage), and fitness (maximal endurance power of a cardio-respiratory cycle-test). Results: Leptin-levels were higher among overweight/ obese and pubertal children; than among lean and pre-pubertal children. Among unfit or fat children, only, a lower adiponectin-level was associated with a higher IR six years later. Conclusions: Circulating levels of leptin, but not adiponectin, IL-8, or HGF, seem to increase with progressed fatness and maturation of children. A high fitness and a low fatness counteracted the adverse association of a low adiponectin-level on IR six years later.

Grant support: This work was supported by grants from the Danish Heart Foundation, Aase and Ejnar Danielsen Foundation and a part of a Ph.D-fellowship from the BioCampus Research Cluster of Lifestyle-related Illnesses.

October 11th 15:30 – 15:45

**Children’s intake of liquid and solid sucrose in association with changes in body-fatness over 6 years. European Youth Heart Study**

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Background: Among children obesity is associated with adverse metabolic changes in risk factor levels for diabetes, CVD and certain cancers. The prevalence of obesity among children have increased in the past years, and at the same time a steep increase in consumption of soft drinks was seen. Purpose: To examine the associations between children’s intake of liquid and solid sucrose and subsequent 6-years changes in body fatness, and if these changes were mediated through differences in total energy intake and/or changes in serum insulin. Setting: 3rd grade-children were randomly selected from 25 schools in Odense, as the Danish part of the European Youth Heart Study. Subjects: 213 girls and 174 boys, mean age 9.6 years. Methods: Physiological and anthropometric measurements were obtained, as well as information on physical activity and SES of mother. Dietary information was obtained through 24-hour dietary recall interview supported by qualitative food record and FFQ. Follow-up period was 6 years.
Results: Children’s intake of liquid but not solid sucrose was associated with 6-years changes in BMI z-scores (b = 0.029, p = 0.05) and waist circumference (b = 0.228, p = 0.06). Children’s intake of liquid and solid sucrose was not associated with changes in skin folds (b = 0.372, p = 0.24; b = -0.065, p = 0.84). Associations seemed to be mediated through changes in serum insulin, whereas differences in total energy intake seemed to mediate the association to a lesser degree.

Conclusion: Intake of liquid sucrose, but not intake of solid sucrose, may be a determinant for development of obesity, and effects may be mediated via changes in serum insulin rather than differences in total energy intake.

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Gender differences in physical activity, sedentary behavior and body composition on active Brazilian adolescents

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Purpose: Body weight and composition are determined by genotype, environment, and energy balance. Physical activity or sedentary behavior have different associations with body weight, fat mass and fat-free mass; a relationship that is not clear in adolescents. The aim of this study was to test the associations between gender, physical activity, sedentary behavior and body composition in physically active adolescents. Methods: Weight, height and skinfold thickness were measured in 326 physically active boys and girls aged 11-15y. All subjects answered a questionnaire assessing their usual daily activities for the last month. Time spent on each activity was used to estimate the physical activity level (PAL). Results: PAL was associated with body composition after adjustment for age and maturation, with differences between genders. For boys, PAL was positive and significantly associated with body mass index (BMI) and fat free mass index (β = 0.14 and 0.15, respectively). For girls, PAL was negative and significantly associated with BMI and fat mass index (β = -0.11 and -0.75, respectively). Sedentary behavior, expressed by hours of TV, videogame and computer use, was not associated with any body composition outcome for either gender. Conclusions: The accumulated amount of physical activity, but not of sedentary behavior, was related to body composition in active adolescents. These findings should assist Health Organizations to develop programs and policies focusing on the promotion of physical activity as a healthy behavior in relation to body composition among contemporary adolescents.

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Patterns of physical activity in 9 and 15 years-old children in Iceland

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Physical activity is an important factor to prevent overweight and obesity, which is becoming more and more prevalent in both children and adults. The aim of this study was to explore the relationship between the activity pattern and body composition and fitness. A secondary aim was to explore how leisure- and TV time (TV, DVD, video and computer) is associated with different factors of the activity pattern. In this study, 435 randomly selected 9 and 15 year-old children from 18 primary and/or secondary schools in Iceland participated. Physical activity was measured with Actigraph activity monitors over 3-5 days. From this data, 450 variables were defined and calculated. Using Principal component analysis, seven independent components were found to explain 72% of the variability in the data. Three of these components described activity of moderate or higher intensity. The other four of the components described activity of very high intensity. Two of these seven components were found to most strongly correlate with age, gender, three measures concerning body composition and fitness, and two lifestyle variables. These two components were the total number of bouts of activity over the day, which explained 18.1% of the physical activity variance (r = 0.95) and the average length of individual bouts, which explained 8.0% of the variance (r = 0.82). Results indicate that it is the length of bouts, rather than the total time over certain intensity thresholds, activity level or total activity that is most strongly associated with fatness and fitness. From this it can be concluded, that physical activity is a complex behaviour. Also, it is important not only to look at traditional variables of physical activity, but also to examine different components of the activity pattern when health benefits of physical activity are examined.
Predictors of bone mineral density and content in 7 year old children. Hrafnkelsson Hannes1,2 Sigurdsson Gunnar 1Magnusson Th. Kristjan3, Johannsson Erlingur1,3, Sigurdsson L. Emil1,4, 1University of Iceland, Reykjavik, Iceland.2Seltjarnarnes Health Care Center 3 Center for Research in Sport an

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Introduction: Peak bone mass, generally achieved by early adulthood, is an important determinant of adult risk for osteoporosis. It is likely that the bone mass attained during childhood is an important determinant of the risk of fracture later in life. The purpose of this study was to evaluate bone status and normal distribution of bone mineral density (BMD) and bone mineral content (BMC) in the lumbar vertebra and hip of seven years old children in Iceland and see if gender, height, lean tissue mass and fat mass does predict BMD and BMC in the lumbar vertebra and hip.

Material and methods: This study is a cross-sectional study of seven-year-old children from six elementary schools in Reykjavik. All children attending second class in these six schools were invited to participate. 211 (65%) out of 326 children did have Dual energy X-ray absorbiometry (DXA) scan with paediatric program.

Results: Both BMD and BMC had a positive correlation to height, lean tissue mass and fat mass but when analyzed with linear regression it was only the lean tissue mass that predicted BMC in the hip explaining about 54% of the variance (R square). Lean tissue mass could explain 57% (R square) of BMC in the vertebra but this did increase to 60% when height and gender was put in the model. Fat mass did not show positive relation to BMC or BMD in linear regression. There was a gender difference in BMC with boys having significant more BMC than girls, both in the vertebra and the hip but this difference could be explained by difference in lean tissue mass.

Conclusion: Lean tissue mass seem to be the best predictor of bone BMD and BMC for 7-year-old children and should be taken into consideration when predicting normal BMD and BMC.
Abstracts

Poster Presentations
**Prosiect Sir Gâr (the Carmarthenshire Project): Obesity and cardio-metabolic health of 12-14 year old children in Carmarthenshire, West Wales.**

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Introduction: The aim of Prosiect Sir Gâr is to reduce morbidity and mortality from cardiovascular disease and type 2 diabetes in Carmarthenshire, West Wales. Within Prosiect Sir Gâr, the current study assessed obesity, metabolic status, cardiovascular function and lifestyle factors in 12- to 14-year-old children. This abstract presents baseline data on components of the metabolic syndrome (MetSyn).

Methods: Data were collected from children at three secondary schools (N = 256) between August and November, 2007. Variables in this analysis were body mass index, waist circumference (WC), triglycerides (TG), fasting plasma glucose (FPG), high-density lipoprotein (HDL-C), and systolic and diastolic blood pressure (BP). MetSyn components were compared to two sets of child-specific cutpoints, i.e., those of Cook et al (2003) and the consensus definition of the International Diabetes Federation (2007). Additionally, body mass index was compared to overweight and obesity criteria of the International Obesity Task Force (Cole, 2000). Results. Based on IOTF standards, 72% of children were normal weight, 21.5% were overweight, and 6.5% were obese. Prevalence of MetSyn components using Cook criteria ranged from 1.2% (TG) to 23.9% (WC). 33.9% were positive for at least one MetSyn component, and only one child was positive for MetSyn. Using the IDF definition, prevalence ranged from 4.8% (FPG) to 40.6% (BP). 45.4% were positive for at least one MetSyn component, and only two children were positive for MetSyn. Discussion. To our knowledge, these are the first prevalence estimates of metabolic syndrome in Welsh school children using the IDF consensus definition. Notably, prevalence of MetSyn components varied greatly depending on whether the Cook or IDF criteria were used, but overall MetSyn prevalence was extremely low regardless of the criteria used. Although overweight and obesity prevalence were similar to previous data on Welsh children (Retallick et al, 2006), MetSyn prevalence was much lower.

**Intervention on cardiovascular risk factors in overweight and obese 11-13 year old children in Denmark – 1 year follow-up**

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Objective: To determine the effects of a 1-year lifestyle intervention on obesity related cardiovascular risk factors in Danish overweight children.

Background: The prevalence of overweight and obesity in children and adolescents are increasing world wide. Overweight and obesity is related to an increased risk of cardiovascular disease and Type II Diabetes Mellitus and is displayed by increased levels of metabolic risk factors such as Total cholesterol, Low density lipoprotein (LDL), fasting Insulin and Glucose and decreased levels of High Density Lipoprotein (HDL) and increased Blood Pressure. Early prevention of the development of obesity is mandated since overweight and obesity is relatively persistent from childhood into adulthood. Thus the primary aims of this intervention was to reduce and stabilize BMI and reduce metabolic risk factors of cardiovascular disease.

Methods: In a non-randomized intervention study, 39 overweight or obese 11-12 year old (5th. Grade) children (17 boys and 18 girls) participated in a 6 week camp with emphasis on healthy food and fun based physical activity. There was no calorie restriction. During the 46-week family based follow-up period the families were invited to 4 group meetings, where dietary and physical activity behaviour was addressed and discussed.
Results: The mean changes from baseline to follow-up were BMI -2.16±2.28 kg/m2 (p<0.001), waist circumference -5.92 ± 7.54 cm (p<0.001), Systolic BP 0.24±10.39 mmHg, Diastolic BP -0.19±12.33 mmHg (ns), s[Insulin] -25.09±57.57 pmol/L (p=0.054), s[Cholesterol] -0.42±0.75 mmol/L (p<0.05), s[Hdl] 0.04±0.37 mmol/L (ns), s[Ldl] -0.42±0.65 mmol/L (p<0.05) and s[Triacylglycerol] -0.30±0.59 mmol/L (p<0.05).

Conclusions: This study demonstrated a beneficial effect of 1 year intervention addressing physical activity and dietary behaviour on BMI and several other cardiovascular risk factors. Although present study has methodological problems, available literature indicate that the intervention have had a role in reducing overweight and other metabolic related risk factors.
Results
The effect of Glu298Asp on BP differed according to age-group (p<0.05), thus analyses were stratified by across age-group. The Glu298Asp was associated with diastolic BP (TT=64.7; TG=62.3; GG=63.0 mmHg, p=0.004) and systolic BP (TT=113.2; TG=109.7; GG=111.3 mmHg, p=0.003) in 14-16-year olds but not in the 8-10-year olds where none of the four polymorphisms were associated with BP. The effect of Glu298Asp on systolic BP differed according to PA level in Danish adolescents (p=0.020) but not in Estonian adolescents (p=0.535). No indications of interactions between any of the four polymorphisms and PA on BP were observed within 8-10-year olds.

Conclusion
These results support the role of the Glu298Asp genotype in influencing BP levels in Caucasian adolescents but not in children. Further our results suggest that habitual PA may modify the effect of the Glu298Asp genotype on systolic BP in Danish adolescents. Overall, these findings may have implications for the prevention of hypertension.

Comparison of physical activity, dietary habits and body mass index between adolescents in 10th grade in elementary school and 1st grade in high school

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Objective: The aim of the research was to examine difference in physical activity, sports participation, diet, and body mass index between adolescents in 10th grade in elementary school (15 years old) and 1st grade in high school (16 years old).

Methods: Participants were 561 students from schools in Reykjavík and surrounding communities. A total of 262 tenth grade and 299 first grade students answered a questionnaire about physical activity, sports participation and dietary habits. Apart from answering the questionnaire each student’s height and weight were measured by the examiners. These measurements were used to calculate the student’s body mass index.

Results: Girls in 10th grade participated significantly more often and spent significantly more time in sports and exercise than girls in the 1st grade. Significantly more girls in 10th grade than 1st grade fulfilled the Icelandic physical activity recommendations. Among the boys there were also changes toward less physical activity. However, the only significant difference was that more boys in 10th grade than 1st grade participated in sports. Reasons for exercising were significantly different between girls in 10th and 1st grade. Girls in the 1st grade reported more often than girls in the 10th grade to be dieting or keeping in shape as the main reasons for exercising. As for dietary habits, adolescents in 1st grade consumed fast food significantly more often but adolescents in 10th grade consumed fish significantly more often. There was not a significant difference in BMI between the years.

Conclusion: The research shows a considerable change in physical activity, sports participation and diet between the cohorts, especially among the girls. This suggests that more focus should be placed on this particular age group in order to reduce and possibly reverse these changes towards less physical activity and worse dietary habits.

Eating behaviour, physical activity, and body mass index in preschool children

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The behaviour of eating in children depends on various factors, such as genetics, environmental, hereditary and many others. These factors also should be related with body mass and development of adiposity also in preschool children.

Aim of the study was to clarify eating behaviours in children, 3–7 years of age. To evaluate food intake patterns and its eventual correlation with the body mass of children.

Materials and methods: Study involved 57 children (28 boys and 29 girls), aged 3–7. Parents filled the questionnaire about eating behaviours, food environment, physical activity, height, and weight of their children.

Body mass index was calculated.

Results: Parents evaluated appetite of the child as very good in 13.8%, satisfactory in 60.3%, low in 3.4%, and changing in 22.4%. Results reflected various behaviors related to nutrients, possible uniformity of food consumed, insufficient usage of vegetables, fruits and crop products. Parents of 94.7% of children reported participation of their child in organised physical activities. Only 10.7% of boys and 20.7% of girls were with BMI in between 35th–
65th percentile. 46.4% of boys and 37.9% of girls were with BMI in between 4th–35th percentile but 14.3% of boys and 17.2% of girls in 3rd percentile and lower. With BMI between 65th–97th percentile were 28.6% of boys and 24.1% of girls. There were week relations between eating behaviour, physical activity and body mass index in preschool children. Conclusions. Eating behaviour and physical activity are only some factors that influence BMI of preschool children.

28 Board #7 October 10th 13:15 – 14:30

Physical Activity, Well-Being and Body Culture in Kindergartens in Odense, Denmark

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This contemplated study is one of three doctoral projects which, supplementary to each other are planned to form the Odense Preschool Study. The superior aim of this study is to contribute to the existing knowledge of determinants of physical activity for children 3-5 years of age by making a study of the connection between physical activity and motor skill development, well-being, anthropometric measures, social, psychological and environmental parameters. On weekdays 96% of all Danish children in the age of 3-5 years spend most of their waking hours in Danish kindergartens. Here, Danish pedagogues are responsible for creating a culture in order to motivate the children to being physically active, as it is prescribed in the Danish National Aims and Strategies for a better Health. Studies of school-aged children suggests, that school children being physically active are in good health and have a high score in general health-related well-being (Andersen, 2006, Strong 2005).

This specific doctoral project is a mixed methodology study composed of two different theoretical/methodological approaches:
1. A cross-sectional study of the correlation between physical activity and general health-related well-being of the 5-years-old children in 43 kindergartens in Odense by using a validated questionnaire CHQ-PF50 and
2. An ethnographic field research concerning the body culture and well-being in one of the kindergartens.

645 five-year-old children and their parents attending 43 different kindergartens are invited to join the survey. The physical activity level of the children is measured using accelerometry. The well-being of the children is assessed by using the Danish version of the Child Health Questionnaire (CHQ), which is validated as a reliable tool for the functional, physical and psychosocial assessment of children. The ethnographic field research is based on a phenomenological approach using ethnographic participation, fieldnotes and formal semi-structured interviews with pedagogues and 5 year old children.

29 Board #8 October 10th 13:15 – 14:30

Exploring the constructs of children’s psychological well-being for the purpose of understanding the link between psychological well-being and physical activity

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For the purpose of exploring the previous construct of children’s psychological well-being, two preliminary studies of psychological well-being were conducted. Both studies were based on children’s self report questionnaire with cross sectional samples of N=2900 (10-15 yrs) and N=2000 (6-10 years). Though different methodological and theoretical approaches were used both data sets largely reinforce each other and past findings showing declining levels of well-being with growing age. Higher level of psychological well-being was also identified with boys, children from two parent income backgrounds, and certain school districts. Based on the current explorative studies a new developmental framework consisting of 8 dimensions of wellness (recognition, self-acceptance, self-confidence, personal growth, social network, intimate relations, autonomy, environmental mastery) for analyzing psychological well-being is proposed.
Duration of TV viewing is associated with food preferences and food habits in children

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Background. Food preferences (FP) are presumably formed in early childhood and hard to change later in life. Healthy food preferences should therefore be established in childhood.

Identification of factors that influence this process is the first step towards promotion of healthy FP from early childhood.

Objective. To investigate the cross-sectional relation between TV viewing (hours/day) and the sum of FP (ΣFP), and the sum of food habits (ΣFH), respectively.

Design. Data are from the Danish part of European Youth Heart Study I and II. Analyses included data from 1997 (EYHS I) and 2003 (EYHS II) on 517 3. graders and 473 9. graders. ΣFP and ΣFH were calculated as scores (range 0–18 and 0–27, respectively) based on the children’s views on and intake of 9 foods.

Results. ΣFP was inversely associated with TV viewing (h/day) in 3. (β = -0.44, P = 0.0064) and 9. grade girls (β = -0.41, P = 0.0039), and 3. grade boys (β = -0.50, P = 0.0018). A borderline significant inverse association was observed for 9. grade boys (β = -0.22, P = 0.08).

ΣFH was inversely associated with TV viewing (h/day) in both 3. (β = -0.82, P < 0.0001) and 9. grade girls (β = -0.58, P = 0.0005), and 3. (β = -0.58, P = 0.0041) and 9. grade boys (β = -0.62, P = 0.0007).

Conclusions. Consistent inverse associations with TV viewing were observed for ΣFP and ΣFH in both 3. and 9. grade. However, the numerical differences in ΣFP and ΣFH between low and high levels of TV viewing were small suggesting that the overall effect of TV viewing on food preferences and food habits is limited.

Is there any relationship between BMI, physical activity and TV-watching behaviour in preschoolers?

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The aim of this study was to identify a possible relationship between BMI, physical activity (PA) and TV/Games/DVD-watching/week (tgd-w), in preschool aged children. The sample consisted of 1550 preschoolers (783 boys and 777 girls), aged between 48 to 79 months (Mean = 60.63, SD = 7.03 months). Physical activity was assessed using an OMRON walking style II pedometer while hours of “tgd-w”, were recorded using a parental questionnaire-diary. The results showed that even children of this age were at risk according to their BMI, because more than 35% are overweight and obese. Differences between groups was assessed using one way analysis of variance (ANOVA). The results of the first analysis using BMI as independent factor, showed statistically significant effect in “stpw” (F = 4.94, p < .05) and in “kw” (F = 7.70, p < .005) but not in “tgd-w” (F = 2.01, p = .174). The post hoc test Bonferroni showed statistically significant differences between normal and obese children in “stpw” (MD = 22.045, 62, p < .05) and in “kw” (MD = 12.54, p < .005). However, the results of the second ANOVA using “tgd-w” as independent factor showed statistically significant effect in “stpw” (F = 5.23, p < .05) and in “kw” (F = 5.42, p < .05). Bonferroni test showed statistically significant difference between the group of children “watching” TV-Games-DVD less than 4 hours per week and the group “watching” more than 8 hours per week, in “stpw” (MD = 19.199, 28, p < .05) and in “kw” (MD = 7.79, p < .05). In contrast with other researchers BMI was found to have an acceptable relationship to PA for preschoolers. Additionally, it was found that “tgd-w” is a risk factor contributing with sedentary behaviour and inactivity.
Relationship between Body Mass Index and Selected Motor Abilities in Austrian Children and Adolescents Aged 10-15 Years

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The prevalence of childhood obesity has increased at an epidemic rate, and obesity has become one of the most common health concerns in Europe. The aim of this cross-sectional study was to examine the effects of Body Mass Index on different components of physical fitness. Standardized height and weight measurements were performed and BMI was calculated in a total of 21,035 Austria children (9,609 girls and 11,426 boys aged 10-15 years). The children were classified as slim and underweight (12% girls and 10% boys respectively), normal weight (77% girls and 78% boys), overweight (7% girls and 8% boys), or obese (4% both sexes) according to age- and gender dependent percentiles based on the Krommeyer-Hausschild reference system. Different motor abilities were determined by a battery of tests consisting of: sprint running, agility run, standing broad jump, medicine ball throw, reaction time measurement, balance measurement and endurance run) and related to the sub-categories mentioned above. Both, overweight and obesity was associated with significant (p<0.00001) poorer results in 5m, 10m, 20m sprint running, agility running, 2000m endurance running, standing broad jump, balance performance and complex reaction time in both girls and boys respectively. However, overweight and obese youth of both gender had significant better results (p<0.05 to p<0.005) in medicine ball throw (explosive power of the upper extremities) compared to underweight and normal weight subjects. “Underweight” (<10th percentile value) slim subjects performed best in almost all parameters. However, compared to normal weight subjects this difference was not significant in most cases.

The results of the present study showed that overweight (>90th percentile value) and obesity (>97th percentile value) are limiting factors for fitness performance in children and that a low BMI would markedly improve motor and cardiorespiratory fitness.

CARDIORESPIRATORY FITNESS PREDICTS LATER BODY MASS INDEX, BUT NOT OTHERS CARDIOVASCULAR RISK FACTORS FROM CHILDHOOD TO ADOLESCENCE

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BACKGROUND: We analyzed the 5-year longitudinal relationship between CRF and CVD risk factors in children. METHODS: A total of 153 students (66 boys and 87 girls) were evaluated in 1998 and 2003. Multilevel modeling was used to determine the effect of CRF across time (Model 1 - adjusted for time and Model 2 - Model 1 with further adjustment for gender and age). RESULTS: In both models, a significant main effect was found for BMI (p<0.05). CONCLUSIÓN: Data showed that in children, lower levels of CRF are associated with higher levels of BMI over a 5-year follow-up period.

The association between physical fitness and objectively measured physical activity. The European Youth Heart Study

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In the adult population a relatively clear association between physical fitness and physical activity has been documented. Studies in children have generally reported a weak association between these two variables, giving rise to much debate. The studies in children have been criticized for relying on self-report instruments for assessing physical activity - a methodological weakness that, potentially speaking, could have a significant impact on the results. The aim of this study is to examine the longitudinal association between physical fitness
and objectively assessed physical activity, taking into account major sources of variation in physical activity. Data comes from the Danish part of the European Youth Heart Study. In all, 153 subjects were included in the analyses. Physical fitness was determined by a progressive maximal cycle ergometer test (Watt Max Test). The maximal power output was scaled to body mass using empirically derived scaling exponents. Habitual physical activity was measured by use of the uniaxial MTI Actigraph. All analyses were corrected for within-week variation, within instrumental measurement error and day-to-day variation in physical activity. Results showed that longitudinal changes in habitual physical activity significantly explained 12 % of the variation in physical fitness. A significant interaction was found between physical activity and baseline physical fitness in the model. When stratifying data by quartiles of baseline physical fitness, a graded relationship was found. The explained variation accounted for by physical activity for the quartiles were as follows: Q1(lowest) R2=23% p<0.01; Q2 R2=17 % p<0.01; Q3 R2=1 % ns; Q4 R2=5% ns.

It was concluded that the longitudinal association between habitual physical activity and physical fitness depends on the baseline level of physical fitness and ranges from very low to moderate.

35 Board #14 October 10th 13:15 – 14:30

Trends in physical activity and participation in sports clubs among Icelandic adolescents

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Background: Physical activity among adolescents and its implications for health status is of increasing concern. We examined trends in physical activity and participation in sports clubs among Icelandic adolescents.

Methods: Cross-sectional survey data were used to determine levels of vigorous physical activity and participation in sports clubs (defined as engaging in moderately intensive activity four times or more a week) for cohorts of Icelandic adolescents in 1992, 1997, 2000 and 2006.

Results: There was a 6% increase in the rate of vigorous physical activity and a 15% increase in active sports club participation among 14- and 15-year-old Icelandic adolescents from 1992 to 2006. The trends were consistent across genders; however, only 53% of boys actually achieved the recommended criterion for vigorous physical activity, with the percentage of girls averaging 16% lower than that for boys. Additionally, there was an overall increase in the proportion of inactive adolescents, with girls consistently reporting higher levels of inactivity than boys even though the net increase in inactivity was higher for boys.

Conclusion: Although our results show an overall increase in vigorous physical activity and participation in sports clubs over the past decade among both genders, our data also indicate that over half of all Icelandic adolescents are not achieving the recommended level of participation in physical activity. Furthermore, less than one third of the population studied is achieving the recommended level of activity through organized clubs. Initiatives to increase physical activity among the least active of adolescents should receive high priority in public health.

36 Board #15 October 10th 13:15 – 14:30

New opportunities for school canteens

Margrét Bragadóttir. Reykjavik City, Reykjavik, Iceland.

Background: Concurrently with growing considerations of children’s obesity, new potentials rise for school canteens for health promotion by making healthy food available for all school children. The purpose of this project was to evaluate and inspect the development of healthy food supply in pre- and compulsory schools in Reykjavik and look for associations between healthiness of school meals and overweight and obesity among children in compulsory schools.

Methods: Data from the Public Health Institute were obtained from a cross sectional study that was submitted to headmasters and described by quantitative methods. A measure of healthy food supply in school canteens was developed. Information on overweight and obesity among children in compulsory schools were obtained from the Centre for Child Health Services.

Results: The schools did follow recommendations regarding food supply in most cases. The food was healthier in preschools, but the compulsory schools did show more improvements between the years 2005 and 2007. Negative association was observed between healthiness and obesity of children in compulsory schools.

Conclusions: School canteens in Reykjavik should increase supplies of healthy food, because results indicate that the prevalence of obese children was higher in compulsory schools with less healthy meals.
**Measurement & Development of European Consensus on Core Competencies and Functions required for Effective Public Health Nutrition Practice**

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Objectives
To assess the level of consensus amongst European key stakeholders regarding the core competencies and functions required for effective PHN practice in Europe.

Design
A modified Delphi study involving 3 rounds of questionnaires focused on assessing agreement amongst panellists on the core workforce functions and competencies required for effective PHN practice, key selection criteria in the recruitment of PHN practitioners and the priorities for PHN workforce development in Europe. A consensus rule of ≥66.7% agreement amongst panellists was applied.

Subjects
A panel of 62 PHN stakeholders participated in at least one round. A cohort of 52 panellists completed all three Delphi rounds.

Results
11 workforce functions (28.9%) were defined as core functions and the highest agreement amongst panellists was reached on the Intervention management functions. 29 competency units (50.9%) were defined as core or essential for effective PHN work and the highest agreement was on Analytical, Public health services, Nutrition science and Professional competencies. Six key selection criteria (40.0%) were defined as high priority when recruiting a PHN and 2 selection criteria (18.2%) were defined as high priority for workforce development in Europe.

Conclusions
There is a strong European agreement amongst PHN experts on a range of PHN workforce functions and competencies defined as core and are required for effective PHN practice. The primary barrier to the PHN workforce development in Europe is the lack of information on the existing workforce and accordingly the determinants of the workforce capacity. Essential competency units identified can be used to develop and review competency standards for public health nutrition in Europe.

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**Iodine status of Icelandic adolescent’s girls**

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Objectives:
Iceland has been known for high iodine status due to high fish consumption in the past. In recent years fish intake has decreased, especially among young people. Iodine status has never been assessed in Icelandic adolescents.

The aim of this study was to access iodine status of Icelandic adolescence girls and to gather information on intake of fish and milk, the main sources of iodine from food.

Methods:
A random sample of Icelandic teenage girls born in the years 1987-1992 was selected by Statistics Iceland. Food frequency questionnaire was used to evaluate food consumption (n=112), blood sample was taken to measure TSH (n=100) and urine sample to measure iodine and creatinine (n=111).

Results:
Mean urinary iodine concentration was found to be 186±145µg/l and the median concentration 140µg/l. When iodine concentration was corrected for urinary creatinine the mean urinary iodine concentration was 126 ± 99µg/g and the median 103µg/g. 10-15% of the subjects had median iodine concentration below 50µg/l which is defined as moderate iodine deficiency according to WHO. Milk and dairy products were the main source of iodine, providing 43% of the iodine in the adolescence diet. Fish provided 24 % of the iodine from food. A positive association was seen between milk consumption and iodine concentration (r=0.275; p=0.003). The average intake of fish was less than 15 g/day and the subjects consumed fish on average 1.3 times per week. Fish intake was not related to iodine concentration of urine.
Conclusion:
The study shows that 10-15% of Icelandic adolescent girls are defined as having moderate iodine deficiency. Milk was the major source and determinant of iodine status in this age group. Fish intake was below recommended intake. Although fish intake was not found to be related to iodine status in the present study, fish intake should be emphasised.

39 Board #18 October 10th 13:15 – 14:30

Self-reported differences in food choices and physical activity among obese children and their parents at the beginning of a family-based behavioral treatment: A comparison between drop-outs and completers

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Background: Treatment of childhood obesity is often limited by high drop-out rates. Food choices and activity patterns at baseline were compared between drop-outs and completers.

Methods: Participants were 84 obese children aged 7-13 years (BMI>2.5 SDS) and one participating parent for each child. At the beginning of a 12 week treatment program, parents and children filled out questionnaires aimed at assessing dietary habits and physical activity.

Results: There was a significant difference in several food choices between drop-outs and completers, both among parents and children. Parents of drop-out children reported eating sweets more often (p=0.038), daily consumption of milk products was more frequent (59% vs 22%, p=0.004) and vegetables were consumed less often (p=0.048) compared to completers. Among drop-out children, consumption of sweets was also more common (p=0.011), as was intake of carbonated beverages containing sugar (p= 0.033). Daily consumption of bread was, however, less common (40% vs. 64%, p=0.044) among drop-outs vs. completers. Among parents of drop-outs were less likely to enjoy trying new foods (23% vs. 43%, p=0.049). No significant difference in physical activity was reported between the groups, but 41% of parents of drop-outs compared with 60% of completers reported physical activity at least once per week (p=0.124).

Conclusion: Among drop-outs, both parents and children reported consuming less healthy food than completers. Furthermore, there was a trend towards less regular physical activity among drop-out parents compared to completers although not significant. These findings suggest that families living a healthier lifestyle prior to treatment are more likely to comply with a lifestyle-based treatment intervention than families needing it the most.
List of Participants
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