PO0378B
Risk factors for lymphedema patients
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Mechanisms of disease
Background: Lymphedema is edema developing mainly in the arms and legs due to an abnormal lymphatic system, over 100 millions of patients worldwide suffer from it. At present, prevention is the best treatment. Thus, it is important to know which patients are more prone to develop it in order to prevent it. By evaluating the risk factors for lymphedema, we intended to find effective prevention.

Methods: We have investigated that outpatients who chiefly complained of lymphedema visited the lymphedema clinic at one University hospital from September 1 in 2003 to August 31 in 2005. We evaluated the risk factor for lymphedema by questionnaires.

Results: The total number of patients was 50, 19 patients with breast cancer and 41 patients with cervical cancer. The incidence of lymphangitis was more frequent, more obese and the impairment of the site of oedema more severe, the stage of cancer was higher in the patients higher than stage 2 than in the patients below stage 1.

Conclusion: Obesity is the one of risk factors of lymphedema, so we are able to prevent lymphedema and protect the aggravation of oedema by weight reduction.

PO0379
Recent trends in obesity and risk of diabetes, hypertension and hypertension - diabetes co-morbidity (HDC) in England
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Background: The prevalence of obesity is increasing rapidly worldwide, and in England. The aim was to look at changes in generalized and abdominal obesity among adults between 1993 and 2003, and evaluate their impact on the risk of diabetes, hypertension and HDC in 2003.

Method: Health Survey for England (HSE) data from 1993 to 2003 were used to look at trends and HSE 2003 data (n = 7,687) were used to run sex-specific logistic regression models to assess the risk of hypertension and/or diabetes due to different fat patterns.

Results: Generalized obesity increased from 15.8% in 1993 to 26.3% in 2003 among men; and from 19.3% to 25.8% among women. Abdominal obesity also increased in both sexes (in men from 26.2% in 1993 to 39.0% in 2003; and in women from 32.4% to 47.0%). Projections based on the 1993 to 2003 HSE data indicate that by the year 2010, 32.9% of men and 31.2% of women will have raised waist circumference (WC). The odds of diabetes and hypertension due to generalized obesity (adjusting for age, smoking, alcohol intake, physical activity) were more than double for men and women. The odds for HDC were higher in women (2.99; 95% CI 1.86, 4.78) than in men (2.65; 95% CI 1.82, 3.86) as were the odds for both conditions due to abdominal obesity. Women with raised WC were more than 3 times as likely to have HDC, while in men the risk was almost twice as great.

Conclusions: If the trends in obesity increase as estimated, it is expected that the risk of co-morbidities will also increase. This will have major cost implications on the health service. Therefore prevention of obesity is of paramount importance.

Funding Disclosure: The survey (Health Survey for England) on which this paper is based was funded by the Department of Health.

PO0380
Methods and motivations for losing weight in a non-interventional cohort followed on the internet
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To describe the methods and motivations for wanting to lose weight in a non-clinical population, and to assess health care utilization by this cohort. PROCEED is a longitudinal, observational, cohort of overweight or obese subjects [body mass index ≥ 25 kg/m²], aged 35–75, recruited based on their intention to lose weight. Subjects self-reported weight monthly on the Internet. US subjects who completed the 6-month follow-up were broken down between those who lost ≥ 5% of their baseline weight (n = 58, 9.7%) and those who had not (n = 541, 90.3%). At baseline, over 80% of the subjects in both groups were using ‘diet’ (small portions and drinking water being the common methods used) and ‘physical exercise’ (exercise, walks or jogs), and 10% used medical methods (including gastric or bariatric surgery) to lose weight. Reasons to lose weight were mainly, ‘prevent future problems’, ‘to feel better’, ‘to be able to wear all clothes’ and ‘to be active’ (at least 50% of subjects in each group). Differences between groups (weight losers/non-losers) were seen for ‘improving or correcting a health problem’ in women (57% vs. 34%, P = 0.05) and ‘reducing discrimination’ in women (18% vs. 9%, P = 0.02) and in men (13% vs. 3%, P = 0.02). Early results from the PROCEED study suggest that it can provide useful information on the methods used by overweight/obese subjects, their motivation and success in managing weight. This confirms that it should be possible to assess predictors of weight loss and the impact on health care utilization.

PO0381
An assessment of sexual behaviour and relationships in severely obese subjects
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To assess the associations between obesity, sexual activity and relationships. To look specifically at levels of sexual satisfaction and desire amongst the morbidly obese population. To establish if levels of sexual abuse are higher amongst the morbidly obese. The causes of differences will be identified to provide targets for therapy. Patient notes from a weight management clinic in Blaenau Gwent, Wales were used to identify 100 suitable study candidates. The subjects included men and women, aged 18–65 with BMI of >35 and no serious medical conditions. These people were sent questionnaires regarding their sexual behaviours and relationships. Questionnaires were also given to a control group of non-obese people with BMI<30 who were matched with respondents for age and sex. 33 patients and 35 controls returned questionnaires. Results from the morbidly obese group were compared with controls.

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with results from other BMI groups both descriptively and using one-way analysis of variance test (ANOVA) to compare means. People with BMIs<35 experience less frequent and less satisfactory sexual intercourse and desire. Body image and confidence also play an important part in limiting the sexual activity of the severely obese. The morbidly obese are no less likely to form relationships or be happy in their relationships than people of lower BMI's. Levels of sexual abuse are higher amongst the morbidly obese population.

**PO0382**

An audit on the effect of morbid obesity on employment

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To investigate the effect obesity has on an individual's employment, their attitudes towards work, and to investigate how prevalent discrimination is. A questionnaire was sent to 206 patients eligible for the study, 51 responded, 68.6% of them were female and 31.4% were male. The youngest patient was 26 years old, the oldest was 63 years old, and the mean age was 47.5 years old, with a standard deviation of 11.8 years. The responses suggest that obesity has a negative effect on a person's ability to work. 29% of respondents had identified ill health or job-related factors as leading to their obesity. 40% of the unemployed group had stopped due to ill health, and 58.8% of the same group reported not currently working due to obesity-related health problems. Of the employed group, 33.3% reported finding that their weight makes it hard for them to do their current job, 27.8% reported feeling that they had been discriminated against, and 33.3% felt that they had been unsuccessful in a job interview. Of the unemployed group, 18.3% reported that they felt they had been discriminated against in the workplace, and 20% reported feeling that they had been unsuccessful in a job interview due to their weight, all of them felt that this had negatively affected their motivation to seek out work. Obesity can reduce an individual's motivation to seek out employment, and their potential to become employed. Discrimination is still common and this can negatively impact on an individual's motivation to lose weight.

**PO0383**

Overweight and obesity among women in North Iran, 2003

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Obesity is a widespread and growing problem in the world with significant medical and economic consequence that has affected not only developed but also developing countries. It is associated with several chronic illnesses that are the major causes of mortality and morbidity in the world. Therefore, the prevalence of obesity in a population can be considered as a rough indicator for health status. In a cross-sectional study, one thousand three hundred twenty three women aged from 22 to 43 years in urban area of Rasht, the biggest city in North Iran, were selected in 2003. Weight was measured to 0.1 kg and height was measured to 0.1 cm. Other information regarding behaviours and socio-economic factors were obtained through a questionnaire filled by interview. Overweight was defined as BMI of 25.0–29.9 kg/m² and BMI > 30.0 kg/m² was defined as obese. In this study, 508 women (38.4%) were overweight and 189 women (14.3%) were obese. Level of education and working outdoor were associated with fatness and the rate of overweight and obesity among women who were more educated and work outdoor were significantly lower than others (P < 0.001). This study revealed that obesity is a major health problem among women of Iran and level of education is negatively associated with BMI, as was seen in developed countries.

**PO0384**

Self-assessment of waist circumference reported on the Internet is reliable

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Validation of weight and waist circumference (WC) data collected on the Internet. Proceed is a longitudinal, observational, cohort of overweight subjects [body mass index ≥25 kg/m²] aged 35–75 who were recruited by e-mail from an existing Internet panel, based on their intention to lose weight over the next year. At baseline each subject was asked about willingness to be selected to have a study representative conduct a one-time in-home visit to record health data. At baseline all subjects were shown an instructional WC-measurement video or diagram on-line. All subjects were mailed a standardized weight scale and tape measure. Subjects reported WC and weight monthly online. A sample of respondents who had agreed at baseline to an in home visit was selected for a visit each quarter without-replacement. Field interviewers used the same study scale and study-provided tape measure to assess weight and WC in the subjects home. Using paired t-tests; interviewer-assessed in-home weight and WC were compared to self-reported data. At month six 124 subjects were visited by a field interviewer. The average time between the interviewer assessment and closest self-reported survey was 1.3 days (95%CI [-1.1-3.7]). Self-reported and interviewer-assessed WC (103.2 cm, 95%CI [100.3–106.1]; 104.1 cm, 95%CI [101.6–106.7], respectively, r = 0.87) was not significantly different (n = 116, P = 0.19). Self-reported vs. interviewer-assessed weight (92.3 kg, 95%CI [89.9–95.7]; 94.1 kg, 95%CI [90.7–97.4], respectively, r = 0.92) was 1.8 kg lower on average (n = 124, P = 0.01). This analysis demonstrates the reliability of self-reported WC and weight in an Internet cohort study.

**PO0385**

A comparison between obese and non-obese patients with type 2 diabetes: quality of life and preference for weight change

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Background: Greater body weight is related to health risks and decreased quality of life (QoL) among type 2 diabetes patients. The purpose of this study was to assess and quantify values for weight change among obese and non-obese type 2 diabetes patients.

Method: Patients with type 2 diabetes in Scotland and England completed standard gamble (SG) interviews to rate their own health and hypothetical diabetes health states with variations in weight. SG methodology is commonly used to assess patient preference and obtain utilities for health economic analyses. Two generic QoL (EQ-5D) and two diabetes-specific measures (ADS;DSC-R) were administered to compare the obese and non-obese patients.
Results: A total of 129 patients completed the study: 74 obese (BMI>30) and 55 non-obese (BMI<30). SG utilities of current health states with weight greater than their own, but obese patients had greater preference for health states – with weight changes as small as 3% or 5% lower than their current weight (P < 0.05). Compared with non-obese patients, obese patients had lower scores on the EQ-5D VAS measuring overall health status (P = 0.03), and the DSC-R total score (P = 0.01).

Conclusion: Small changes in weight had a significant impact on patient preference for health states, particularly among obese patients. Obesity group differences suggest that obesity has impact on quality of life above and beyond that of type 2 diabetes from the patients’ perspective.

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PO0386
Are associations between offspring BMI and parental cardiovascular disease mortality providing less biased estimates than the usual BMI - mortality associations?

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Background: The usual association between body mass index (BMI) and cardiovascular (CVD) mortality may be biased by unadjusted confounding, weight loss due to disease, etc., CVD amongst parents will not influence BMI of their offspring which will be less strongly associated with confounding characteristics of their parents, e.g. smoking. The aim was to assess associations between offspring BMI and parental CVD mortality in a large intergenerational study and to evaluate the usefulness of such estimates.

Method: The biological parents of 1 345 000 Swedish men born 1951–80 with information on BMI from conscription examination at age 18 were identified in the Multi-Generation Register. Data on parents’ socio-economic position (SEP) and death records were obtained by linkage to other national registers. Risks of death among the parents as function of their sons BMI were estimated as hazard ratios (HRs) by proportional hazards regression with adjustments for paternal SEP and paternal smoking (in a sub sample).

Results: 39062 mothers and 109831 fathers died in CVD during up to 30 years. HRs for CVD mortality was 1.11 (95% CI 1.09–1.11) among mothers and 1.08 (1.07, 1.08) among fathers per standard deviation (SD) increase in offspring BMI. In a sub-sample of 72815 father-son pairs with BMI data for both, HRs for CVD was 1.45 (1.31, 1.61) per SD increase of own BMI and 1.13 (1.04, 1.24) per SD increase of offspring BMI.

Conclusion: The usual within subject estimates of the association between BMI and CVD mortality may be biased and provide inflated estimates.

PO0387
Physical inactivity, low BMI but not obesity is independent risk factor of 8 year mortality for Taiwanese elderly

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Background: To study the effect of Physical inactivity and BMI on mortality in a Taiwanese elderly population, we have analysed the mortality experience of a cohort of 876 community-dwelling men and women aged 65 years or over, who had participated in the 1996 Elderly Medication Survey in Southern Taiwan.

Method: At baseline, through face-to-face home interviews, we collected information on education, living status, smoking, drinking, physical activity, medical history and activity of daily living, together with measured height and weight using standardized protocol. Cox proportional hazards analysis was applied after 8 year of follow-up.

Results: After adjustment for age, gender, level of education, current smoker, habitual drinker, living status, medical history and activity of daily living, total mortality was increased among the lean subjects (BMI<18.5) (OR:1.34; 95% CI 1.01–1.79), but not in overweight or obese subjects. Individuals who reported a sedentary life-style, either defined by lack of leisure time physical activity or short of household physical activity, had a risk of dying of 1.32(95% CI 1.02–1.70) and 1.45(95% CI 1.08–1.93), respectively.

Conclusion: Physical inactivity had a strong independent effect on mortality, whereas low BMI, but not obesity predicted 8 year mortality in Taiwanese elderly.

PO0388
The impact of a UK general practice weight management programme on prescribing costs: the Counterweight Programme

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Background: Economic analyses of weight management models play critical parts in development of health services.

Method: The Counterweight programme is a multi-centre trial aimed at improving obesity management in primary care. Medical records of 3400 patients stratified by age (18–75 years) and sex were audited to establish prescribing costs at varying BMI levels (BMI 25.0 kg/m² n = 1150, BMI 25 to <30 kg/m² n = 1100, BMI 20 to <25.0 kg/m² n = 1150). Practice staff were trained and supported by specialist dieticians to deliver an evidence-based weight management programme in 65 UK practices. BMI changes from baseline to 12 and 24 months were used to assess their impact on prescribing costs.

York Health Economics Consortium compared data with predicted changes in BMI to give relative changes in prescribing costs with and without intervention.

Results: Prescribing costs per patient increased with BMI, particularly above 30 kg/m². At BMI of 20 kg/m², 25 kg/m², 30 kg/m² and 40 kg/m², mean annual costs for men were £8.45, £14.49, £23.98 and £63.59, and for women were £7.80, £11.56, £16.72 and £27.16 respectively. BMI reductions at 12 months resulted in cost savings of 7.6% (males) and 5.2% (females) per patient increasing to 10.3% and 6.8% for high attenders. Data at 24 months showed similar patterns.

Conclusion: Prescribing accounts for approximately 25% of the total UK general practice budget. Prescribing costs rise with BMI. Costs of delivering weight management should be balanced against potential savings, or at least cost avoidance with successful weight management.
PO0389
Maternal obesity incidence, demographic trends, and impact on service delivery in a north east England maternity unit, using data for 36 625 subjects over a 15 year period
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Introduction: Local maternity staff anecdotaly report an increase in maternal obesity. This study aims to identify the incidence, trends, and immediate impact of maternal obesity on maternity resource.

Methods: Data from a large maternity unit in the northeast of England, UK, between 1990 and 2004 was grouped into lean (BMI<18.5 kg/m2), normal (BMI 18.5–24.9 kg/m2), overweight (BMI 25–29.9 kg/m2), and obese (BMI>30 kg/m2). Trends in incidence over time utilised the Chi squared test for trend, and logistic regression calculated adjusted OR (95%CI) for demographic trends in maternal obesity.Analysis on the immediate impact on service delivery will use regression analysis, and will include the obesity subgroups: moderate (BMI 30–34.9 kg/m2), severe (BMI 35–39.9 kg/m2), and morbid obesity (BMI>40 kg/m2). This will be completed by April 2006.

Results: Incidence and trends analysis was performed on 36 625 subjects. Maternal obesity has significantly increased from 1990 to 2004 (9.9%-16.0% P < 0.01). Predictors of maternal obesity were residing in areas of deprivation (OR 2.00, 1.73–2.31, P < 0.01), parity (OR 1.16, 1.11–1.20, P < 0.01), unemployment (OR 1.14, 1.05–1.24, P < 0.01), and age (OR 1.04, 1.04–1.05, P < 0.01). Maternal obesity was significantly reduced in Indian or Bangladeshi ethnic origin (OR 0.35, 0.18–0.66, P < 0.01), and Pakistani origin also showed a borderline reduction (OR 0.81, 0.64–1.01, P = 0.06).

Conclusions: The increasing incidence of maternal obesity in the local area confirms the anecdotal reports of obstetric staff. The predictors of maternal obesity are closely related to health inequality issues of obesity in the general population, with the exception of ethnic origin: in 1999 obesity was higher than the national average by 25% in Pakistani women.

PO0390
Change in waist circumference and metabolic consequences over 9 years: the D.E.S.I.R. study
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Background: The long-term effect on metabolic parameters, of gaining or losing abdominal adiposity has been little analysed in longitudinal studies.

Methods: 1863 men and 1938 women, aged 30–65 years at inclusion or loosing abdominal adiposity has been little analysed in longitudinal studies.

Results: At baseline, 8% of men and 13% of women had NCEP defined abdominal adiposity: waist > 102/88 cm (men/women); at 9 years, 16% and 25% respectively. Over this period, 25% of the men and 34% of the women increased their waist by more than 7 cm, while 14% and 13% lost more than 2 cm. In subjects with a 7 cm or more increase in waist circumference, in comparison to those with a stable waist (± 2 cm), the age-adjusted odds ratios were, in men and women, for incident: hyperglycaemia (≥26.1 mmol/L) 1.7 (1.0–2.8) and 2.7 (1.4–5.0); high arterial blood pressure (SBP/DBP ≥135/85 mmHg) 1.5 (0.9–2.4) and 1.5 (1.0–2.2); hyper-triglyceridaemia (≥1.7 mmol/L) 2.3 (1.5–3.5), 2.2 (1.4–3.6); hyper-HDL-cholesterolaemia (<1.03/1.29 mmol/L men/women) 2.0 (1.1–3.4) and 1.9 (1.2–2.8); the NCEP defined metabolic syndrome 6.6 (3.9–11.3), 4.5 (2.6–7.4). These results were little attenuated after adjusting on BMI.

Conclusions: Increasing waist circumferences had similar deleterious metabolic effects in men and women, which was accentuated when combined together into the metabolic syndrome: odds-ratios were more than 6 in men and 4 in women whose waist circumferences increased by more than 7 cm over 9 years.

PO0391
Weight and weight-related problems – the Otago Diabetes Register, 1998–2004
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Background: Obesity is an important risk factor for the development of type 2 diabetes (T2DM) and its complications. Almost half of the patients enrolled on the Otago Diabetes Register (ODR) are obese and the mean weight of both men and women has increased significantly since 1998. The aim of this study was to describe weight and weight-related problems of new T2DM cases diagnosed between 1998 and 2004 according to age using ODR data.

Methods: Data held on the ODR were collected annually from general practices and Births, Deaths and Marriages Office. Demographic and diabetes information was extracted from the ODR for T2DM cases diagnosed between 1998 and 2004. Demographic, clinical and test result information for the year of diagnosis were compared between four age groups (<40, 40–59, 60–79 and ≥80 years).

Results: 1 589 new cases of T2DM were identified. 5% were aged <40 years and 38% were aged 40–59 years at diagnosis. Weight, body mass index and diastolic blood pressure increased significantly across age groups from 105.4 kg, 36.0 kg/m2 and 135/85 mmHg to 69.3 kg, 26.4 kg/m2 and 80.2 mmHg respectively, for the youngest age group compared with the other groups. Increased waist circumferences had similar deleterious metabolic effects in men and women, which was accentuated when combined together into the metabolic syndrome: odds-ratios were more than 6 in men and 4 in women whose waist circumferences increased by more than 7 cm over 9 years.
PO0393
A comparison of measured and self-reported height and weight with and without knowledge that one will be subsequently measured: the potential for bias in parameter estimation
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Background: Although BMI derived from measured and self-reported height and weight may correlate highly, it is unclear whether important differences exist among their distributions. We compared BMI distributions from 1) measured height and weight (BMI_M), 2) self-reports in those who knew they would be measured (BMI_MSR), and 3) self-reports in those who knew they would not be measured (BMI_MSR-). To investigate potential biases, we analysed diabetes using BMI_M and BMI_MSR, respectively, as prognostic variables.


Results: BMI_M and BMI_MSR means and standard deviations from NHANES III (n = 16 530) were similar (26.92 ± 5.83 & 26.32 ± 5.34, respectively) and larger than BMI_MSR- (25.27 ± 4.85) from NHIS (n = 586 668). Comparing deciles showed BMI_MSR was under-reported to a greater degree than BMI_M and BMI_MSR- and differences in BMI_M and BMI_MSR- deciles were even more pronounced. BMI_M and BMI_MSR correlation was high (r = 0.94), but using BMI_MSR resulted in biased parameter estimation. ORs comparing diabetes risk in those of normal weight (18.5≤BMI<25) to overweight (BMI≥25), overweight (25≤BMI<30), obese (30≤BMI<35), and morbidly obese (BMI≥35) using BMI_M were 0.99, 1.92, 2.61, and 4.17; and using BMI_MSR were 0.87, 1.77, 2.64, and 4.66, respectively.

Conclusions: Despite high correlation, BMI from measured and self-reported weight are not interchangeable, particularly when subjects know their weight will not be measured. Methods for estimating bias resulting from using BMI_MSR need to be developed.

PO0394
Pilot program for prediabetic overweight and obese adults
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Overweight and obesity are prevalent in Chile (National Health Survey, 2003), predisposing to Type 2 Diabetes Mellitus (T2DM) and cardiovascular disease. The Chilean Health Ministry in conjunction with obesity specialists decided to implement a pilot program for prediabetic overweight and obese adults to decrease the risk of T2DM and cardiovascular risk factors (CVRF) by improving their nutritional status with an interdisciplinary program. This would be a model to be extended to Chilean population with risk. 276 participants were recruited from primary care centres, from December 2004 to June 2005, aged 18–55 years, BMI 25–38, fasting blood glucose 100–125 mg/dL or with any direct family member with T2DM. Subjects were studied for 6 months, including 3 physician visits, 4 dietician visits, 14 physical activity sessions and four group workshops (psychologist (2), dietician (1), physician (1)). Lab tests were performed at the beginning and at the fourth month, including fasting and postprandial blood glucose, plasma insulin, lipids and HOMA. The following results compare the initial and final prevalence: BMI ≥30:68.8% vs. 51.9%, systolic blood pressure >140 mmHg: 24.3% vs. 5.7%, diastolic blood pressure >90 mmHg: 28.1% vs. 9.4%, glucose blood ≥100 mg/dL: 60.6% vs. 19.2%, plasma insulin >12.5 uUI/mL: 48.5% vs. 33.7%, HOMA ≥2.5: 63% vs. 42%. HDL cholesterol increased 6.8%. All previous results were statistically significant with p <0.05. This intervention proved to be effective in decreasing CVRF, feasible to be used in the national health system but requiring follow-up studies.

PO0395
Tracking of obesity and overweight among Tunisian schoolchildren: a 4 year cohort study in Sousse, Tunisia
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Background: Obesity in childhood adversely affects children’s health and well being, and leads to serious consequences in the longer term because of tracking of overweight and obesity to adult life. As a result of the epidemiologic transition, Tunisia is currently facing the extension of obesity and overweight among adults and children. The objective of our study is to confirm the ‘tracking’ phenomenon of obesity and its stability among Tunisian schoolchildren.

Methods: We undertook in 2003 in the region of Sousse Tunisia, after 4 years of follow up, a cohort study of a representative sample of 789 schoolchildren aged initially 13–15 years. This schoolchildren sample had participated in a first epidemiological study on cardiovascular risk factors in 1999. We were able to follow up and studied 453 schoolchildren (57.4% of the initial sample study). The main measurements were weight and height, blood pressure, fasting blood lipids and glucose. Self-administered questionnaires were used to assess physical activity and diet.

Results: Prevalences of obesity 6.1% and overweight 20% were similar between boys and girls with significant difference. Children who were initially considered as obese were identified 4 years later at a subsequent exam as obese in 48.9%. Those who were at the higher quartile of Body Mass Index BMI initially stayed in the same fourth quartile of BMI 4 years later in 77.3 %. This tracking was highly statistically significant.
Conclusion: The stability of cardiovascular risk factors such as obesity among schoolchildren imposes an early screening for a better management and a cardiovascular health promotion policy since childhood through community based intervention program towards healthy diet and physical activity in order to reduce the cardiovascular disease burden later among adults.

PO0396
BMI and fitness of Amish, Mennonite and contemporary-living children
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Background: To investigate the assumption that the contemporary lifestyle of children in developed countries has contributed to deterioration in their fitness and anthropometric measures, Canadian children living a traditional agrarian lifestyle were compared with children living a contemporary lifestyle.

Method: Anthropometric (BMI, triceps skin fold) and fitness (aerobic fitness step test, grip strength, back flexibility) measures were done on Old Order Amish (OOA, n = 80), Old Order Mennonite (OOM, n = 124) and contemporary-living (CL, n = 275) boys and girls aged 8–13. ANOVA was used to assess group and sex differences after Bonferroni adjustments for multiple comparisons. The proportion of children classified as overweight or obese were compared among groups and to Canadian population-representative (CPR) BMI data for same-aged children from the Canadian Community Health Survey using the Cole method.

Results: Data indicate that biological-age adjusted BMI and triceps skin fold are significantly smaller in OOA (girls and boys) than OOM or CL. Furthermore, strength (girls and boys) and aerobic fitness scores (boys) indicate a progressive reduction as increasingly modern lifestyles are adopted. The proportion of OOA girls (8%) and boys (0%) classified as overweight was remarkably lower than CPR (girls 26%, boys 30%), CL (girls 27%, boys 25%) and OOM (girls 30%, boys 33%).

Conclusion: Though cross-sectional, these data indicate a progressive temporal gradient suggesting that modern living may be conducive to lower fitness and less favourable anthropometric measures when compared to lifestyles representative of earlier times.

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PO0397
Accuracy of parental reported body weight, height and BMI of 4-year-old children
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In adults, body weight tends to be underestimated and height tends to be overestimated when based on self-reported data. Whether this discrepancy between measured and reported data exists in young children is not clear. We studied whether body weight and height of 4-year-old children reported by their parents corresponded with measured body weight and height. In addition, determinants associated with the differences between measured and reported body weight, height and body mass index (BMI) were studied. The children in this validation study participated in the PIAMA (Prevention and Incidence of Asthma and Mite Allergy) birth cohort study. Data on body weight and height of 864 4-year-old Dutch children born in 1996/1997 were collected via a questionnaire and a medical examination. Based on measured BMI, 15.1% of the girls and 11.8% of the boys were overweight. In general, mean reported body weight, height and BMI of 4-year-old children corresponded well with measured values. However, parents of children with a low BMI tended to over report body weight and parents of children with a high BMI tended to underreport body weight. Over 45% of the overweight children according to measured BMI were missed when reported BMI was used. This finding suggests that overweight prevalence rates in children are underestimated when based on parental reported body weight and height.

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PO0398
Is medical check-up for the lifestyle-related disease prevention from childhood useful?
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Background: Progress of medicine and the public health care insurance system in Japan increased elderly people’s population ratio more rapidly than any advanced nations. At other side the advance in society of a woman accompanying late marriage have caused a rapid decrease in the birth rate. So, it is worried about absolute fall of young power, which supports Japanese future.

Methods: First, the medical check-up including lifestyle and health condition was carried out for the first-year student in a junior high school for 26,684 persons (for ten years). Then, for the fourth grader
in an elementary school, 10,899 persons (for eight years) participated. Results: About twenty percent of the children answered that he disliked exercise. Deviation was seen by about 40% of the whole child at the tastes of food. However, many children were drinking coarse tea, which do not have much calorie. In blood chemistry, 10–20% of school children and students, had hypercholesterolemia. The obesity index and the HDL cholesterol value suited negative correlation. The exercise dislike group always had high obesity index compared with the exercise like group, and the HDL value was always low. In statistical analysis, the exercise dislike was the strongest determinant that is growing fat. Finally, a certain instruction was required for 30 percent of a schoolchild, and 25 percent of the junior high school students. Conclusion: It was guessed that lack of exercise is one of the exacerbation factors of the onset of the lifestyle-related disease.

PO0399 Prevalence of obesity and food preferences among upper middle class preschool girls in Tehran
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Overweight during childhood is a matter of concern. The extent of the problem and their food habits remain unknown. This study is aimed to see the prevalence of overweight and obesity among preschool girls with their food preferences in upper-middle class families in Tehran. In a cross section study 145 preschool girls (5–7 years) were randomly selected among 23 nursery schools, which is located in northern part of Tehran, known as a high socio-economic area. Height and weight were measured by Seca scale with precision of 100 g and 0.5 cm. Food preferences collected by a questionnaire, which is asked by a trained nutritionist. Overweight and obesity were identified as Wt for Ht >+1SD to +2SD and >+2SD of NCHS respectively. Type of various food such as fast foods, snacks, sandwiches, raw vegetables and fruits, cooked vegetables and meat were asked as their preferences between obese and non-obese girls. The SPSS used for statistical analyses. The results showed that 23.1% and 12.8% of the girls were obese and overweight respectively. The most preference were on fast foods with 81.6% among obese girls and vegetables, 44.4% and 38.8% respectively in comparison with non-obese girls (P = 0.11). It would be concluded that the obesity and overweight are considerably high among preschool girls in high socio-economic level of families and their food preferences are towards high fat foods and least intake of raw vegetables and fruits.

PO0401 Obese children who were referred to the clinic: characteristics and outcome
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The objective of this study was to characterize a population of obese children who were referred to a paediatric obesity clinic and to analyse the outcome of the referral. Children who were newly referred for obesity between 2003 and 2004 were included in this retrospective study. Clinical and laboratory (liver function test, glucose, insulin, and lipid profile) data, when available, were abstracted from the medical record at the first visit. The database included 54 Japanese children (mean age at referral: 9.1 years) with male gender (59.3%). Twenty children (37.7%) had liver dysfunction (ALT >33 IU/L), 10 (18.9%) had hypercholesterolemia (T-cho >220 mg/dL) and 30 (81.1%) had insulin resistance (HOMA-R >2.6). At follow-up, almost children dropped out and only four children (7.4%) had an age- and gender-specific obesity index below 20%. The referral, occurring after a prolonged interval from the obesity onset, was ineffective in treating obesity. With family history, only one child could achieve improvement. Liver dysfunction related to hypercholesterolemia or hyperinsulinemia were often present also at a young age. These data suggest the need for early family-based behavioural-life style intervention program, enabling them to keep motivation.

PO0402 Waist circumference and clustering of CVD risk factors in children and adolescents
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Obesity in children and adolescents is regarded as a serious public health problem, with consequences for young people's quality of life. Distribution of body fat is considered a better predictor of metabolic abnormalities and cardiovascular disease (CVD) than its quantity. Aim: To analyse the relationship between Waist Circumference (WC) and the clustering of biological risk factors associated to CVD Methods: A random sample of 154 Caucasian children and adolescents (aged 13–16 years; both genders) was selected in eight schools. Anthropometric measures were evaluated according to internationally accepted procedures. Risk factors were: body fat, total cholesterol, systolic and diastolic blood pressure and cardio respiratory fitness. Two groups (‘at risk’ or ‘without risk’) were defined for each gender taking into account the cut-off points of WC stated by Taylor (2000). The relationship between WC and the clustering of risk fac-

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Concerning CVD in youngsters from 13–16 years old, for both genders among those who are over or below the cut-off points of this anthropometric measure.

**PO0403**

Children and teenagers with special needs - a high population risk group for paediatric obesity?

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**Background:** The epidemic and consequences of childhood obesity are well documented. However little attention has been paid to the prevalence of obesity within the population of children with special needs. We carried out an audit to review the prevalence of obesity (BMI >95th centile) in a population of ambulatory children attending special needs schools within Edinburgh.

**Methods:** Nursing records of ambulatory children attending three special needs schools were reviewed for the most up to date concurrent weight and height. 139 records were reviewed (age 10.6 ± 3.3, 44 females, 95 male). Body mass index (BMI) was calculated; BMI centile, SD score and special need diagnosis were noted.

**Results:** In the secondary schools (n = 71) 35% (25/71) were obese (BMI >95th centile); 22% (16/71) were grossly obese (BMI >99.6th centile). In the primary schools (n = 68) 16% (11/68) were obese; 7% (5/68) were grossly obese. Compared with prevalence in the general Scottish paediatric population of 9% obese (>95th centile) in primary and 15% in secondary 3.

**Conclusions:** A higher percentage of the children with special needs in this audit were obese than in the general paediatric population. By senior school not only are more of the children obese than the general adolescent population but also more grossly obese (>99.6th centile). These figures show the highest incidence of childhood obesity in a population reported in the UK. They indicate that both evaluated early prevention programmes in the primary school years and treatment interventions in senior schools are actively required.

**PO0404**

Inactivity and overweight among children living in Scotland: do parental activity and inactivity behaviours matter?

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**Background:** Scottish boys and girls have some of the highest overweight rates internationally. Inactivity may be related to overweight but there is limited information on the extent that parental inactivity explains children’s overweight. This study examines the relationships between inactivity and childhood overweight while taking into account parental inactivity.

**Method:** The 2003 Scottish Health Survey assessed times of leisure-time television/other screen entertainment (TVSE) and physical activity among a nationally representative sample of 2425 Scottish children (1215 girls) aged 2–15. Overweight (including obesity) was defined using the IOTF standards. Weighted multiple logistic regression assessed the odds of overweight by daily TVSE time while controlling for: i) age, physical activity, snacking, soft drinks and parental social class and ii) parental variables (BMI status, TVSE, physical activity).

**Results:** Boys reported 2.6 ± 1.6 and girls 2.3 ± 1.3 TVSE h/day (P < 0.001). TVSE was associated with higher overweight odds in boys only: compared with <1 h/day, odds ratio for 1 to under 3 hours/day was 3.0, 95%CI = 1.5–6.0; for ≥3 hours/day: 3.7, 95%CI = 1.8–7.6. Inclusion of parental variables did not improve overall predictive power and only parental BMI status was significant (P < 0.05 for boys and P < 0.01 for girls).

**Conclusion:** Scottish children report high amounts of TVSE. While inactivity is related to boys’ overweight, these associations are independent of parental inactivity and activity habits. Parental BMI is a strong predictor of children’s overweight but this may not due to the shared within the family physical activity/inactivity habits. Anti-obesity interventions for children should be sex-specific and test different physical activity and inactivity elements.

**PO0405**

Prevalence of metabolic syndrome in youngsters

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**Background:** In Flanders, there are four types of secondary education (SE): general (GSE), artistic (ASE), technical (TSE) and vocational (VSE). VSE provides practice-oriented education in which young people learn a specific occupation. Previously we reported VSE to be the type of education with the highest prevalence of overweight and obesity. Students attending VSE also reported to do less sports activities and smoke more often than their peers.

**Method:** Overweight and obesity were assessed by body mass index (BMI) based on measured height and weight, using cut-off points for BMI as proposed by Cole et al., in a community sample of 869 adolescents attending VSE in 14 secondary schools (mean age: 17 y). All criteria of the metabolic syndrome were determined for 506 students after an overnight fast. The metabolic syndrome was defined analogous to NCEP: ATP III criteria, with modifications for students under 19 years of age.

**Results:** The prevalence of overweight and obesity was respectively 14.3% and 7.3%. Overweight or obesity was significantly more prevalent among girls (24.7%) than boys (17.9%) (P = 0.019). In the total sample 5.9% of the adolescents had metabolic syndrome. The prevalence of metabolic syndrome was significantly higher among obese adolescents (43.2%) than among overweight adolescents (8.3%) and among normal weight adolescents (1.3%) (P < 0.001).

**Conclusion:** Being overweight or obese substantially increases the risk for metabolic syndrome. Prevention and treatment of the metabolic syndrome should be part of a school health program, especially in schools with a high prevalence of overweight and obesity such as VSE in Flanders.

**PO0406**

Prevalence of metabolic syndrome among school children in Taiwan

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The purpose of this study is to evaluate the prevalence of metabolic syndrome among school children in Taiwan. After multistage random sampling, we totally enrolled 1767 children (874 boys and 891...
PO0407
Case-control study on the risk factors of obesity with gynecomastia in male adolescents
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Background: This study is aimed to understand the risk factors of obesity with gynecomastia in male adolescents (OGMA), so as to formulate and implement the intervention program and provide theoretical basis for management of the disease.

Methods: A 1:2 matched case-control study of 40 cases was conducted. The study factors included the history of birth and feeding, diet behaviour, life habit, past history and family condition. Fifty variables were analysed.

Result: Scarcity of physical training, drinking frequently, excessive snacks, living together with grandparents for a long time, mumps and father’s attitude to obese son are significantly correlated to OGMA in the model of multi-factorial conditional Logistic regression, and the OR values are 8.375, 4.118, 3.287, 1.427, 1.603 and 0.042 respectively.

Conclusions: It is concluded that scarcity of physical training, drinking frequently, excessive snacks, living together with grandparents for a long time and mumps are risk factors of OGMA, and father’s attitude to obese son is a protective factor. Those who have these risk factors and lacking for father’s care is the key population of the community intervention program of the disease.

PO0409
Factors determining obesity among adolescents in Bahrain
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Objectives: To find out social, lifestyle and dietary factors that may be associated with obesity among adolescents in Bahrain.

Methods: A cross-sectional study on 732 adolescents aged 15-18 years (336 males and 386 females). Data was obtained through interviewing the adolescents using a pre-tested questionnaire, which contained information on social background, food habits and lifestyle. Weight and height were taken and body mass index was used to determine obesity. The subjects were grouped into two categories obese (which include overweight and obese) and non-obese.

Results: The prevalence of overweight and obesity was 29.5% among males and 36.9% among females. As age increased the prevalence of obesity increased among males whereas, among females the peak of obesity was seen at ages 16 and 17 years. Obesity was most prevalent among adolescents with highly educated fathers or mothers. Skipping breakfast was significantly associated with obesity among females but not among males. There was no association between frequency of eating fast foods and obesity. However, obese adolescents were more likely to eat fast food outside home and eat large portion size of fast foods. Of those who watched television for 1-2 hours a day, 25% were obese in males and 30% in females. The percentage increased to 33% and 41% respectively among those who watched for 3-4 hours a day. Obesity was found to be associated with daily hours in using the Internet among females only, whereas eating while using the Internet was significantly associated with obesity between both sexes. No significant association was found between obesity and practicing sports in both the sexes.

Conclusions: In general, the prevalence of obesity was high especially among females. There are several social, dietary and lifestyle factors determining obesity among adolescents in Bahrain. This creates the need for effective programme to control obesity in this community.
PO0410
The consumption and attitudes of adolescents towards energy drinks in Saudi Arabia
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Background: To find out the trend in consumption of energy drinks among adolescents in Saudi Arabia and the attitudes towards these drinks

Methods: A cross-sectional study was carried out on 843 adolescents (466 males, 377 females) in the age group of 13–18 years. The samples were selected using a multistage stratified method. The data was obtained using a pre-tested questionnaire. Twelve schools were selected (6 males and 6 females). The objective of the study as well as each question was explained to the subjects who were then asked to fill up the questionnaire.

Results: Most of the adolescents (80%) tried energy drinks and the difference was highly significant between males (90%) and females (68%). About 31% of males drank three cans of energy drinks per week compared to 7% of females (P < 0.0001). The main reasons for consumption of these drinks were: delicious (60%) and to give energy (45%). Of adolescents 13% believe that these drinks provide energy for them. There was no special time to consume energy drinks however, 4% of adolescents consume them during examination and 14% before or after practicing sport. About half of the samples studied (54%) know that the energy drinks contain caffeine. The majority of adolescents consume energy drinks as replacement for carbonated drinks (67%) and 70% of them did not know the ingredients of energy drinks.

Conclusion: Energy drinks have become a popular drink for adolescents in Saudi Arabia, especially among males. It is important to educate the family as well as the adolescents about the advantages and disadvantages of these drinks.

PO0411
Caloric beverages and overweight in German adolescents—results from the DONALD study
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Background: Studies from various countries yielded inconsistent results on the association between caloric beverages (CB) and overweight. We used data from the DONALD Study (Dortmund Nutritional and Anthropometric Longitudinally Designed Study) to evaluate the association between CB and Body Mass Index (BMI) in German adolescents. Methods: Long-term consumption of CB (sum of lemonades, iced teas, fruit drinks, juices) over a 5 year period at the beginning of adolescence (age 9–13 years) was determined in 244 children on the basis of 1593 yearly collected 3-day-weighed dietary records with plausible total energy intake (TEI). Standard Deviation Score of BMI (BMI-SDS) and % Body Fat (%BF) at the last examination were used as outcome variables in a stepwise regression analysis stratified by gender, considering weight at birth, maternal BMI and TEI as covariates.

Results: CB consumption (g/day) was higher in boys than in girls (P < 0.05). A significant positive association was found between CB consumption and BMI-SDS in boys, but not in girls. The long-term CB consumption had no association with %BF in boys, but a negative association in girls. TEI showed a weak positive association with BMI-SDS in boys, but not in girls, when CB was not included in the model.

Conclusion: In Germany, CB consumption seems to influence the development of overweight only among boys. This result may be explained by possible underreporting of CB especially by overweight girls. This possibility is supported by the fact of a missing association between TEI and BMI-SDS among girls but not boys.

PO0412
Obesity indices in relation to birth weight and breastfeeding in Greek primary school children
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Background: The prevalence of overweight and obesity increases worldwide. Early identification of overweight and obese children and hence the associated risk factors, is a major challenge in fighting the obesity epidemic. To study the obesity indices in relation to birth weight (BW) and breastfeeding (BF) in Greek Primary School Children (GPSC).

Methods: 1152 GPSC (578 boys and 574 girls, 6–12 years), from fourteen primary schools of Palamida Palirion Municipality, was surveyed. Parental questionnaires included children’s BW and BF history. Obesity was defined as a BMI equal to or greater than the age- and sex-specific cut-points proposed by the I.O.T.F.

Results: The prevalence of overweight was 22.6% and obesity 6.5% (Boys 8.1% - Girls 4.7%, P = 0.07) Obesity prevalence was reduced significantly as age increased (9.1% at age 6–9 to 3.1% at age 10–12, P < 0.001) in both sexes. BF was high (81.7%) but seems to have no effect in children’s obesity (8.8% vs. 5.4% vs. 8.1% in never, 1–6 and >6 months BF respectively, P = NS). BW was positively related to obesity both as absolute weight values (3438 ± 69 gr vs. 3536 ± 9 gr in obese and normal children respectively, P < 0.01) as well as categories (from 5% obesity prevalence in the 1st quartile of BW, to 8.6% obesity prevalence in the 4th quartile of BW, P < 0.01).

Conclusions: Our study demonstrates a high prevalence of overweight among GPSC especially in boys. BF seems to have no effect on the prevalence of childhood obesity in contrast with BW that was positively related.

PO0413
BMI and waist circumference at 8 years and metabolic profile in adolescence
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Background: Waist circumference (WC) has been recommended to identify young people at risk of morbidity associated with central adiposity. The aim of this study was to determine whether sex and age specific WC cut points at 8 years are more effective at predicting elevated metabolic risk in adolescence compared to IOTF BMI cut points.

Methods: Anthropometric measurements were taken on 342 children aged 8 years in 1996/97. Seven years later, at age 15 years, blood pressure (BP) was measured in 270 participants and fasting blood samples obtained in 174. Elevated metabolic risk was defined as the presence of three or more of the following: overweight, high systolic BP, high triglycerides, low HDL cholesterol, high insulin and impaired fasting glucose.

Results: Over 7 years, the prevalence of overweight (BMI cut-points) increased from 19.7% to 31.7%. At 15 years 17.7% of children were identified as having an elevated metabolic risk. Individually, BMI (odds ratio (OR) 3.4, P = 0.008) and WC (OR 3.5, P = 0.004) at 8 years predicted metabolic risk to a similar extent. However, the best predictor was a combination of both: 8 year olds with a high BMI and WC were more likely (OR 4.9, P = 0.019) to have an increased metabolic risk compared to those with a low BMI and WC.
Conclusions: A combination of both BMI and WC in mid-childhood can be used to predict elevated metabolic risk in adolescence. Identifying predictors of risk factor clusters is important; clusters may track more than the individual risk factors.

**POO414**

**Investigating the capacity of early childhood settings to support healthy eating strategies for obesity prevention**

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**Background:** Interventions to improve nutrition and prevent obesity are far less common in early childhood settings than they are in schools. This study investigated the capacity of early childhood settings to promote healthy eating.

**Method:** Surveys were mailed to all early childhood service providers (kindergartens (*n* = 50), day care centres (*n* = 26) and family day care providers (*n* = 66)) in Geelong. The survey included policy, socio-cultural, economic and physical environment factors that may be barriers to or facilitators of healthy eating initiatives.

**Results:** Completed surveys were received from 101 settings (response rate 71%). Overall, 47% of staff members in the settings had some training in childhood nutrition and staff reported high motivation and confidence to promote healthy eating within their settings. Nearly all services (96%) had a food or nutrition policy. Key barriers to healthy eating were parents undermining healthy eating messages (81% of settings) and children’s learned eating behaviour (72%). Fifty-three percent of all kindergartens and day care centres reported using chocolate or confectionery for fundraising.

**Conclusions:** These surveys provide a simple method for needs assessment in early childhood settings and have potential as a monitoring tool. We found that early childhood service providers have the confidence and motivation to facilitate obesity prevention. The major barrier was a lack of support from parents. Training staff to communicate more effectively with parents may help to overcome this barrier. Social marketing directed at parents about the importance of healthy eating may also assist in creating a more supportive environment.

**POO415**

**Obesity prevalence estimates in children and adolescents in Wales, UK: a comparison of standards based on BMI and waist girth**

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11–14 years from three large schools participated voluntarily in a series of measurements including weight, height and waist girth (midway between lowest rib and superior iliac crest). Prevalence estimates were: 32% (overweight or obese, IOTF); 8.3% (obese; IOTF); 54.5% (obese, WGPR72); and 19.4% (obese, WGPR98). Using the IOTF obesity classification as the comparison standard, the sensitivity of WGPR98 was 92% and specificity was 87%. For WGPR75, sensitivity was 100% but specificity was only 50%. These data show that estimates of obesity prevalence in this population are highly dependent on the method used to determine obesity and that the recently proposed 75th percentile of WG leads to a large number of false positive cases of obesity in comparison to the IOTF BMI standards. Further criterion-referenced evidence is required to determine standards and measures that accurately predict obesity-related co-morbidity.

**POO416**

**Prevalence estimates of the metabolic syndrome in children and adolescents in Wales, UK**

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In children and adolescents, diagnosis of metabolic syndrome (MetS) relies on modified adult criteria. This study aimed to estimate the prevalence of MetS in a cohort of children and adolescents using three published definitions of paediatric and adolescent MetS. Participants (*n* = 369, 192 male) aged 11–14 years, had their waist girth, resting blood pressure and fasting plasma glucose, HDL-C and triglycerides measured. Prevalence of MetS was estimated using the criteria of Cook et al. (2003), de Ferranti et al. (2004) and Ford et al. (2005). Data presented as mean ± SD. For males and females respectively, waist girth was 71.4 ± 10.7 cm and 67.5 ± 9.1 cm (*P* < 0.05); systolic BP was 115 ± 12 mmHg and 113 ± 10 mmHg (*P* < 0.05); diastolic BP was 66 ± 9 mmHg and 70 ± 9 mmHg (*P* < 0.05); HDL-C was 1.49 ± 0.31 mmol/L and 1.56 ± 0.33 mmol/L (*P* < 0.05). For both males and females, glucose was 4.9 ± 0.4 mmol/L and triglycerides were 0.88 ± 0.45 mmol/L and 0.95 ± 0.41 mmol/L (*P* > 0.05). Prevalence estimates of MetS using the three criteria were 8.9%, 18.2% and 9.2% respectively. Prevalence estimates in males and females were 9.9% and 7.9% (Cook et al. 2003), 18.9% and 17.5% (de Ferranti et al. 2004) and 10.4% and 7.9% (Ford et al. 2005). The three proposed definitions all identified a high prevalence of MetS in this cohort. Prevalence estimates based on the criteria of de Ferranti et al. were considerably higher than those based on the criteria of Cook et al. and Ford et al., principally due to the lower cut-off point (>75th percentile) for identifying central obesity (waist girth) in the de Ferranti criteria.
PO0417
Percent body fat cut-off values for classifying overweight and obesity recommended by the International Obesity Task Force (IOTF) in Korean children aged between 7 and 18 years
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Aim: To predict the percent body fat (%BF) cut-off values corresponding to overweight and obesity recommended by the International Obesity Task Force (IOTF) in Korean children and to compare those values with the published cut-off values in Caucasian children.

Methods: We measured body mass index (BMI) and %BF using a bioelectrical impedance analyser in 1083 Korean children and adolescents (555 boys and 528 girls) aged 7–18 years. The classification of overweight and obesity was based on the age- and sex-specific BMI cut-off values of the IOTF guidelines. Correlation and multiple linear regression were conducted.

Results: For boys, the same value of BMI predicted a lower %BF with age. As girls grew older, %BF tended to be higher at a lower BMI, and then become lower at a higher BMI. The predicted %BF cut-offs for overweight and obesity varied by age and sex: overweight, 14–24% in boys and 24–34% in girls; obesity, 21–32% in boys and 31–44% in girls. While these %BF cut-off values in older Korean boys tended to be lower than the published %BF cut-offs in Caucasian boys, the %BF values in Korean girls were similar to the values in Caucasian girls.

Conclusions: The %BF values classifying overweight and obesity recommended by the IOTF may require age- and sex-specific cut-offs in Korean children aged 7–18 years. These cut-off values tended to be lower in Korean than in Caucasian boys.

PO0418
Influence of parental eating behaviour on parental feeding practices
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Introduction: Parental restrictive feeding practices may have a counter-productive effect on child’s eating behaviour. However, the determinants of these practices are unknown. We aimed therefore to describe the associations between parental feeding practices and child’s BMI, parent’s BMI, and parents’ own eating behaviour.

Subjects and methods: Two schools (one urban and one semi-rural) were involved in a study of child’s eating behaviour. The participants were 72 children, aged 4–6, 48 fathers and 68 mothers. The Three Factor Eating Questionnaire-R18 identified 3 aspects of parental eating behaviour: restrained eating, uncontrolled eating and emotional eating. Parental restrictive feeding practices (monitoring, restriction of child’s eating for weight control, or for health reasons) were measured using the Child Feeding Practices Questionnaire. Associations between child’s and parent’s characteristics, and parental feeding practices were tested by partial Spearman correlations.

Results: Monitoring and restriction for weight control or health were not associated with parental BMI. However, they were strongly associated with child’s BMI (in Mothers, Monitoring = 0.28, P = 0.02; Weight control: ρ = 0.38, P < 0.001; Health: ρ = 0.31, P = 0.008) and parental concern for child’s overweight, especially among mothers. Monitoring and restriction of child’s eating for weight control were positively associated with mothers’ own restrained eating (Restriction: ρ = 0.44, P < 0.001; Monitoring: ρ = 0.22, P = 0.06). Furthermore, restriction for health was associated with parental uncontrolled eating (Mothers: ρ = 0.25, P = 0.04; Fathers: ρ = 0.35, P = 0.02).

Conclusion: Parental restrictive feeding and monitoring appear to be a reaction to child’s overweight or parental concern about child overweight. Furthermore, parents’ own eating habits may impact their restrictive feeding practices.

PO0419
Association between infant obesity and arterial hypertension in Santa Juliana - a small city in Minas Gerais, Brazil
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Obesity is a factor of predisposition to various diseases, mainly arterial hypertension. The weight is one of main factors that determine the increase of arterial pressure in children, mainly when they are older than 5 years old. There is a direct relation between blood pressure, BMI – Body Mass Index and mortality from cardiovascular disease. We have proposed to identify the prevalence of infant obesity in the city of Santa Juliana, Minas Gerais, Brazil, and correlate it to blood pressure. Santa Juliana is a small city in the middle of the country. The city has 8,078 inhabitants, and 810 children are at school. We have analysed 599 children from elementary school, age 6–11. A good deal of information has been collected, such as height, weight, age, gender and blood pressure. We have classified children into obesity, overweight, normal and malnutrition, according to graphics from the National Centre for Health Statistics. We have classified blood pressure in: normal, limit and hypertension according to the ‘IV Brazilian Guidelines for Arterial Hypertension’. The statistical method was chi-square test and the significance level was 5%. Among the 599 children, there were: 5.5% of malnutrition, 73.3% of normality, 8% of overweight and 12.4% of obesity (P < 0.01). Among the obese: 55.4% were female (P = 0.89); 10.8% were limit blood pressure, 50.5% were normal blood pressure and 28.3% were hypertension (P = 0.007). We have verified a high prevalence of infant obesity in the city of Santa Juliana, and a high prevalence of hypertension among the obese.

PO0420
Prevalence of infant obesity in Santa Juliana - a small city in Minas Gerais, Brazil
Magalhães FO, Nunes AA, Borges MH, Ventura AA, Benevenutto LC, Silva DR, Sousa ACM, Rezende AFC, Andrade MEP, Faria MS and Ceccatto SMF
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Obesity is a chronic disease and a public health matter. This high incidence is associated with various co-morbidities such as: cardiovascular disease, diabetes mellitus, arterial hypertension, hyperuricemia, hyperinsulinemia, dyslipidemia, arteriosclerosis, sleep disturbances, coelitiasis, a high incidence of neoplasis and others. We have proposed to identify the prevalence of obesity in children from Santa Juliana. Santa Juliana is a small city in the middle of the country. The city has 8,078 inhabitants, and 810 children are at school. We have analysed 599 children from elementary school, age 6–11. A good deal of information has been collected, such as height, weight, age, gender and we have also asked about physical exercise. We have classified the children into obesity, overweight, normal and malnutrition, according to BMI – Body Mass Index, defined according to graphics from the National Centre for Health Statistics. The statistical methods were: chi-square test, Odds Ratio and the signifi-
Cance level was 5%. Among the 599 children, there were: 5.5% of malnutrition, 73.3% of normality, 8% of overweight and 12.4% of obesity \((P < 0.01)\). Among the obese 55.4% were female \((P = 0.89)\); 59.5% did exercises regularly \((OR = 0.94) \,(P = 0.9)\). We have concluded that there is a high prevalence of obesity and overweight in Santa Juliana. There was no difference between gender, and no relation to physical exercises.

PO0421
Coping with the obesogenic environment: development of a conceptual model to explain the family factors associated with children’s healthy weight status
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Background: With the growing epidemic of obesity, preventive strategies are required that target the underlying drivers of excessive weight gain. Previous research has focused primarily on obese adults using current health theories and models with varying success. There is a definite paucity of research into children, in particular into the determinants of energy balance and healthy growth. This research takes a preventive approach focusing on family factors that are protective of unhealthy weight gain in children.

Method: A review of literature was conducted to identify family determinants of dietary intake, physical activity and obesity. The search included computerised databases (such as PubMed, PsycINFO, and Web of Science) and citations in the identified literature.

Results: A holistic model was created that identifies possible family influences on children’s food intake, physical activity and hence weight status. The four main constructs included in the model are: parent knowledge, parenting style, parental support and involvement and the family environment. Parenting style includes general parenting practices, child feeding practices and role modelling opportunities. Parental support includes household food supply, as well as parent food and physical activity involvement. The family environment encompasses the family meal environments, parents’ diet and physical activity habits.

Conclusion: Empirical research will use this model to explore the family factors associated with a healthy weight status in children. Acknowledging that children live in an obesity promoting environment and the importance of the family home in developing behaviour, further understanding the key protective family factors will enhance future obesity prevention efforts.

PO0422
Childhood obesity and attention deficit /hyperactivity disorder (AD/HD): a newly described comorbidity in obese hospitalised children
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Background: Although the occurrence of psychopathology among obese individuals has been studied extensively, the prevalence of AD/HD among obese individuals has not been investigated. AD/HD is a prevalent childhood disorder (5–10%). Increased co-morbidity has been noted between AD/HD and psychiatric disorders: oppositional defiant, conduct, anxiety, mood, substance abuse and learning disorders. To date, co-morbidity between childhood AD/HD and eating disorders has not been described. To describe a subgroup of children presenting with obesity and comorbid AD/HD and assess a possible causal relationship.

Method: School aged children hospitalised for obesity (BMI > 85%) in a tertiary referral centre underwent extensive evaluations and were prospectively assessed for co morbid AD/HD.

Results: During a 4 year period, a total of 32 obese school aged children were hospitalised and 26 were included in the study. We found that over half (57.7%) suffered from comorbid AD/HD.

Conclusion: AD/HD shows a high comorbidity among obese hospitalised children. The characteristic difficulty in regulation found in AD/HD may be a risk factor for the development of abnormal eating behaviours leading to obesity. Raising the awareness to the possible comorbidity between obesity and AD/HD is of great clinical importance. It may enhance the diagnosis and treatment of AD/HD in the obese population that has generally been overlooked. Early intervention may also prevent the development of childhood obesity in AD/HD patients that are at risk. We suggest that obese children should be screened routinely for AD/HD.

PO0423
Muscular strength and cardiorespiratory fitness predict insulin resistance in children and adolescents
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Background: The rising prevalence of obesity in children and adolescents is implicated in insulin resistance and other metabolic abnormalities in adulthood. The independent contribution of fitness to insulin resistance in children is ill-defined.

Methods: In a cross-sectional study we measured fasting insulin, glucose, lipids, body mass, height, waist circumference (WC), BMI, muscular strength and CRF in 126 volunteers from a rural New Zealand community. Linear and logistic regression analyses were performed to assess the univariate and multivariate relationships between these factors and estimated insulin resistance (Homeostasis Model Assessment 2; HOMA2 -IR).

Results: Greater insulin resistance was associated with greater adiposity, lower strength and CRF in these 10–15 year olds. Upper body strength and WC were the only independent predictors of insulin resistance, accounting for 39% of the variance, \((P = 0.000)\). Children in the highest and middle tertiles of absolute upper body strength were 98% less likely to have high insulin resistance than those with the lowest strength, adjusted for maturation, central adiposity and body mass \((OR = 0.019); \,(P = 0.003)\). Similarly, children with the highest aerobic fitness were 95% less likely to have high insulin resistance than those in the lowest tertile of CRF, adjusted for maturation and central adiposity \((OR = 0.05); \,(P = 0.011)\).

Conclusion: Muscular strength has been identified for the first time as an independent and powerful predictor of higher insulin resistance in children. Strength, CRF and central adiposity are highly predictive of increased insulin resistance in this cohort, and should be considered potential targets for interventions designed to prevent or treat metabolic syndrome in children and adolescents.

Funding Disclosure: This work was supported by grants for blood testing from Invercargill South Lions Club Diabetes Services Development Trust and Southland District Health Board and research and equipment grants from the University of Sydney and the Southern Institute of Technology.
PO0424
Applicability of the standardized MET value for children
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One MET is standardized as 3.5 mL/kg/min and \( \approx 1 \) kcal/kg/h. Despite the emergence of some critical debate in the literature this approach is still widely applied. Utilization of this standard value may introduce bias in the estimation of energy cost (EC), mainly when utilizing thresholds to delineate intensity of physical activities for children. The purpose of this study was to verify the applicability of the standardized MET value for children. The pilot sample was comprised of nine participants (mean age \( \pm 10.0 \pm 1.4 \) year). Resting metabolic rate was measured in the fasting state, seated and watching DVD’s. Sub-maximal treadmill tests involved a protocol based on the self-selected speed (SS) with oxygen consumption measurement. Statistical analyses included Paired T-test between the individual metabolic cost (IMC) and the MC using the standardized MET (SMC) and also between measured EC (kcal kg\(^{-1}.h^{-1}\)) and estimated EC at SS. Differences among individuals measured MET, average group MET and standardized MET at SS were analysed using ANOVA followed by the post-hoc Scheffe. Our results showed an average MET value at rest of 4.4 ± 0.9 mL/kg/min and 0.70 ± 0.07 kcal/kg/h. A statistically significant difference (\( P < 0.01 \)) was detected between IMC and SMC, and also between measured EC and estimated EC at SS. These preliminary results support the use of the standardized MET for groups of children. However, it is very important to consider the individual measured MET value for EC estimation and also for individual physical activity or dietetic prescriptions. A more comprehensive study with a larger cohort is underway.

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PO0425
The weight of opinion on childhood obesity: the early childhood education sector
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Early childhood is a significant period when the foundations for good or poor eating habits, levels of physical activity, and self-regulation of appetite are laid. Because long day care centres and preschools structure the daily environments in which many young children in Australia play and learn, the sector has an important role to play in preventing and (sometimes) dealing with childhood overweight and obesity. A qualitative study was carried out to see how the early childhood sector perceives the issues of overweight and obesity and their role in it, current practices surrounding healthy eating and physical activity, and supports they see as necessary to strengthen their role. Researchers interviewed directors and staff members of four preschools and four long day-care centres in three metropolitan areas and one rural area in NSW. Establishing healthy habits with regard to food and physical activity form a core component of early childhood education. Participants recognized childhood overweight and obesity as a serious issue and appreciated the complexity of its causes. Challenges arose over the sensitive nature of weight, defining overweight among young children, and the emotions inherent in the family food environment. Strengthening the supports and resources to the early childhood education sector during this critical period of child development should be seen as one of the important policy efforts in the attempt to reduce the incidence of childhood overweight and obesity.

PO0426
The weight of opinion on childhood obesity – the views of Australian general practitioners
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A qualitative research study was conducted to investigate the extent to which community members, professionals and government agencies see overweight as a threat to the health of young Australians, their views on causes and solutions, and perceptions about their roles and responsibilities. As the dominant professional group involved in primary health care in Australia, General Practitioners (GPs) can make a significant contribution to addressing the problem. Four focus groups were conducted with GPs from three metropolitan and one rural area of NSW. Group participants included men and women, and GPs from a range of cultural backgrounds with practices in low, medium and high socio-economic areas. Group discussions were led by an experienced facilitator, following a protocol of topic questions and prompts that had been developed based on an analysis of published literature, consultation, and pilot interviews. The paper will present the findings on how seriously GPs regard the problem of childhood overweight and obesity, and the barriers they experience in raising and addressing the problem in consultations with children and parents and adolescents. The paper will also describe some of the strategies the doctors use in discussing this issue with parents and adolescents. The results emphasise the difficulty doctors experience in addressing a medical problem that has a wide range of environmental and behavioural causes, and where community members predominately see it as a social issue.

PO0427
The thickness of preperitoneal fat accumulation determined by ultrasonography in children and adolescents: the trend of the standard values by sex and age
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Background: The excess accumulation of visceral adipose tissue (VAT) may be a crucial contribution to metabolic syndrome, even if in children.

Aim: It is beneficial for children to investigate the accumulation of VAT with the ultrasound examination, since that is an exact and non-invasive method.

Subjects and Methods: 194 non-obese Japanese children (85 boys and 109 girls, 4-year-old to 20-year-old in age) were subjected. Height, weight and waist circumference were measured. An ultrasonographic examination with a 13 MHz linear type probe was performed to determine the maximum thickness of preperitoneal fat (P-max) and the minimum thickness of subcutaneous fat (S-min). The subjects classified into five groups with following ages: 4–6 years (groupA), 7–10 years (groupB), 10–12 years (groupC), 13–15 years (groupD), and 16–20 year (groupE). The standard of the accumulation of VAT were obtained by sex and each age group.

Results: The P-max became to be thick progressively with age and both sexes. In adolescent groups, gender difference was found in P-max, which was thicker in girls than in boys (girls vs. boys in group C and D: \( 5.91 \pm 2.47 \) mm vs. \( 3.32 \pm 1.60 \) mm, \( 7.37 \pm 2.88 \) mm vs. \( 4.51 \pm 2.06 \) mm). P-max was significantly corre-
lated with age, weight and waist circumference ($r = 0.667$, $0.613$, and $0.608$, respectively).

**Conclusion:** We have revealed the standard ranges of preperitoneal fat thickness in children and adolescent. For preventing metabolic syndrome in early age, these values may be useful for evaluation of visceral fat accumulation.

**POO428**

**Secular changes in body weight, height and body mass index of school children in Sendai, Japan, 1934–2003**

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The purpose of this study is to examine secular changes in body weight, height, and body mass index (BMI) of school children in Sendai. The weight and height of school children at the age of 11.5–12.0 years were measured in every autumn since 1934. The analyses of the data encompassing 70 years revealed remarkable reduction in body weight and height of the school children in early 1940’s. The mean of the height and weight increased markedly in late 1940’s until early 1970’s. Linear regression analysis using the data from 1989 to 2003 showed that there were significant increases in BMI. The increases in the upper percentiles of BMI were more marked compared with those in the lower percentiles. There were no remarkable changes in 10 and 25 percentile values. On the other hand, 75 and 90 percentile values of BMI showed an upward trend in boys. These changes were similarly observed in girls. It is conceivable that the decrease of weight of school children in early 1940’s may reflect a food shortage due to the World War II. In addition, the increase of physique after the war may result from improvement of the food situation. The present analyses suggest that the social background affected the growth of school children. In addition, these findings after the end of 1980’s suggest that further investigation is needed to elucidate the cause for the upward shift of the BMI distribution in Sendai school children.

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**POO429**

**Relationships between early growth rate and Fat (FM) and Fat-Free (FFM) Mass in adolescence.**

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**Introduction:** Rapid early postnatal weight gain predicts adult obesity. We aimed at studying the relationships between height and weight postnatal growth velocity at different ages during infancy, and fat (FM) and fat-free (FFM) mass in adolescence, separately in boys and girls.

**Method:** (1) Anthropometric parameters were measured in 345 subjects aged 8–24 years (called ‘adolescents’). Bipodal-Impedancemetry was used to estimate fat mass percent. We used the residuals of regression of FM and FFM on height, age and Tanner stage to build independent indices. (2) Weight and height in infancy were collected from health records. Individual estimations of growth velocity at selected ages between birth and 5 years were assessed through modelling of growth curves. (3) We correlated estimations of early growth velocities to body mass indices in adolescence.

**Results:** In boys, weight growth velocity at age three months was correlated with FM and FFM indices in adolescence ($r_{FM} = 0.20$, $P = 0.01$; $r_{FFM} = 0.37$, $P = 0.003$). In girls, correlations were significant only with FM ($r_{FM} = 0.22$, $P = 0.004$; $r_{FFM} = 0.35$, $P = 0.03$). Between 1 and 2 years, weight growth velocities remained associated with later FM for girls, whereas for boys relationships with FM and FFM were reduced. Height growth velocities from 0 to 5 years were mainly correlated to height in adolescence.

**Discussion:** Very early weight growth (3 months) was a predictor of FM in both genders and FFM in boys only. This may suggest a role of the early postnatal sex-hormone surge in FFM programming in boys. Knowledge of early growth determinants could help to better understand obesity risk in adolescents.

**POO430**

**Roll out of a successful model for obesity prevention in children – the epode initiative (Ensemble Prévenons l’Obésité Des Enfants)**

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Since 1992, the FLVS project has proved that the decrease of obesity prevalence in children is possible through whole-of-community actions. EPODE program has been set up in 2004. It involves 500 000 people among which 50 000 children in 10 French pilot towns (prevalence of children overweight including obesity is 20.6%) and is now expanding to other French towns as well as Spain and Belgium. It is within the family that the main determinant of the lifestyle such as diet and physical activity are being decided. The concept of EPODE is to use local stakeholders such as teachers, health professionals, shopkeepers, local producers, catering, and media to deliver the same health message to the family at the same time. The keys to success of EPODE are concrete, visible, sustainable and local actions, the involvement of all local players and stakeholders around a mobilizing linking theme, actions highlighted by a continuous communication. It also involves existing local actions and projects. The implementation of the program is enabled by a specific organization including a national board coordinating the project managers in the towns, themselves managing a local team. This organization can be duplicated in other countries taking into account the local cultural specificities. Since EPODE has been launched, over 1000 actions have been performed in two years time in the 10 French pilot towns, with a strong participation of all local players and the population. EPODE evaluation includes BMI assessment for each child as well as the study of sociological and behavioural changes.

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**POO431**

**Overweight and obesity in south Australian preschool children: a spatial perspective**

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This research will explain and clarify some of the variation in mean BMI between preschool children in South Australia by employing Geographical Information Systems (GIS) to analyse a longitudinal data set containing BMI and location (address) information for some 80% of South Australian preschoolers. Spatially referenced data is supplied by Child and Youth Health (CYH), a SA government organisation that offers free health assessments to all families within the state. Up to 80% of 4 year old children are estimated to attend a preschool check, at which their height and weight are recorded. BMI
calculated from these measurements can be mapped and analysed for small areas. Preliminary analysis indicates disparate spatial distribution of overweight and obesity among South Australian preschool children, with overweight prevalence of 18–20% in the most disadvantaged areas compared to 10–12% in the least disadvantaged. By incorporating available socio-demographic and environmental data sets within a GIS environment, it will be possible to further detect correlates between BMI, socio-economic variables and environmental attributes at a small scale which may be able to explain some of the discrepancy.

POO432
Validation and application of a novel method of measuring non-response bias in school-based surveys of paediatric overweight and obesity
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Non-response bias is a potential concern in epidemiological studies, especially those which measure adiposity among young people. The purpose of this study was to assess the validity of a method of estimating non-response bias based on body mass index in a population survey of Australian school students and to determine the magnitude of non-response bias. A population survey of students in Grades K, 2, 4, 6, 8 and 10 was conducted in 2004 and height and weight measured. Teachers estimated the height and weight of non-participating students and half of the participating students. Among those students whose height and weight had been both measured and estimated, percent agreement between the body mass index (BMI) categories based on measured and estimated values was calculated to determine the validity of the estimated values of height and weight. The prevalence of overweight and obesity among participating and non-participating students was compared to determine the magnitude of non-response bias. Percent agreement between BMI category based on estimated and measured height and weight was >60% for more than 88% of classes, indicating that most teachers were able to provide reasonably accurate estimates of students’ height and weight. Across all age/sex groups, the differences in the prevalence of overweight and obesity between participating and non-participating students were all less than one percentage point. This method provides an affordable and reliable method of assessing non-response bias in school-based surveys of overweight.

POO433
A descriptive epidemiology of small screen recreation among Australian adolescents
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Objective: To describe the epidemiology of small screen recreation (SSR) that is; television, computer, video, and DVD use among Grade 6, 8 and 10 school students in New South Wales (NSW), Australia.

Methods: Cross-sectional representative population survey (n = 2750) from 45 primary and 48 secondary schools in rural and urban areas. Students in Grade 6, 8 and 10 completed a self-report questionnaire on the time they spend during a usual week in 5 categories of sedentary behaviour (small screen recreation [SSR], education, cultural, social and non-active travel). Height and weight were directly measured.

Results: Grade 6, 8 and 10 students spent approximately 34 hours, 41 hours and 45 hours/week of their discretionary time, respectively, engaged in sedentary behaviour. Urban students and students from Asian-speaking backgrounds spent significantly more time sedentary than students from rural areas or other cultural backgrounds. SSR accounted for 60% and 54% of sedentary behaviour between primary and secondary school students, respectively. Overweight and obese students spent more time in SSR than healthy weight students. Educational activities accounted for approximately 20% of sedentary behaviour and increase with age. Girls spent twice the time in social activities compared with boys. Time spent in cultural activities declined with age.

Conclusion: A clear understanding of young people’s patterns of sedentary behaviours is required to develop effective and sustainable intervention programs to promote healthy living. The types of sedentary behaviour young people engage in differs according to sex, age and cultural background. BMI was significantly associated with sedentariness among some children, but not consistently across age groups.
PO0435
Family and home correlates of television viewing in 12–13 year old adolescents: the Nepean study
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Purpose: To determine the association between factors in the family and home environment and viewing television, including video and DVD use, in early adolescence.

Methods: Cross-sectional survey of 343 adolescents aged 12–13 years (173 girls), and their parents (338 mothers, 293 fathers). Data were collected via self-report and checked for completeness at interview. The main measures were familial and home environmental factors that predicted adolescents viewing ≥2 hours of television/day. Factors examined included family structure, opportunities to watch television/video/DVDs, perceptions of rules and regulations on television viewing, and television viewing practices, including eating habits in front of the television.

Results: Two-thirds of adolescents watched ≥2 hour’s television per day. Factors in the family and home environment associated with adolescents watching television ≥2 hours per day include adolescents who have siblings (Adjusted Odds Ratio [95% CI] AOR = 3.0 [1.2, 7.8]); access to pay television (AOR = 2.0 [1.1, 3.7]); ate snacks while watching television (AOR = 3.1 [1.8, 5.4]); co-viewed television with parents (AOR = 2.3 [1.3, 4.2]); and had mothers who watched ≥2 hours television per day (AOR = 2.4 [1.3, 4.6]).

Conclusions: There are factors in the family and home environment that influence the volume of television viewed by 12–13 year olds. Television plays a central role in family eating practices and as a medium for recreation. Intervention strategies targeting families to reduce adolescents’ snacking while watching television may indirectly influence the incidence of overweight and obesity.

PO0436
Changes in sedentary behaviour among adolescent girls: a 2.5 year prospective cohort study
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Objective: To describe longitudinal changes in sedentary behaviour among girls, during early to mid adolescence.

Methods: 2.5 year prospective cohort study, comprising 5 data collections, 6 months apart, between 2000 and 2002. Participants were 200 girls aged 12–13 years from 8 high schools located in Sydney, Australia. The main outcome was self-report measures of the usual time spent each week in a comprehensive range of sedentary behaviours.

Results: Retention rate for the study was 82%. Girls aged 12.9 years old spent approximately 45% of their discretionary time in sedentary behaviour, which increased to 63% at age 14.9 years (P < 0.001). Small screen recreation was the most popular sedentary pastime, accounting for 33% of time spent in sedentary behaviours, followed by homework, studying and reading (25%). However, the time spent in these behaviours remained relatively stable during the study period. Change in sedentary behaviour was primarily related to increased time spent on hobbies and crafts (47% increase), computer use (33% increase), and sitting around talking with friends (24% increase).

Discussion: Girls spend a large proportion of their discretionary time in sedentary behaviour, which increases during the transition between early and mid-adolescence. Small screen recreation is the most popular sedentary behaviour, but viewing times are relatively stable, indicating that pre-adolescence may be the most appropriate age to implement intervention strategies targeting this behaviour. Interventions among adolescent girls that focus on exchanging at least one hour of sedentary behaviour a week with physical activity could have significant health benefits.

PO0437
ACE-Obesity: the cost-effectiveness of two multi-faceted school-based interventions to reduce the prevalence of unhealthy weight in children in Australia
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Aim: We performed a comparative cost-effectiveness analysis from a societal perspective of two multi-faceted school-based interventions aimed at reducing the prevalence of unhealthy weight in Australian children.

Methods: Both interventions were based on the ‘Know Your Body’ (KYB) program available commercially (www.kendallhunt.com). The program was integrated into the school curriculum and delivered by the regular teachers to educate children on health, physical activity and nutrition. The program was adapted and trialled in Greece (Manios et al., 1999) and Israel (Tamir et al., 1990). The Greek intervention also included an additional active physical exercise (PE) component. Benefits were modelled from changes in mean BMI to future savings in Disability Adjusted Life Years (DALY). The reference year was 2001, the target population was all children in grade 1, and costs and benefits were discounted at 3%. We calculated incremental cost-effectiveness ratios (ICERs) and also took into consideration second stage filters of strength of the evidence, equity, acceptability, feasibility, sustainability, and potential side effects.

Results: Both interventions were cost-effective (less than AUD$50,000 per DALY saved), but the Greek intervention was almost 3 times more cost-effective. Although the Greek intervention was more expensive, the costs were offset by savings in future health care costs due to a reduction in obesity-related conditions. Its superiority is due to its greater efficacy, which was attributed to the active PE component by the authors.

Conclusions: A multi-faceted school-based intervention that incorporates an active PE component alongside health education is more cost-effective than a purely health education approach.

PO0439
Fast food consumption, high-energy intake, and television viewing are associated with obesity in Indonesian adolescents.
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Background: Obesity among adolescents is increasing in Indonesia, however there is no information about risk factors needed to design interventions. To examine whether fast food consumption, high-energy intake, and television viewing are factors associated with obesity.

Methods: A cross-sectional study in Yogyakarta, in late 2003 recruited junior high school students from urban (n = 4747) and rural (n = 4602) areas. 7.8% of urban and 2.0% of rural students...
were obese (BMI ≥ 95th percentile of WHO reference). A random sample of 140 obese and 140 non-obese students was selected from the cross-sectional sample, and physical activity, nutrient intakes, and socio-economic status were measured.

**Results:** Students who ate fast food ≥3 times/month were 3 times (OR = 3.0, 95% CI = 1.4–6.3) more likely to be obese than those who ate fast food <3 times/month. Students with high energy intake of ≥2200 kcal/day had higher odds of obesity, and the odds increased linearly such that students with energy intake ≥2200 kcal/day were 8 times (OR = 8.1, 95% CI = 2.0–31.8) more likely to be obese than those with energy intake <2200 kcal/day. Adolescents viewing TV ≥5 hours/day were 5 times (OR = 4.7, 95% CI = 1.9–11.6) more likely to be obese than those viewing TV <3 hours/day. Mild physical activity was associated with higher odds, while moderate/vigorous activity was associated with lower odds (P < 0.05) of obesity.

**Conclusions:** Fast food consumption, high energy intake, TV viewing, mild physical activity are associated with obesity and altering these behaviours is likely to be amongst the key interventions to reduce obesity in Indonesian adolescents.

**PO0440**

**Alarming trend of waist circumference in Tehranian children and adolescents-Tehran lipid and glucose study**

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**Background:** Waist circumference is an independent predictor of non-communicable diseases whose sensitivity and specificity in young people have been demonstrated. This study was aimed to compare the waist circumference of Tehranian children and adolescents in a 3 year interval.

**Methods:** Height, weight and waist circumference of children (3–10 years) and adolescents (11–19 years) of district 13 of Tehran were measured two times in 1999 (n = 733) and in 2001 (n = 673) in the framework of phase 1 and 2 of Tehran Lipid and Glucose Study (TLGS), respectively. BMI was calculated by dividing weight (in kg) to height square (in m²). Children and adolescents were considered overweight and obese, if their BMI would be 25 and 30 in 18 years old based on international curves.

**Results:** Mean of waist circumference in male subjects in the ages of 8.5, 10 (mean differences 8.6 ± 3.0 and 9.4 ± 3.2 cm, respectively, P < 0.01), 12, 15.5 (mean differences 8.3 ± 3.3 and 15.7 ± 4.1 cm, respectively, P < 0.05) and 13.5 (mean differences 11.8 ± 3.2 cm, respectively, P < 0.01) years old in the second phase of TLGS was significantly higher than that in first phase. In contrast, in female subjects, only in 14.5 year olds, waist circumference was higher than that of first phase (68.1 ± 5.9 vs. 72.9 ± 8.2 cm, P < 0.05). Mean of BMI increased in 8.5, 10, 13 and 13.5 year old males (mean differences 2.3 ± 1.1, 2.5 ± 1.1, 4.1 ± 1.6 and 3.5 ± 1.2 kg/m², respectively, P < 0.05) and 8.5, 14 and 14.5-year-old females (mean differences 2.4 ± 0.8, 2.1 ± 1.0 and 2.1 ± 0.9 kg/m², respectively, P < 0.05). Prevalence of overweight (9.1% vs. 16.8% in boys and 12.1 vs. 15.4% in girls) and obesity (5.5 vs. 6.3% in boys and 7.0 vs. 8.5% in girls) were higher than that of first phase (68.1 ± 5.9 vs. 72.9 ± 8.2 cm, P < 0.05). Prevalence of overweight and obesity among adolescents.

**Conclusion:** The findings demonstrate that over-nutrition is exceeding of under-nutrition in Tehranian adolescents. Therefore, designing programs to improve the nutritional behaviours and physical activity by using attractive modern Technology for parents, teachers and adolescents from mass media is highly recommended.

**PO0441**

**Under-and over nutrition in a group of Tehrani adolescents**

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**Background:** Adolescence is one of the most challenging periods in human development. Underweight, overweight and obesity in adolescence increase the risk of non-communicable disease and premature death in adulthood. This study was conducted to determine the prevalence of underweight, overweight and stunting in 11–13 years old adolescents in the framework of ‘Interventional planning to improve the management of school buffet and nutritional behaviours of secondary school students’.

**Methods:** In the first phase of mentioned project, height and weight of 788 adolescents 11–13 years old (398 girls and 390 boys) were measured in district 4 of Tehran city. Weight for height and height for age indices were compared with reference population (NCHS/WHO Tables) to determine the underweight, overweight and stunting. In classification of malnutrition for each values <−3 and >+3 SD, between −3 to −2 SD and +2 to +3 SD were considered as severe and moderate, respectively.

**Findings:** The prevalence of underweight was 6.4% (3.8% severe and 2.6% moderate) and 11.4% (6.8% severe and 4.8% moderate) in girls and boys, respectively. The prevalence of overweight and obesity were 8.7 and 9.7% in girls and 8.8 and 10.1% in boys, respectively. The prevalence of moderate and severe stunting was 2.6 and 4.6% in girls and 7.0 and 8.5% in boys, respectively. The highest prevalence of overweight and obesity was found in 11 years old females and 13 years old males. However, the highest prevalence of stunting was found in 13 years old females and 11 years old males.

**Conclusion:** The findings demonstrate that over-nutrition is exceeding of under-nutrition in Tehranian adolescents. Therefore, designing programs to improve the nutritional behaviours and physical activity by using attractive modern Technology for parents, teachers and adolescents from mass media is highly recommended.

**PO0442**

**Information and communication technology use, body mass index, and overweight among adolescents**

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**Background:** Children and adolescent overweight has reached dimensions of a global epidemic during recent years. Simultaneously, information and communication technology use has rapidly increased.

**Methods:** A population-based sample of Finnish twins born in 1983–1987 (n = 4098) assessed by self-report questionnaires at 17 years during 2000–2005. The association of overweight and BMI with computer and cell phone use was expressed as odds ratios (OR) from logistic regression and beta coefficients (beta) from linear regression analyses adjusted for gender, physical exercise, and parents’ education and occupational classes.

**Results:** The proportion of adolescents without a computer at home decreased from 18% to 8% during 2000–2005. Compared to them, having a computer without an Internet connection was associated with a higher risk of overweight (OR 2.26, 95%CI 1.35–3.76) and...
BM (beta 0.57, 95%CI 0.15–0.98). Belonging to the highest tertile of weekly computer use for study/work (OR 1.38 1.04–1.82), recreation (OR 1.69, 1.24–2.31), and study/work and recreation (OR 1.70, 1.24–2.32) was positively associated with overweight. The proportion of adolescents without a cell phone decreased from 12%–1% during 2000–2005. Monthly phone bill had a positive linear trend in relation to BM (beta 0.18, 95% CI 0.06–0.30).

**Conclusion:** Having a computer was associated with a higher BMI and risk of overweight. Computer use hours were associated with an increased risk of overweight. Cell phone use was positively associated with BMI. Increasing use of information and communication technology may be associated with the obesity epidemic among adolescents.

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**PO0443**

**Parents’ perceptions and concerns about their children’s weight**

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**Background:** For parents to address overweight or obesity in their children, they first need to perceive their child to be overweight and to show some level of concern. We aimed to: (1) measure the level of misclassification between children’s actual and parent-perceived weight status, and (2) determine the level of parent concern about their child’s (actual) weight and whether concern varied according to the accuracy of parents’ perceptions.

**Methods:** Participants were 1711 primary school children aged 5–12 years from the Barwon-South West region of Victoria, Australia. Height and weight were measured and weight status determined using international standards. Parents completed a Computer Assisted Telephone Interview (CATI) that included questions relating to their child’s weight.

**Results:** 448 children (26.2% of sample) were overweight or obese. Of these, weight status for almost half (48%) was underestimated by parents. This ‘bias’ did not vary according to the child’s gender, parent’s education, or household socio-economic status but did for child’s age and parent-respondent gender. More than half (57%) of the parents of overweight-obese children expressed no concern about their child’s weight. Parents who underestimated the weight status of their overweight child were significantly less concerned (P < 0.001) about their child’s weight than those who correctly perceived their child as overweight.

**Conclusions:** Parents were relatively poor judges of overweight or obesity in their own child and consequently there was a lack of appropriately directed concern. Education to help parents correctly classify their child’s weight status should be part of efforts to prevent unhealthy weight gain.

**PO0444**

**Overweight, obesity and girth of Australian preschooler: prevalence and socio-economic correlates**

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**Background:** To determine prevalence of overweight and obesity; waist circumference percentiles; and associations between socio-economic characteristics and (a) overweight/obesity and (b) girth in Australian 4–5 year old children. Cross-sectional population survey. Wave 1 (2004) of the Longitudinal Study of Australian Children.

**Participants:** Nationally representative sample of 4983 4–5-year-old children (2537 boys and 2446 girls; mean age 56.9 months (range 51–67 months)).

**Main outcome measures:** Prevalence of overweight and obesity (IOTF definitions) and girth percentiles.

**Results:** 15.2% of Australian preschoolers are estimated to be overweight and 5.5% obese. In univariate analyses, the following variables were associated with higher odds of being in a heavier weight category: female sex; language other than English spoken at home; indigenous status; lower maternal education; lower gross family income; poorer disadvantage quintile (a composite postcode-of-residence variable); and less skilled parent occupation category. In a multivariable regression model, speaking a language other than English (particularly for boys), indigenous status, and lower disadvantage quintile were the clearest independent predictors of higher weight status, with children in the lowest quintile of social disadvantage having 47% higher odds (95% CI 14%, 92%) of being in a heavier weight category compared to those in the highest quintile. Waist girth was not related to any socio-economic variable, and median values were the same for boys and girls (54.1 cm).

**Conclusions:** We confirm high rates of overweight and obesity in preschoolers throughout Australia. An emerging socio-economic gradient should bring new urgency to public health measures to combat the obesity epidemic.
PO0445
Fifteen month results from the LEAP (Live, Eat And Play) trial: a randomised controlled trial of a primary care intervention for childhood overweight/mild obesity
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Objectives: To reduce gain in body mass index (BMI) in overweight/mildly obese children in the primary care setting.
Design: Randomised controlled trial (RCT) nested within a baseline cross-sectional BMI survey.
Setting: 28 general practices, Melbourne, Australia.
Participants: 1) BMI survey: 2112 children visiting their general practitioner (GP) April–December 2002; 2) RCT: individually-randomised overweight/mildly obese (BMI z-score <3.0) children aged 5 years 0 months–9 years 11 months (82 intervention, 81 control).
Intervention: Four standard GP consultations over 12 weeks, targeting change in nutrition, physical activity and sedentary behaviour, supported by purpose-designed family materials.
Main outcome measures: Primary: BMI at 9 and 15 months post-randomisation.
Results: Attrition was 10%. The adjusted mean difference (intervention - control) in BMI was −0.2 kg/m² (95% CI: −0.6–0.1; P = 0.25) at 9 months and 0.0 kg/m² (95% CI: −0.5–0.5; P = 1.00) at 15 months. There was a relative improvement in nutrition scores in the intervention arm with an adjusted mean difference of 2.1 (95% CI: 1.3–2.9) at 9 months and 1.6 (95% CI: 0.9–2.3) at 15 months. There was weak evidence of an increase in daily physical activity in the intervention arm. Health status and body image were similar in the trial arms.

PO0446
Economic evaluation of a primary care trial to reduce weight gain in overweight/obese children: the LEAP (Live, Eat And Play) study
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Background: LEAP (Live, Eat and Play) was a randomised controlled trial of a brief secondary prevention intervention delivered by general practitioners (GPs), aiming to reduce weight gain in overweight/mildly obese children aged 5–9 years over a 15 month period.
Objectives: To report costs of the LEAP intervention from a health service and family perspective, and compare costs of LEAP for intervention and control children with the outcomes experienced.
Methods: The research team prospectively recorded and audited GP records to establish GP care utilisation, and parents reported family resource use by written questionnaire. Researchers blinded to intervention status recorded the primary outcome (child BMI); secondary outcomes were reported via written questionnaires.
Results: The cost of LEAP per intervention family was $4,094 greater than for control families, largely as a result of increased family resources devoted to child physical activity. Total costs borne by the health sector were $873 per intervention family and $64 per control, a difference of $809 (P < 0.001). At fifteen months, intervention children showed no difference in adjusted BMI compared with the control group but had a sustained improvement in nutrition and increased daily physical activity.
Conclusions: LEAP resulted in higher costs to families and the health care sector, but did not ultimately alter child BMI trajectory. Given the policy and health relevance of the child obesity epidemic, it is essential that any assessment of potential interventions includes measures of monetary and other costs, and incorporates costs borne by families.

PO0447
Prevalence of obesity in adolescent students from Santa Maria city in the south of Brazil
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Santa Maria, a city of 300 000 inhabitants, has about 11 000 adolescent students in public high school.
Objective: This study aimed at determining the prevalence of obesity in adolescents who attend public schools in the city of Santa Maria and the relationship with their life habits. This was a cross-sectional study involving 616 adolescents (55.1% female) ranging from 14–19 years old, who go to different public schools in the city.
Method: The following variables were studied: sex, age, hours in front of TV and/or computers, exercise and breakfast habits. Nutritional status was evaluated by the body mass index (weight/height^2) and waist circumference (abdominal obesity: male ≥ 94 cm and female ≥ 80 cm) measure-the mean point between iliac crest and the last rib.
Results: Overweight and obesity were 13.5% and 1.8% in female and 9.8 and 5.5% in male. However, based on the new criteria abdominal obesity was present in 10% of male and 29% in female. Overweight and obesity were associated to skipping breakfast (70% vs. 38% P < 0.001); three or more hours in front of TV and/or computers 54% vs. 38% P < 0.01). There was no difference considering the fact exercising or not.
Conclusion: Overweight and obesity is present in 15% of adolescent in Santa Maria and this increase was observed in others parts of the country. It was associated to their life habits. According to the new criteria of abdominal obesity, this levels extremely high in our female adolescents.

PO0448
Relative body mass index correlates with DXA measures of body fat in children of varying ages and adiposity
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Background: Clinical methods to assess the severity and progression of obesity in children are limited. Body mass index (BMI) cutoffs (85th and 95th percentiles on age and gender-specific growth charts) provide a means for classifying youth as overweight and obese, however they do not help clinicians assess the overweight severity or progression in this population nor facilitate comparisons across age and gender groups. Relative BMI (RBMI), BMI/50th percentile BMI for age and gender * 100, provides a measure of overweight severity in children. This study examined the relationship between RBMI, BMI, and DXA measures of total fat mass in 4–18 year old children of varying adiposity to determine the clinical utility of RBMI.

Methods: Children (n = 577, 80% female, 12.24 ± 1.76 years of age, BMI 21.54 ± 7.32, RBMI 116.89 ± 35.02) were weighed and height was measured with calculation of BMI (wt in kg/ht in m^2) and RBMI, and then had whole body fat (Kg) and % body fat measured by DXA scan. Associations between RBMI, BMI, and DXA measures of fat mass were determined by Pearson Correlation coefficients using SAS v9.1 with P < 0.05 considered significant.

Results: Both RBMI and BMI were strongly correlated with DXA measures of total fat mass (r = 0.96 P < 0.001 and r = 0.97 P < 0.001) and % body fat (r = 0.79 P < 0.001 and r = 0.74 P < 0.001) respectively.

Conclusion: Both RBMI and BMI correlate strongly with DXA measures of fat mass. RBMI facilitates longitudinal follow-up of overweight in youth, and allows comparisons across gender and age groups making it a clinically useful measure.

PO0449
Prevalence of obesity and some related factors among children aged 0–5 years, Bandar Turkmens district, Iran
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Background: Child obesity is increasing in developing countries. This study assessed prevalence of obesity and some related factors among children aged 0–5 years in Bandar Turkmens district, Iran.

Methods: In this descriptive- analytical study, 616 children aged 0–5 years were selected with stratified random sampling. Obesity was defined as >+2SD NCHS reference. Data were collected by questionnaire, interview with mothers and were analysed with Chi-Square and Fisher tests and multiple regression logistic models.

Results: In this study, 6% of children were obese. Prevalence of obesity didn’t differ significantly between boys and girls (6% and 6.1% respectively) Birth weight <2500 g and >4000 g (P = 0.031), breast feeding duration <18 months (P = 0.017), mother’s present age ≥37 years (P = 0.039), mother’s delivery age >30 years (P = 0.043) and formula or cow’s milk plus breast feeding up to 6 months old (P = 0.018) had significant correlation with children’s obesity. Exclusively breast feeding up to 6 months of age rather than formula or cow’s milk plus breast feeding, reduced 2.45 times obesity risk (P = 0.019). Obesity risk was higher among children who breastfed lower than 18 months (P = 0.072). Mother’s delivery age >30 years increased 2.028 times obesity risk (P = 0.039).

Conclusion: This study suggests that exclusively breast feeding at first 6 months of age, longer breast feeding duration and pregnancy in lower than 30 years of age reduce risk of child obesity.

PO0450
The prevalence of obesity in primary school children in Nišava district (Serbia)
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Background: Numerous investigations documented that there is a significant correlation between children’s obesity and non-communicable diseases in adults. More detail knowledge of obesity prevalence in children is a first step in the prevention of many diseases. The aim of the paper was to establish prevalence of obesity in primary school children in Nišava district (Serbia).

Methods: It was investigated 10274 randomly sampled children (5021 boys and 5253 girls) age from 7–15 years. The study was done as transversal investigation during 2002 and 2003. Body height and body weight of the children were measured with standard procedures and body mass index was calculated.

Results: Overweight (P85–P95) was observed in 9.8–10.0% boys and 9.6–10.11% girls depending to age. Obesity (>P95) was present in 5.0–5.15% schoolboys and 5.01–5.33% schoolgirls. Body mass index over 85th percentile was found in 14.3% of children (girls of 7 years old) till 15.19% (girls of 12 years old) and that was significant increase compared with the previous examination conducted in Serbia.

Conclusions: The results confirm that urgent preventive action against children’s obesity is necessary in Serbia.

PO0451
Excess BMI at ages 7–13 years is associated with coronary heart disease (CHD) in adulthood among 238 609 Danish schoolchildren
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Worldwide, children are becoming heavier at younger ages. The long-term consequences of excess childhood weight on CHD in adulthood are largely unknown. Therefore we investigated if BMI at ages 7–13 year is associated with an increased risk of CHD in adulthood. Subjects were 120 263 boys and 118 346 girls born between 1932 and 1975 from the Copenhagen School Health Records Register. BMI status was obtained by linkage to the Danish Hospital Register. BMI z-scores were calculated from internal age- and sex-specific references. Sex-specific Cox regressions were conducted. Among boys at 7 year, a 1 z-score increase in BMI (1.3 kg/m^2) was associated with a 1.06 relative risk (RR) (95%CI: 1.03–1.09) of a CHD event in adulthood. From 8–12 year the RR increased; by 13 year a 1 z-score increase in BMI (2.7 kg/m^2) was associated with a 1.14 RR (95%CI: 1.10–1.18) of a CHD event. Among girls at 7 year, a 1 z-score increase in BMI (2.2 kg/m^2) was associated with a 1.17 RR (95%CI: 1.14–1.20) of a CHD event. Among girls at 9 year, a 1 z-score increase in BMI (1.8 kg/m^2) was associated with a 1.04 RR (95%CI: 1.00–1.09) of a CHD event in adulthood. From 10–12 year the RR increased; by 13 year a 1 z-score increase in BMI (2.7 kg/m^2) was associated with a 1.14 RR (95%CI: 1.10–1.18) of a CHD event. Among boys and girls, excess BMI during childhood is associated with having a CHD event in adulthood. As the risk increased from the ages of 7–13 year, these results suggest there are possibilities for intervention during childhood to prevent the negative consequences of excess childhood BMI on adult health.
PO0452
Preliminary report: analysis of critical periods of BMI-development and later adiposity measured by densitometry or BMI via a structural equation model approach

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Aim: To investigate critical periods of BMI development for adiposity in late adolescence.

Methods: BMI (kg/m²) and %BF (BodPod) were measured in 481 children at age 17 year, and related to annual BMI values (0–10 year) obtained from maternal and school healthcare registries. Standard multiple regression (SMR) and structural equation models (SEM) were used to investigate the relation between BMI-development and adolescent BMI (BMI10 year) or %BF (%BF10 year). SEM has the advantage of handling missingness directly, if a missing-at-random assumption is appropriate. BMI-development was defined either as absolute BMI, or growth velocities (kg/m²/year) at 0–1 year, 1–3 year, 3–6 year and 6–10 year.

Results: Strong evidence of BMI-tracking during childhood was found. Using BMI at the various ages as predictor for %BF17 year and BMI17 year in SMR, only the latest BMI-value (BMI10 year) was significant (β10 year, girls = 1.0, 0.4–1.6; β10 year, boys = 1.2, 0.5–1.9; β10 year, girls = 0.6, 0.4–0.8; β10 year, boys = 1.0, 0.8–1.2, respectively). Using velocities as predictors, all four chosen periods were significant independent predictors of both BMI17 year and %BF17 year in both genders. The results however were based only on 220/481 children because of missing data. Using data on all children and fitting SEMs, gender differences were found regarding critical periods for %BF17 year with the ages between 0–1 year (β0–1 year = 2.3, 0.5–4.1), 3–6 year (β3–6 year = 5.4, 2.1–8.8) and onwards (β6–10 year = 4.2, 1.5–6.9) being influential for girls while only the latter period (β6–10 year = 9.7, 4.7–14.8) was influential for boys. For BMI, all periods were significant in both genders.

Conclusion: While the relationship between BMI-development and adolescent BMI was significant during all periods and fairly homogenous across genders, the relationship with %BF was gender-dependent.

PO0454
Australian newspaper coverage of the debate around television food advertising to children 2002–2005

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Concern about childhood overweight and obesity has led to calls for restrictions on television food advertising during children’s viewing times as one preventative measure. Childhood overweight and obesity are commonly discussed in the Australian media, whose coverage can have a strong influence on defining audience perceptions and responses. This study aimed to analyse the media debate around childhood overweight and obesity and television food advertising in order to inform those advocating for food advertising restrictions.

We searched Australian newspaper articles printed between July 2002 and July 2005 where childhood overweight or obesity and restricting/banning television food advertising were cited. Articles were coded for both qualitative and quantitative data including: tone towards food advertising restrictions, speakers in the debate and language used. One hundred and eight-seven articles were coded. Articles were mainly positive towards restricting television food advertising during children’s viewing times. Speakers supporting the restrictions came from a number of roles including: lobby groups, health professionals, academics, state government health departments and obesity experts. Arguments supporting the restrictions focused on children as vulnerable ‘victims of modern marketing’. Those advocating for the status quo included: Federal politicians, Australian Association of National Advertisers, Australian Food and Grocery Council and the Australian Broadcasting Association. The negative arguments focused on industry freedoms and personal responsibility, and portrayed the restrictions/ban as an imposition of the ‘nanny state’ and ‘un-Australian’. This research found that the debate was polarized between arguments for social responsibility and arguments for individual responsibility.

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PO0455
Improved body composition after a physical activity intervention in overweight township children
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Physical inactivity among children increases the risk of obesity, but little is known about physical activity, obesity and associated metabolic abnormalities in low-income African children. The objective of the study was to assess changes in body composition and insulin sensitivity after a physical activity intervention of grade nine African adolescents (n = 249). Body composition (air displacement plethysmography and anthropometry) and fasting blood glucose, insulin, leptin, and fibrinogen were measured at baseline and after 10 weeks’ intervention. Habitual physical activity was assessed using the Previous Day Physical Activity Recall. Children from the intervention school participated in a physical activity programme three times per week. Compliance was measured and poor compliers were grouped with the control school. Changes in % body fat (%BF), lean mass and insulin sensitivity variables of the two groups were compared using ANCOVA, with adjustment for gender, school, habitual physical activity and Tanner stage. At baseline 57% of children were moderately overweight (%BF > 25% in girls, >20% in boys), had significantly lower lean mass and habitual physical activity score and higher fasting plasma insulin, fibrinogen, leptin and insulin resistance (HOMA-IR) than children with normal body composition. Changes in body composition after the intervention was significantly different between intervention and control groups in the overweight children. There was also a tendency of lower fasting glucose and insulin in the overweight children after the intervention. The physical activity intervention was associated with improved body composition in moderately overweight children.

PO0456
Prevalence of overweight and obesity in preschool children from Ho Chi Minh City, Vietnam in 2005
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Objective: To examine the relationship between socio-demographic factors and overweight in pre-school aged children in urban areas of Ho Chi Minh City (HCMC), Vietnam.

Methods: The study examines data from the baseline survey of a 1 year follow-up study assessing risk factors for early onset obesity in pre-school aged children in HCMC conducted from 2005 to 2006. Data from a representative cluster sample of 670 children born in year 2000 and enrolled in kindergarten was analyzed. Weight and height of children were measured. Socio-demographic information, and parents’ self reported height and weight were collected using pre-coded, interview-administered questionnaire. Overweight and obesity were defined according to age- and sex-specific IOTF BMI cut-off points.

Results: A multivariate logistic model showed that parental BMI, parental education, birth weight, duration of breast feeding and average amount of time per night for sleeping were all significantly associated with overweight or obesity (P < 0.05). The odds of overweight or obesity in children whose both parents were overweight was 3.1 (95% CI: 1.6, 6.39) times higher than for children whose parents had normal weight. Children who were breastfed longer than 12 months were 0.44 (95% CI: 0.22, 0.89) less likely to be obese compared to those who had no breastfeeding.

Conclusion: The study has shown a marked association between overweight and obesity in young children with parental overweight status. Longer duration of breast feeding was also strongly associated with less overweight and obesity. These findings need to be confirmed in the cohort analysis for change in BMI.

PO0458
Treading lightly with our instruments: body image considerations for school-based child and adolescent obesity prevention research
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Background: When we measure children for health and weight status is it a health promoting experience or does it generate concerns about body image? The rise of obesity levels in children necessitates the engagement of children, parents and school staff in solutions including discussions regarding food and physical activity. Yet related body image concerns emerge in children as young as 5–8 years old. In the context of a school community intervention study, we aimed to develop a program policy and methodology to prevent unintended body image concerns.

Methods: Fun ’n healthy in Moreland! is a child obesity prevention research and intervention study being conducted in 23 primary schools in an inner urban area of Melbourne. We reviewed the scientific litera-
PO0459
Child overweight and obesity increasing at 1% per year: population data from an inner urban metropolitan cluster RCT

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Background: Despite increased awareness of childhood obesity as a public health issue, epidemiological or population surveillance data has not been updated since 1997 in Victoria, or Australia more widely. Thus we aimed to examine weight and height status, environmental context, and parent and child behaviours in a community wide survey of primary school aged children across an inner urban culturally diverse area of Melbourne, within the context of fun ‘n healthy in Moreland, a 5 year intervention trial.

Methods: This cluster controlled trial is being conducted in 23 primary school communities. The cross sectional baseline measures consisted of child height and weight, lunchbox survey, child questionnaire, 24 h food recall, parent questionnaire, playground survey, school environment questionnaires and teacher questionnaires.

Results: Over 3,000 children and families were recruited, of which 37% of participating parents were born overseas. Using Cole’s cutpoints, we estimated 31% of children were overweight and obese, demonstrating, for the first time, a steady increase of 1% per annum across Victoria. Only 53% of children spent the recommended 60 min/day or more being moderately or vigorously active. 33% of children had fruit and/or vegetables in lunchboxes.

Conclusion: Baseline data confirms reported steadily increasing trends in the prevalence of overweight and obesity among school aged children. The results also indicated high proportions of children not meeting physical activity and dietary targets. The wide ranges of results evident within and across school communities will be used to inform school-specific intervention development. Cross sectional surveys will be repeated in 2007 and 2009.

PO0460
Improving our understanding of childhood obesity: BMI vs. BIA

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Background: Accurate methods for estimating body fat percent in children are not suitable for epidemiological studies and clinical use. Bioelectrical impedance analysis (BIA) offers an inexpensive, acceptable and portable method for measuring body composition in children, however, different equations have been developed to estimate percent body lean and fat mass in various paediatric populations.

Methods: A cross-sectional survey of BMI and BIA in a population-based sample of 341 healthy 3-year-old children compared the results from various published BIA equations, how they relate to BMI and how they rank children in terms of body fat mass (BFM).

Results: Percent BFM varied considerably across different equations. In general, BMI was positively associated with BFM; however, wide ranges of BMI equations were produced for children with similar BMI’s. Percent BFM estimates rose rapidly in children in the overweight/obese range, indicating increasing BMI above normal weight for age is primarily due to increasing body fat. Published equations were highly consistent in the order in which they ranked children according to percent BFM.

Conclusion: At any given BMI the percent BFM in children estimated from BIA varies greatly, supporting concerns about the utility of BMI for indicating individual BFM. BFM estimates given by different paediatric BIA equations were highly correlated, indicating they rank children according to BFM in the same order. If agreement could be reached on which equation to use, BIA could provide a practical method for comparing relative fat mass in paediatric populations and provide a system for monitoring the obesity epidemic.

PO0461
Trends in obesity prevalence in schoolchildren of the province of Alicante (Spain) in the last 10 years

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Introduction: Obesity in childhood is becoming a frequent healthy problem with an influence in social adaption and psychological development of the child. It is well known its relation with cardiovascular illness and diabetes. The national study Paises (1984) concluded a prevalence of 4.9%. The national Enkid Study (1998–2000) shows a prevalence of 3.96%. In the last years, an increase in childhood obesity prevalence has been also pointed out also in western countries.

Aim: To estimate prevalence of obesity in schoolchildren of Alicante, comparing with a study performed in the same province (271 schoolchildren aged 6–11 years) in 1993.

Methods: A total of 394 schoolchildren (204 boys, 190 girls) chosen at random from Alicante province, aged 6–11 years. Height and weight were measured with standard anthropometer. BMI was calculated in kg/m². For this study, obesity and overweight were defined according to BMI values ≥97th percentile or ≥2 SDS, and ≥85th percentile or ≥1 SDS respectively, using Spanish reference growth data provided by longitudinal study Fernandez et al., Zaragoza (Spain) (1998) and by the Enkid study (Spain) (1998–2000).

Results: Prevalence of overweight and obesity, according to BMI, range from 16.2% to 22.3%, and 14% to 18.8%, respectively, depend-
PO0462
Serum leptin levels and its relation to body mass index in schoolchildren of the province of Alicante (Spain)
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Introduction: Childhood obesity is increasing in the last decades and, consequently, the risk of metabolic syndrome. Circulating leptin concentrations are increased in obese children.

Aim: To study leptin serum levels in schoolchildren of the province of Alicante and its relation to their body mass index (BMI) and glycaemic levels.

Subjects and methods: A total of 314 schoolchildren (166 boys and 148 girls) chosen at random from the whole province of Alicante, aged 6–11 years. Weight, height, BMI, leptin and glycaemia levels were carried out. Serum leptin levels were measured using commercial kits (Human Leptine DSL-23100 Active, Diagnostics Systems Laboratories, USA).

Results: The average of leptin and glycaemia levels is of 10.76 ± 8.73 and 81.32 ± 7.98 mg/dl, respectively. The differences observed between the values of leptin are statistically significant in both sexes (P < 0.05). There is a weak positive correlation, statistically significant, between glycaemic levels and BMI (r = 0.115) and between glycaemic and leptin levels (r = 0.118). There is a strong positive correlation, statistically significant, between serum leptin levels and BMI in both sexes (r = 0.583).

Conclusion: In accordance to others studies, we also observe a sexual dimorphism in our study population in all groups of ages. It has been shown that leptin serum levels are higher in females compared to males with similar BMI. Until now, we don’t have reference values of serum leptin levels in healthy children population. Furthermore, we are not aware of its possible utility in the clinical practice in childhood obesity.

Funding Disclosure: Acknowledgement to Lilly Laboratories for its kind support.

PO0463
Associations between parental feeding style and children’s eating and weight
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Background: Research into the effect of parental control on children’s eating and weight provides no clear answers. Some studies find control to be associated with unhealthy food choices, disordered intake regulation and greater adiposity, while others find favourable or null associations. One explanation for the discrepancies could be variability in measures of parental feeding style. Another could be the measurement of eating behaviour, which has relied on single behavioural tests on comparatively small samples.

Method: We administered multi-dimensional parent-reported measures of feeding style and children’s eating behaviour in a socio-economically diverse sample of parents of 3–5 year old children (n = 541). Three aspects of parental control (‘restriction’, ‘encouragement to eat’, ‘instrumental feeding’) and two dimensions of children’s eating behaviour (‘satiety responsiveness’, ‘food responsiveness’) were assessed, and children’s BMI centiles were calculated from measured heights and weights.

Results: ‘Restriction’ and ‘instrumental feeding’ were not associated with BMI centile but were positively associated with ‘food responsiveness’. ‘Encouragement to eat’ was associated with lower BMI centile, higher ‘satiety responsiveness’ and lower ‘food responsiveness’. All associations were stronger in boys than girls.

Conclusion: Parents who encourage their children to eat have leaner children who are more responsive to internal satiety cues. In contrast, parents who restrict food and use food instrumentally have children who are more responsive to food cues. Longitudinal and genetic designs are needed to clarify the direction of influence between parent and child.

PO0464
Cigarette smoking is associated with abdominal and visceral obesity but not with overall fatness
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Background: Smokers have a lower body mass index than non-smokers and smoking cessation is associated with an increase in body weight. However, recent evidences suggested the possibility that smoking can increase waist circumference. The aim of this study was to investigate which types of obesity are associated with cigarettes smoking.

Methods: Two hundred eighty-three visitors to university hospitals located in four main provinces of South Korea were recruited. Body mass index, waist circumference, total body fat percentage, and area of visceral and abdominal subcutaneous fat were measured by computed tomography scan.

Results: Those who never smoked had a higher body mass index compared with past/current smokers. However, waist circumference, and visceral fat area showed a J- or U-shaped association with total smoking amount during a lifetime. After restricting the analyses to past/current smokers, significant dose-dependent associations of smoking pack-years with abdominal and visceral obesity were observed. Overall obesity measured by body mass index and total body fat percentage did not show such associations. Although current smokers clearly showed significant associations, we could not demonstrate these in past smokers, possibly because of the limited sample size.

Conclusions: Although smokers had a lower mean body mass index than those who never smoked, they showed more metabolically adverse fat distributions with increasing smoking amounts. This finding suggests that smoking is not beneficial for weight control. Therefore, smoking cessation and avoidance of smoking commencement should be addressed in preventing obesity and its related complications.
PO0465
Gluten sensitivity as a possible cause of hyperinsulinaemia leading to obesity

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Background: The incidence of coeliac disease (CD) and dermatitis herpetiformis (DH) occurs in approximately 1 in 100 of the Caucasian population (1). The genes associated with CD (HLADQ-8 or HLA-DQ-2) occur in around 30% of the Caucasian population (1). Traditionally CD is a disease typified by the triad of diarrhoea, underweight and anaemia, however atypical presentation of the disease is increasingly common as there is now screening by an IgA antibody test, prior to endoscopic biopsy for diagnosis. The management of CD and DH is through a strict gluten free diet (GFD).

Method: A comparison report of several cases of obese individuals who presented to a New Zealand Registered Dietician as unable to lose weight will be discussed.

Results: Several of the subjects presented with negative IgA antibody screening for CD, but proceeded with the GFD trial to determine if it improved troublesome dermatological symptoms. Circulating insulin levels reduced by up to ½ within 3 months of commencing a GFD. Individuals found weight loss considerably easier, and reported reduced hunger. Other measures of both objective and subjective wellness improved, despite the difficulties of maintaining a GFD. Contamination episodes with gluten resulted in return of both gastrointestinal and dermatological symptoms.

Conclusions: The mechanisms involved in hyperinsulinaemia through gluten sensitivity are unknown, but deserve attention given the incidence of gene within the Caucasian population and the burden of cost associated with both untreated CD and obesity.

PO0466
Prenatal and post-natal parental smoking and overweight in childhood and adulthood: findings from a national birth cohort

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Background: Maternal smoking during pregnancy is a potential risk factor for childhood and later obesity. However, the influence of parental postnatal smoking has not been assessed.

Methods: The 1970 British Cohort Study was studied at birth (1970; n = 16 567), 5, 10, 16 and 30 years. We examined associations between maternal pre-natal smoking and maternal and paternal post-natal smoking reported at age 5 years & 10 years and overweight at age 10 years (IOTF) and 30 years (BMI ≥ 28.5 kg/m²). Models were adjusted for birthweight, breastfeeding, parental BMI, offspring smoking and socioeconomic status. All prenatal and postnatal smoking variables were included in a multivariable model.

Results: Data were available on 9785 subjects (9.1% overweight at 10 years; 16.7% obese at 30 years). At 10 years, both maternal prenatal and postnatal smoking predicted overweight, but in the multivariable model, only maternal persistent smoking birth to 10 years remained significant (odds ratio = 1.5, 95% CI: 1.1, 2.0; P = 0.001). At 30 years, both maternal prenatal and postnatal smoking predicted obesity, but only prenatal smoking of ≥5 cigarettes per day remained significant in the multivariable model (OR = 1.6; 95% CI 1.1, 2.3; P = 0.009). Paternal smoking was not associated with later overweight.

Conclusions: Maternal postnatal smoking was a stronger predictor of child overweight than prenatal smoking, but by age 30, the effects of prenatal smoking predominated. These associations were independent of birthweight. Research is needed into the mechanisms by which prenatal and postnatal smoke exposure may influence later overweight. Postnatal smoking may be a proxy for other parental life-style factors associated with childhood overweight.

PO0467
Influence of marital status on body mass index and waist circumference in Greek adults (data from the first national epidemiological study on the prevalence of obesity in Greece)

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Socioeconomic factors, including marriage, have been related to obesity. From 17403 adults representing Greek population, 7170 males–8174 females (aged 44.7 ± 10.4 – 41.5 ± 10.8, respectively) were extracted and analyzed as having complete records. Anthropometry comprised waist circumference (WC) and Body Mass Index (BMI).

Results: Subjects were grouped according to marital status (MARST) (‘single’, ‘married’, ‘divorced’, ‘widowed’) and according to age (20–35, 36–50, >50). In males there was a significant difference (P = 0.000) both in WC and in BMI between the MARST groups only in the first age group. In females, WC differed significantly (P = 0.000) between the MARST groups only in group 20–35, while BMI differed significantly both in first (P = 0.000) and in third age group (P = 0.038). Multiple regression analysis, exploring WC and BMI, with independent variables age (years), alcohol consumption (g/week) and MARST revealed that: (i), In males, alcohol (P = 0.001) and MARST (P = 0.000) were important in the prediction of WC. Single men had smaller WC than the other groups. (ii). In females age (P = 0.000) was important in the prediction of WC, while only married women had greater WC (P = 0.038) than single ones. (iii). In males only MARST was important in the prediction of BMI: Divorced (P = 0.000), widowed (P = 0.013) and married men (P = 0.000) had greater BMI than single men. (iv). In females both age (P = 0.000) and alcohol (P = 0.005) were important in the prediction of BMI, while, regarding MARST, only married women (P = 0.006) had greater BMI than single. Marital status, alcohol and age have a different impact on BMI and waist circumference, in males and females.

PO0468
Socio-cultural factors associated with obesity in the Arab countries

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Background: Obesity has become an epidemic problem among both children and adults in the Arab countries. Most of the studies focused on changes in lifestyle, food habits and inactivity as factors determining obesity. However, social and cultural factors are given less attention.

Objective: The main objective of this study was to highlight the role of social and cultural factors in occurrence of obesity in the Arab countries.

Methods: Data of this study were obtained through two methods; reviewing the current literature on obesity in the Arab countries, including many unpublished studies and reports, and reanalyzing some studies in order to obtain information related to socio-cultural aspects. More than 60 studies were reviewed and/or reanalyzed from 15 Arab countries.

Results: The prevalence of obesity and overweight ranged from 15% to 45% among adolescents and 30% to 75% among adults. Unlike many other countries, obesity was more prevalent in urban areas than rural areas. Eating outside home was found to be associated...
with obesity, especially among adolescents. People who watched television more than 3 h a day were more likely to be overweight than those who watched less than 3 h a day. Television food advertisements have an impact on the food habits of children and adolescents. The most TV advertisements preferred by children were chocolates, sweets, soft drinks and fast foods. Body image was reported as a contributing factor. Individual body image as well as peer and parent body image created social pressure on obese individuals. Body shape preference was also an important factor, as it was found that 30% to 45% of the adults prefer plump women and about 40% of young girls preferred plump men. Wrong beliefs and attitudes related to reducing weight were highly prevalent, especially among obese females. Women are facing several social and cultural barriers to practice exercise in many Arab countries. The way the women and men dress their clothes in some cultures may contribute to hiding the body fat from the public, which in turn encourages obesity.

**Conclusion:** To assess and prevent obesity in Arab countries it is very important to consider the social and cultural factors in addition to food intake and physical activity.

**RO0469**

**Knowledge and practices related to obesity among university students in Kuwait**

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**Background:** Obesity is highly prevalent among both children and adults in Kuwait. Lack of nutrition awareness was considered as one of the main factors for this high prevalence.

**Objective:** The main objective of this paper was to assess the knowledge and practices related to obesity among University students in Kuwait.

**Methods:** Data were obtained from University students during summer courses 2004 in Kuwait University. A specially designed pre-tested questionnaire was used. The questionnaire included information on sex, age, food habits and several information and misconception on obesity that are commonly spread in the Kuwaiti community.

**Results:** About 10% of the students consume fast food daily, and the highest percentage consumes it 1–3 times a week (49% male and 54% female). Males were more likely to intake large size portions of fast foods (49%) than females (11%). The difference was statistically significant ($P < 0.01$). Eating while watching television was more practiced by females (44%) than males (34%). Fast foods, soft drinks, French fries, nuts, seeds and chocolates were the main foods consumed while watching television. The differences between males and females was not statistically significant. Misconception regarding weight control was very common among students. The most prevalent ones were: Sauna bath reduces body fat (53%), herbal tea helps in reducing weight (53%), drinking grape fruit juice participates in dissolving the body fat (50%), brown bread contains less energy than white bread (45%), and vegetable oil provides less calories than animal fat (32%). There was a significant difference in believing of the misconception and nutrition attitudes between males and females.

**Conclusion:** There is lack in nutrition information related to obesity among University students. In general, students have many misinformation and unhealthy habits, which may contribute to high occurrence of obesity among them.

**PO0470**

**Energy cost of prepared foods varies by type of food establishment**

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**Background:** Almost two-thirds of Canadian adults are overweight or obese. Increasingly, the food environment is being examined as a determinant of food choice. One measure of the food environment, food affordability, may explain food choice to some extent, particularly among lower-income populations.

**Methods:** As part of a larger study exploring the food environment at the University of Alberta, 86 food establishments on campus were characterized as Asian, Burgers, Cafeteria, Coffee, Juice bar, Pizza, Sandwich and Sit-Down. The price, weight and energy (kcal) of typical and atypical foods from each food establishment were recorded. Energy was assessed using ESHA Food Processor© or nutrition information provided by the food establishment. Energy cost (CAD/100 kcal) was calculated. Regression analysis with categorical independent variables was used to assess differences in mean energy cost by type of establishment.

**Results:** The mean energy cost of ‘typical foods’ for all establishments was $1.03/100 kcal. Coffee shops ($0.60/100 kcal) and Burger establishments ($0.65/100 kcal) provided the cheapest sources of energy while Juice bars ($1.51/100 kcal) and Cafeterias ($1.52/100 kcal) provided the most expensive sources of energy. Cafeterias, Sandwich shops and Juice bars provided significantly more expensive sources of energy than did Burger establishments ($P = 0.002, P = 0.034, P = 0.023, respectively) and Coffee shops ($P = 0.009, P = 0.011, P = 0.000, respectively).

**Conclusion:** These findings may have implications for food establishment choice and subsequently, food choice. Specifically, students on limited budgets may be making very rational choices when they choose potentially ‘obesogenic’ alternatives due to the significantly lower energy cost of foods at the Burger establishments and Coffee shops.

**PO0471**

**Outside play among Australian primary school children: a descriptive analysis of neighbourhood and school settings that may influence physical activity**

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Environments that are unsupportive of physical activity (PA) may be contributing to obesity in Australian children. The aims of this paper were: to report on indicators of PA behaviours and aspects of the environment related to PA. We used a cross-sectional computer assisted telephone interview (CATI) to survey parents of 1711 5–12 year old children from the Barwon South-Western region of Victoria, Australia, about their children’s PA and their local neighbourhoods. Interviews with representatives of schools ($n = 18$) attended by the children were also conducted. On average, children spent 73 min playing outside after school yesterday, and most children (74%) were also involved in some form of weekly recreation. Most parents reported that the availability of sport, physical activity or dance programs within their neighbourhood was good (79%), that there was at least one open-space for play nearby (85%) and that the local neighbourhood was a safe place for children to play and move about (75%). The biggest safety risk was traffic (26% said risk was high). Schools audits showed a high commitment to PA, usually one or more policies focusing on PA (although few were written), adequate PA facilities and equipment, and sufficient staff qualified to teach physical education/PA. Overall, time spent playing outside was quite high (57% of children met current Australian recommendations). In the Barwon-SW region, neighbourhoods and schools were found to be supportive of PA, although
PO0472
Genotype by environment interactions in BMI: a preliminary investigation of the effects of childbirth on post-pregnancy weight retention in an Australian female twin sample

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Genetic effects explain 50–90% of the variation in weight. However, recent increases in the prevalence of obesity are likely to have been caused by changes in the environment rather than changes in genetic background given the short period over which this increase has occurred. Environmental conditions such as lifestyle and eating habits that promote excessive caloric intake and sedentary patterns are in direct contrast to our hunter gatherer past and thus, genotypic interaction with the current environment may explain inter-individual differences in weight. Additionally, over the last 3 years, studies have shown that post-pregnancy weight retention (Gutersohn et al., 2000) is a possible cause in the development of obesity in women after child bearing years. Women who are homozygous for the 825T allele (825TC is a polymorphism in exon 10 of the GNβ3 gene) retain more weight after delivery compared with women with at least one 825C allele. Furthermore, the 825T homozygous genotype has been associated with increased BMI. The moderator model (Purcell, 2002) was used in a sample of ~10,000 Australian twin families to investigate the changes in genetic and environmental estimates over time due to the influence of childbirth in women. Moreover, the moderator model was incorporated into the Quantitative Trait Locus (QTL) Linkage Analysis (Purcell & Sham, 2002) to examine the influence of childbirth in QTL estimates of BMI. These results may give some indication of the impact that childbirth has on genetic, environmental, and QTL factors relating to obesity in an Australian adult population.

References:

PO0473
Is long sleep duration good to childhood obesity patterns?

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The aim of this study was to determine whether an association between sleep duration and obesity exists in a sample of Portuguese children. A cross-sectional study of children 7–9.5 years old was performed between October 2002 and June 2003. A total of 2274 girls and 2237 boys were observed. Weight and height were measured, and parents filled out a questionnaire about family characteristics. Overweight and obesity, using age- and sex-specific body mass index (BMI) cut-off points as defined by the International Obesity Taskforce, were used. In the total sample we found 20.3% of overweight children and 11.3% of obese children. The prevalence of obesity (including overweight) decreased by duration of sleep: >8 h, 49.1%, 8–9 h, 33.0%, 9–10 h, 28.7%, and ≥11 h, 26.3%. Parental education showed positive relationship with sleeping: children of more educate families showed more hours of sleeping; more TV hours showed a negative relationship with sleeping: more hours of TV less hours of sleeping; more physical activity showed a positive association with sleeping: more hours of physical activity more hours of sleeping. After adjusted for demographic factors such as parental obesity, parental education and TV, the odds ratio were: for sleeping 9–10 h, 1.07 (95% CI 1.06–1.07); 8–9 h, 1.14 (95% CI 1.11–1.16) and <8 h, 2.28 (95% CI 2.27–2.29). The effect of sleep duration on childhood obesity is strong and seems to be independent of other risk factors associated with childhood obesity.

PO0474
Combined heart rate and movement sensing to estimate energy expenditure: validity of different levels of individual calibration

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Obesity results from prolonged exposure to excessive levels of energy intake, relative to the level of energy expenditure (EE). Declining population levels of EE have been blamed for the rising prevalence of obesity worldwide but this is poorly documented, as EE is difficult to measure. Objective and more precise methods may be required to better inform preventive strategies. We report here on the validity of combining accelerometry with heart rate monitoring (Actiheart) on three levels of individual calibration during common activities of daily living. These calibration levels include a moderate-to-high intensity treadmill test, a simple 8-min step test which may be performed in the field, and static calibration using only sleeping heart rate and gender to differentiate between individuals’ response to exercise. We measured EE by indirect calorimetry in 38 men and women (22–54 years, 19–34 kg/m2) performing desk work, household chores, shopping, flat and uphill walking, flat running, stair walking, and biking. A sub-sample (n = 27) was also measured over 24-hr by whole-body calorimetry. A total of 187 000 time points were modelled with a branched equation approach (Brage et al., JAP2004). Treadmill-calibrated activity EE estimates were highly correlated with measured EE (between-individual R2 = 0.98, overall R2 = 0.79, P < 0.001), followed by steptest-calibrated estimates (between-individual R2 = 0.97, overall R2 = 0.79, P < 0.001), and non-dynamically calibrated estimates (between-individual R2 = 0.84, overall R2 = 0.76, P < 0.001). We conclude that combined heart rate and movement sensing is valid for assessing physical activity, even when used in conjunction with simpler individual calibration procedures. Population studies may consider this method a realistic alternative to subjective methods.

PO0475
Sentinel site for obesity prevention: theory, design and methodology

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In spite of greater awareness of childhood obesity we know surprisingly little about the progression of the epidemic through a population and equally little about how to prevent children from becoming overweight or obese. This paper describes the theoretical basis, design and methodology of an innovative research platform that aims to build the programs, skills and evidence necessary to attenuate and eventually reverse the obesity epidemic in children. Several theoretical frameworks contribute to the foundations of the Sentinel Site for Obesity Prevention and it is built around three pillars: multi-
strategy, multi-setting intervention programs; community capacity building and; monitoring and evaluation. The intervention programs are developed through a prioritization process that determines which behaviours, knowledge/skill gaps, and environments to target. They target children in three age categories (0–3 years, 4–12 years, 13–18 years) from three demonstration sites within the Barwon South Western region of Victoria, Australia. Capacity is built by having existing services deliver the interventions. A regionally representative comparison area innovatively links intervention evaluation with population monitoring. The success of the Sentinel Site will be measured by the impact and sustainability of the interventions, but also by the transferability of skills within and beyond the demonstration areas and the quality and dissemination of the evidence. The design and preliminary evidence have already been used to guide similar programs and to stimulate action on obesity prevention.

PO0476

Multi-criteria mapping – a technique for comparing views on European obesity policy options

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Background: In the absence of clear and effective means for preventing obesity, public health policy development depends largely on expert opinion and political feasibility. These in turn depend on the views of leading stakeholders with specific interests in the policies under discussion. Objective methods are needed for elaborating the opinions of stakeholders and mapping their views into a coherent framework.

Method: European Commission funding enabled researchers in nine member states (Cyprus, Greece, Finland, France, Hungary, Italy, Poland, Spain and the UK) to interview some 20 leading stakeholders in each country, representing various sections of industry, consumer groups, public health specialists, advertisers, sports groups, government, schools, journalists and researchers. Each participant was asked to rate a standard set of options using self-defined criteria, giving scores for optimistic and pessimistic scenarios. Scores were compiled using multi-criteria mapping software developed at the University of Sussex.

Results: Subjects found the procedure acceptable and suitable for expressing their opinions. The analysis of results showed clear trends in opinions and preferences. Options for preventing obesity could be ranked in importance within different types of approach.

Conclusion: The multi-criteria mapping technique is a flexible and user-friendly aid to the development of reasoned judgments and could help policy-makers find objective, transparent routes to decision-making. It can facilitate cross-national comparisons and the articulation of EU-wide policy initiatives.

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PO0477

Overweight is a risk factor of multiple dysmetabolism in diabetes mellitus type 2

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Diabetes mellitus type 2 is actually a real pandemic. The minority of affected persons is non-obese.

Objective: To study susceptibility alleles of Dm type 2 and other clinical data.

Material and methods: We studied 499 non-obese persons (BMI ≥22 and <30): 272 (54.5%) diabetic patients (92 males, 180 females) and 227 (45.5%) non-diabetic persons (55 males; 172 females) (NS): ≥40 and ≤70 years old. A clinical record was done and was determined: glycaemia, total cholesterol, total triglycerides and insulinemia (non-insulin treated patients). Leucocytic DNA was obtained for genetic study. Medians from quantitative variables were compared by T-Student Test for independent samples; the association from quantitative variables were explored by Chi Square Test; significance level P < 0.05.

Results: There was a predominance of familial antecedents of Dm, and personal antecedents of high blood pressure, coronary heart disease, asthma and glaucoma in the diabetic persons (DG). There was a predominance of HBP (systolic, diastolic and systo-diastolic) in the DG. There were not statistical differences between both groups in insulinemia, cholesterolemia and triglyceridemia. Grouping the persons in normal weight (≥22 and <25), and overweight (≥25 and <30), statistical differences were found in the overweight DG in: hypercholesterolemia, in females; hypertriglyceridemia, in both sexes; hyperinsulinemia, hypercholesterolemia + hypertriglyceridemia and risk factor clustering, in male sex. Overweight non-diabetic women were hyperinsulinemic.

Conclusion: Overweight is a risk factor of multiple dysmetabolism in type 2 diabetic patients. Recommendations: In Diabetes mellitus type 2 is indispensable to get and maintain normal weight. Overweight must be included in prevention programs.

PO0478

Effects of weight reduction on conventional and new risk factors for cardiovascular disease in Japanese male workers

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Background: Obesity is one of the most important health problems in Asian countries as well as western countries. Our hypothesis is that weight reduction with well-balanced food supplementation leads favourable changes in conventional and new cardiovascular risk factors.

Method: We recruited 48 men working for an electric power company. We provided nutritional intervention using well-balanced formula foods (Micro-Diet) for 4 months and health check-ups including measurement of serum adipocytekines and sleep disordered breathing (SDB) estimated by 3% oxygen desaturation index (3% ODI). Health check-ups were undertaken at baseline, at 3 months (start of intervention), at 5 months, at 6 months, and at 7 months (SDB was checked at 3 months and 7 months). Control group (n = 46) was recruited from the same company.

Result: Compared with the start of intervention (at 3 months), serum IL-6 levels, and leptin levels significantly decreased after 2 months intervention (at 5 months). In addition, adiponectin level significantly increased and 3% ODI significantly decreased after 4 months intervention (at 7 months). Compared with the control group, the intervention group showed greater decreases in body weight, BMI, glutamic pyruvic transaminase (GPT), high-density lipoprotein cholesterol (HDL-cholesterol), and triglyceride after 3 months intervention (at 6 months).

Conclusion: New risk factors (IL-6, leptin, and adiponectin) as well as conventional risk factors, significantly reduced after nutritional intervention using well-balanced formula foods among Japanese male workers.
PO0479
Higher childhood BMI increases the risk of smoking in adolescence and adulthood: findings from a national birth cohort
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Background: Obesity and smoking are two of the most significant and prevalent cardiovascular risk factors. There is cross-sectional evidence that obese adolescents and adults are more likely to smoke to control weight. However, longitudinal associations between childhood BMI and later smoking have not been examined.

Methods: We used data from the 1970 British Cohort Study, a national birth cohort studied at birth (1970; n = 16 567), 5, 10, 16 and 30 years. Logistic regression was used to examine associations between BMI z-score in childhood and regular smoking in adolescence and adulthood.

Results: Data were available on BMI z-score at 10 years and adult smoking in 8726 subjects, of whom 20.3% were regular smokers at 16 years and 17.3% at 30 years (211 cigarettes per day). Higher BMI z-score at 1 years predicted higher risk of regular smoking at 16 years [odds ratio (OR) 1.09, 95% CI: 1.01, 1.17; P = 0.04] and at 30 years (OR 1.20, 95% CI: 1.12, 1.29; P < 0.0001) when adjusted for gender and social class. These findings were robust to further adjustment for pubertal timing and for BMI in adolescence and adulthood respectively (OR at 16 years 1.15; 1.01, 1.28; P = 0.04; OR at 30 years 1.20; CI: 1.11, 1.29; P < 0.0001).

Conclusions: Higher BMI in childhood increases the risk of regular smoking in adolescence and adulthood, independently of later BMI and of factors associated with smoking, including social class and early puberty. This association needs confirmation and study of possible mechanisms, which include weight control behaviours, biological mechanisms or other factors associated with both smoking and childhood obesity.

PO0481
Association between maternal seafood consumption before pregnancy and foetal growth, evidence for an association in overweight women. Results from the French EDEN study (study of pre and early postnatal determinants of the child’s development and health)
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Background: Recent studies suggest the benefits of seafood consumption on foetal growth and infant development.

Objectives: To determine the association between seafood consumption in pregnant women and foetal growth.

Subjects and methods: Pregnant women [before 24 completed weeks of gestation (WG)] were invited to participate into the study. Of the first 784 women included, 612 answered two food frequency questionnaires on their usual diet in the year prior pregnancy and during the last trimester of pregnancy. Foetal abdominal circumference was measured by ultrasound at 20–24 and 30–34 WG. Birthweight and head circumference were measured at birth. These variables were compared across tertiles of the mother’s seafood consumption by multiple linear regressions adjusted for centre, mother’s age, smoking habits, height, parity, gestational age and the newborn’s sex. Because of significant interaction, analyses were stratified according to pre-pregnancy body mass index (< or ≥ 25 kg/m²).

Results: For overweight women only (n = 144), a higher seafood consumption before pregnancy was associated with higher foetal abdominal circumference (P < 0.03), birthweight (P < 0.05) and head circumference (P < 0.006). From the lowest to the highest tertile, mean birthweight was 208 g higher (P < 0.02). Adjustments for the mother’s educational level or cardiovascular and metabolic parameters did not change these results. Few significant associations were found with seafood consumption at the end of pregnancy.

Conclusion: High seafood consumption in early pregnancy either directly or indirectly promotes foetal growth in overweight women. Follow-up of the infants may help determine whether this has beneficial consequences for the child’s health and development.

PO0482
White blood cell count and obesity related risk markers
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Introduction: The relationships between the mortality of stroke and cardiovascular disease with white blood cell count (WBCC) were defined previously but although the decrement in WBCC with loss of weight in obese subjects was reported in several studies, its relationship with obesity is still less known. Here we evaluated the relationships between WBCC and metabolic risk markers in obese women.

Methods: Overweight 321 and obese 1646 women were enrolled into the study. The mean WBCC was 7283 ± 1558/µL with a median 7140/µL. The subjects were divided into three tertiles; Group I with 4000 < WBCC < 6500, Group II 6501 < WBCC < 8100 and Group III with WBCC > 8101/µL. Metabolic risk markers regards of metabolic syndrome were compared within these three groups.
Results: Group III was found to have higher body fat mass (BMI, BF2) with abdominal obesity (waist circumference, WHR, sagittal waist height, concity index). The metabolic risk markers (high triglyceride, plasma fasting glucose and insulin, HOMA and low HDL values) were found to be significantly different than lower WCBC groups. Erythrocytes and platelets were also increased in this group though being within normal ranges.

Conclusion: In numerous studies atherosclerosis was reported to be an inflammatory process with increased WBC count, fibrinogen and C-reactive protein. The WBC count was reported to be decreased in patients who undergone surgery for obesity. The data obtained from current study supports the presence of inflammation in obesity and metabolic syndrome. Additionally this parameter might be used in the follow up period of anti-obesity treatment.

PO0483
The age of menarche and metabolic risk markers
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Background: The relation between smaller menarche age and gynaecological malignancies were well documented. The relationship between dyslipidaemia and increased cardiovascular mortality was also reported in women with smaller menarche age. Although having a tendency to greater BMI the data on the subject is limited. In this study we aimed to evaluate the correlations of metabolic risk markers with menarche age in obese women.

Methods: Overweight and obese 3383 women were included. The mean menarche age was 13.04 ± 1.42 years (9–18 years). The subjects were divided into ten groups (centiles). The subjects with smallest menarche age in the 10th (menarche age ≤11, n = 386) and with the oldest in 90th centiles (menarche age ≥ 15, n = 475) were compared

Results: The mean age was significantly smaller in the small menarche age group (37.08 ± 12.12 vs. 41.37 ± 12.49, P = 0.0001). Although there were no differences for obesity indices, insulinemia, insulin resistance, high triglyceridaemia, low HDL, hypertension, impaired fasting glucose and the incidence of type 2 diabetes individually, the rate of metabolic syndrome was significantly higher in impaired fasting glucose and the incidence of type 2 diabetes individually, the rate of metabolic syndrome was significantly higher in menarche age group (37.08 ± 12.12 vs. 41.37 ± 12.49, P = 0.0001).

Conclusion: Despite there are some reports about the relationship between cardiovascular diseases and smaller menarche age we could not confirm these data in the current study. The smaller age of the first group may be the preventing factor for metabolic risks. However the increased rate of metabolic syndrome as supporting the previously reported Bogalusa Heart Study, suggests the condition has to be followed as a menace for metabolic syndrome.

PO0484
Pre-diabetes and pre-hypertension in obese women
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Background: According to JNC7 guideline, systolic blood pressure (SBP) between 120–139 and diastolic blood pressure (DBP) 80–89 mmHg is defined as pre-hypertension. Plasma fasting glucose (PFG) between 100–126 mg/dL is defined as pre-diabetes which suggested as a warning of overt diabetes. Here in this study we evaluated the metabolic risk markers in the combination of these two situations.

Methods: Overweight (25 < BMI < 30 kg/m2) 934, and obese (BMI >30 kg/m2) 3886 women were enrolled into the study. The subjects were divided into four groups: Group 1; women with PFG < 100 mg/dL and blood pressure <120/80 mmHg; normal group. Group 2; women with 120 < SBP < 139 mmHg, and 80 < DBP<89 mmHg; pre-hypertension group. Group 3; women with 100 < PFG < 125 mg/dL; pre-diabetes group. Group 4; women with both pre-diabetes and pre-hypertension. The women with blood pressure >140/90 mmHg and PFG > 126 were excluded.

Results: In Group 2 BMI, cholesterol, triglyceride, LDL-C were significantly higher than Group 1 (P < 0.05). In both Group 3 and Group 4 BMI, waist-to-hip ratio, creatinine, uric acid, HgA1C, fasting insulin, HOMA, triglycride, cholesterol, LDL-C were significantly higher compared to normal counterparts (P < 0.05).

Conclusion: Despite the guide lines are being updated frequently the normal values for both blood pressure and PFG are not clearly defined yet. Here in the current study we defined the increment in metabolic risk markers not only in the presence of both situations but solely pre-hypertension or pre-diabetes groups as well. So the cut-off points can be decreased to new values at least in obese subjects regards of increased risk of atherosclerotic disease.

PO0485
The value of LDL-C in metabolic syndrome
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Background: Abdominal obesity, hypertriglycrideaemia, low HDL-C, high blood pressure (BP) and high plasma fasting glucose are the five components of metabolic syndrome (MS), but the absence LDL-cholesterol is under debate. Here we evaluated the relationship between LDL cholesterol and risk markers in patients with MS.

Methods: Obese 1892 and overweight 455 women were included into the study. The women with MS were divided into two groups. Group I with LDL < 130 and Group II with LDL ≥ 130 mg/dL.

Results: The mean LDL-C value was 101.96 mg/dL in Group I and 154.85 mg/dL in Group II. The mean age was older in Group I (39.36 ± 12.09 vs. 44.53 ± 11.68 years). Systolic BP (135.44 ± 22.65 vs. 140.89 ± 26.68 mmHg), diastolic BP (86.03 ± 13.04 vs. 88.55 ± 14.48 mmHg), plasma fasting glucose (104.68 ± 30.41 vs. 108.99 ± 34.03 mg/dL), uric acid (4.60 ± 1.24 vs. 4.83 ± 1.35 mg/dL) and liver enzymes were significantly higher in Group II. However plasma fasting insulin (16.57 ± 13.02 vs. 17.59 ± 16.38 U/L) and HOMA (4.40 ± 4.31% vs. 4.78 ± 6.49%) were not different.

Conclusion: The data obtained from this study indicates that LDL cholesterol is associated with several metabolic risk markers. The effect of advanced age can be concluded as an additive factor, or the increment of LDL can be suggested as a later marker of MS. However in both situations LDL has to be taken into consideration regards of a strong risk marker for coronary heart disease and a tight component of the syndrome.
PO0486
Overweight in young children and adults: quantifying the gap between energy intake and energy expenditure
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The prevalence of obesity continues to rise. A specific target for the prevention of weight gain may be the key to arresting the obesity epidemic. Therefore we estimated the degree of positive energy balance responsible for the recent undesired weight gain observed in Dutch children and adults. For children we used data from 2190 children of the PIAMA birth-cohort born between 1996 and 1997. Accumulated body energy was estimated from the weight gain observed between age 2 and 6. We estimated accumulated body energy for adults from the weight gain among participants (n = 4810) from the Doetinchem-cohort who have been measured at least twice in 11 years time. Assuming energy-efficiency of 50%, and accounting for normal growth, an excess energy intake of 75 kcal per day relative to energy expenditure has been sufficient for 90% of those who developed or maintained overweight between 2 and 6 years of age. A somewhat smaller surplus on energy balance (60 kcal/day) has been responsible for the weight gain observed in young adults (20–30 years) over 11 years time. For other age groups (31–50 years and 51–59 years) this 'energy gap' is smaller (50 and 30 kcal/day, respectively). This is the first time the gap between energy intake and energy expenditure has been quantified for Dutch children and adults. Small daily changes in energy balance, corresponding to one soft drink a day, can on the long run make the difference between becoming overweight or not.

PO0487
Nutrition knowledge, dietary intake and household food availability: what is the relationship within an Australian population?
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Background: The positive correlation between nutrition knowledge and nutrition related behaviours may appear axiomatic however the view that nutrition knowledge determines behaviour may oversimplify the complexity surrounding food choice, purchasing, preparation and consumption. Researchers need to acknowledge that nutrition knowledge is multi-layered. Historically, measures of nutrition knowledge have been specific to a population, food group or nutrient, and have limited application outside the intended domain. Research that has used more intricate questions to assess knowledge of current expert guidelines and health implications of food choices, as well as the ability to identify healthier food choices, has supported a positive relationship between knowledge and healthy dietary behaviours. As part of an investigation into family behavioural factors influence upon childhood weight status, the objectives of this study are to assess the validity of a general nutrition knowledge questionnaire for the Australian community, and explore the relationship between general nutrition knowledge, dietary intake and household food availability.

Method: A convenience sample of adults (n = 100) were contrasted with a sample of dietetics students. All completed an adaptation of a UK general nutrition knowledge questionnaire (1) (GNKQ) and a validated food frequency questionnaire. Test-retest reliability and criterion validity were assessed to determine the appropriateness of the GNKQ for an Australian sample. The relationship between knowledge and reported food intake with reference to current recommendations was explored.

Results: To be reported.

Conclusion: This research explored the complex interaction between nutrition knowledge, food availability and food intake behaviours. Further understanding this relationship will enrich the obesity prevention literature.


PO0488
The effect of smoking cessation with nicotine replacement therapy on body weight and waist circumference
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Background: Smoking cessation has substantial health benefits, but is associated with weight gain. Nicotine replacement therapy (NRT) improves rates of cessation and might reduce weight gain. The aim of this study was to examine the effect of a smoking cessation programme, using NRT, on body weight and waist circumference (WC) in free-living subjects.

Method: Fifty-five (56.4% female) smokers with aged 47.9 years were recruited from a smoking cessation program. The programme comprised 7 weeks of group meetings and a further 5 weeks of NRT. Anthropometric data and general information were collected at baseline, week 7, 12 (with NRT) and 18 (without NRT).

Results: For the subsequent follow-up sessions, 32, 21 and 18 subjects attended at week 7, 12 and 18 respectively. Mean weight gain among subjects who completed the study was 2.9 kg (median 3.6 kg, P < 0.01) [male gained 1.1 kg (median 2.7 kg), female gained 3.8 kg (median 4.3 kg, P < 0.01)]. Weight gain after week 12 decreased in males but increased significantly in females (P < 0.05). Mean WC of females at week 18 increased 4.1 cm compared with baseline (P < 0.01). Most of the increased WC in females happened between weeks 7–18, but the trend over the weeks was increasingly significant (P < 0.01) whereas males had an increase in WC between weeks 7–12.

Conclusion: Smoking cessation is associated with increased body weight and WC within weeks of cessation, particularly in females with NRT. Attrition rates are high and effective weight maintenance strategies may improve this.

PO0489
Epistemological foundations of epidemiologic evidence for an obesity epidemic
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With an eye toward justifying the authority of public policy efforts directed at controlling obesity, this paper focuses on the epistemological foundations of the salient epidemiological, experimental, and clinical reports on the following main issues: The interactions of dietary energy intake, energy expenditure, metabolic and genetic profiles, concurrent disease, behaviour, emotional status, and socio-economic factors as they relate to the onset and maintenance of obesity. The interactions of obesity with overall mortality, cardiovascular disorders and mortality, cancer incidence and mortality, diabetes mellitus, hyperension, and muscular-skeletal disorders. Determinants of overweight and obesity in childhood. Psychosomatic and developmental effects of overweight and obesity in childhood.
Waist-to-hip ratio is the preferred measure for predicting coronary heart disease mortality: 15 year data from the National Heart Foundation Australian population risk factor prevalence study

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Body mass index (BMI), waist circumference (WC), waist-to-stature ratio (WSR) and waist-to-hip ratio (WHR) were measured in 9309 adults as a representative sample from Australian capital cities, together with cardiovascular risk factors, in the 1989 National Heart Foundation risk factor prevalence study. Record linkage using the National Death Index identified 799 deaths by the end of 2004, with 194 deaths from coronary heart disease, giving 15 years mortality data. Age standardised hazard ratios were calculated by Cox regression for one standard deviation above the mean of each variable. WHR is superior in magnitude and significance in predicting deaths from all causes (hazard ratios 1.24 for males, 1.26 for females, both \( P < 0.0001 \)) and in predicting coronary heart disease deaths (hazard ratios 1.77 for males, 1.64 for females, both \( P < 0.0001 \)). WSR and WC were significant but less powerful predictors for all cause and for coronary heart disease deaths. BMI performed poorly throughout. In this population, WHR has continued to be the dominant modifiable risk factor for all cause and coronary heart disease mortality, apart from cigarette smoking. WHR continues to show superior and independent predictive ability in comparison with single measures of the lipid fractions or blood pressure levels. This report confirms the landmark Gothenburg studies that described the importance of WHR as the preferred measure of obesity for predicting cardiovascular disease deaths, and it supports the cross-sectional findings from the recent INTERHEART study where WHR, across many nations, correlated best with the acute presentation of coronary heart disease.

The polymorphisms in cholecystokinin 1 receptor was associated with midlife weight gain in women

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We already reported the combination of cholecystokinin 1 receptor (CCK1R) and the beta3-adrenergic receptor polymorphism was a contributing factor for midlife weight gain in men (Obes Res 2004; 8: 1212–6). CCK1R has been reported mediate CCK-induced suppression of food intake, and the peripheral administration of CCK1R antagonists increased food intake. We investigated the relationship of polymorphisms in the CCK1R [A to G (n-81), G to T (n-128)] with body weight gain, and food intakes. The participants were 197 Japanese women aged 40–49 years who received the 2-year follow-up investigation. Weight change from baseline was accessed. Dietary intake at baseline was estimated from 3-d food records with camera. Subjects were grouped into two categories by these genotypes: Wild group (\( -81A/A \) and \( -128G/G \)) \( (n = 142) \) and others (Hetero/Homo group) \( (n = 55) \). The weight changes controlled for weight at baseline in Hetero/Homo group [mean (SD): 0.59 (2.06) kg] was higher than those in Wild group [-0.33 (2.39) kg] \( (P = 0.01) \). The odds ratio for weight gain (\( \geq 0.7 \) kg) of Hetero/Homo group was 1.91 (95% CI: 1.00–3.63) compared with Wild group. However, there was no difference in energy intake at baseline between groups. These results suggest that the CCK1R polymorphisms might be a contributing factor for midlife weight gain in women.

The usefulness of the waist size of trousers as an evaluation tool of abdominal obesity in Korea

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Objective: Abdominal obesity is major risk factor to increase cardiovascular diseases, and waist circumference (WC) is used as main anthropometric index. But not many people who know their correct WC, we aimed to confirm the waist size of trousers (WS) can be used as an evaluation tool of abdominal obesity instead of WC.

Methods: The subjects included 444 adults (male 231, female 213) who visited Seoul National University Hospital. We collected questionnaire about the dressing habits (location of belt, degree of tightening) and drug history about DM and hypertension. The data about cardiovascular risk factors was obtained. We tested the correlation between well-known obesity indices and WS. We analyzed ROC curve to get the best cut-off points to predict MS.

Results: A total of 94% knew their WS. The difference between WC and calculated WS (cm unit) is 1.2 cm for men, and 8.1 cm for women, respectively. Age and sex-adjusted correlation coefficient between WC and WS is 0.836, which is higher than those of BMI or body fat ratio. According to the prevalence of MS, the best cut-off points of abdominal obesity are 34 inch for men, 31 inch for women, which are the same at the ROC curve analysis.

Conclusion: WS can be used by complementary tools for evaluation of abdominal obesity, especially in public education and campaign.
PO0495
Chronic stress: a maladaptive link with body fatness?
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Background: In the context of understanding disease pathways, the term 'maladaptive' has been proposed for indicating disease-promoting effects originating from physiological systems or features, that used to have specific advantages under palaeolithic life conditions. The 'thrifty gene' blueprint as selective advantage against a 'feast and famine' background is a frequently cited example of that paradigm. We report evidence for an additional maladaptive mechanism for obesity: chronic stress.

Method and results: A targeted literature review crystallized into the hypothesis that the human neuro-endocrine stress circuitry – a highly sophisticated machinery for homeostasis and survival – can easily become maladaptive in a modern context of generalised increased volume of incoming stress signals (especially psycho-social stress) against a sedentary background, by inducing shifts in population 'stress tonus' distributions, thereby increasing the risk of its dysfunction. Mental ill-health is an increasing public health issue, affecting about one in four individuals in Europe. Competitiveness, psycho-social stress and mood disorders are major components in this picture. Chronic stress influences fat distribution and appetite regulation negatively in animal models. In contrast, physical activity enhances stress-coping capacity in humans; self-reported stress levels have been found less than half in active people as compared to sedentary individuals. The importance of interactions between stress and physical activity might therefore be considerably underestimated in body fat homeostasis.

Conclusion: From a public health point of view, this hypothesis calls for intensified research in humans for the use of indicators and biomarkers of stress tonus, its determinants and its impact on energy metabolism.

PO0496
An analysis of the proposal to tax junk food
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In response to heavier populations, the World Health Organization is encouraging governments to introduce so-called junk food taxes. In this vein, there is growing academic and political momentum behind the adoption of such a tax in countries such as Canada, the United Kingdom, and the United States. The WHO’s argument rests upon two hypotheses, one scientific and one economic. The first, scientific hypothesis is that energy-dense junk foods, especially those high in fat, sugar, and salt, are making people obese. The second, economic hypothesis is that a junk food tax will reduce consumption of these foods. This paper tests these hypotheses. We examine the scientific rationale behind taxing junk foods and assess whether these foods are significant contributors to obesity. This paper also examines the evidence that junk food taxes alter people’s eating habits by reducing junk food consumption thereby improving diets and overall public health. For example, are those consumers addicted to junk food dissuaded from their eating habits and patterns by a tax? What is the evidence from the three American states that have had junk food taxes for the longest periods of time? This paper’s assessment of the tax proposal’s respective scientific and economic merits lends empirical clarity to the current policy discussion.

PO0497
Maternal pre-pregnancy weight and weight gain during pregnancy and newborn anthropometry: the EDEN study (study of pre and early post natal determinants of the child’s development and health)
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Early determinants of adiposity are of importance in the current context of increasing prevalence of obesity in childhood. We investigated the relationships between maternal anthropometry before and during pregnancy and newborn anthropometry. The EDEN Study was proposed to all pregnant women visiting selected maternities before the 22th week of gestation. Anthropometric measurements were performed on 731 mothers between 22–26 weeks of gestation and on mothers and babies 3 days after delivery. Weight before pregnancy was reported. Pre-pregnancy BMI (pBMI) and mother’s weight gain (mWG) were calculated. Newborn anthropometry was analyzed in relation to pBMI, mWG and mother’s subcutaneous adiposity (divided into quintiles) in separate regression models allowing adjustment for mother’s age, centre, newborn gender and gestational age.

Obese women gained less weight than their peers during pregnancy (3.6 ± 0.7 kg vs. 9.5 ± 0.2 kg, P = 0.0001), and lost more subcutaneous fat during the last three months of pregnancy (−5.8 ± 1.4 vs. −1.0 ± 0.4 mm, P = 0.001). Birth weight and newborn’s subcutaneous skinfolds increased with pBMI (P-trends < 0.001), but not with mWG (P-trends > 0.13). In multivariate regression, anthropometry at birth remained significantly associated with pBMI (P-trends < 0.001) and with mWG, although more weakly (P = 0.05). Mothers who lost more subcutaneous adiposity during the last 3 months of pregnancy had fatter babies at birth independently of pBMI (P = 0.05). The stronger relation with pre-pregnancy BMI than with weight gain during pregnancy may be explained by the ability of fatter women to mobilise energy from their fat store to sustain foetal growth during the last three months of pregnancy.

PO0498
A longitudinal study of weight change and self-rated health
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Background: Among initially healthy people both obesity and self-rated health (SRH) are strong predictors of morbidity and mortality but their interrelation is sparsely studied. The aim of this study was to analyse the mutual relation between weight changes and changes in SRH. We examined whether weight changes had an effect on SRH and if poor health at baseline had effect on later weight gain.

Methods: The Danish Nurse Cohort Study is a prospective population study (1993–1999), and comprises 13 684 female nurses aged 44–69 years. Logistic regression analyses were used to examine the association between changes in body mass index and changes in SRH.

Results: Women who gained weight had higher odds [Odds Ratio (OR): 1.39, 95% CI: 1.25–1.54] for poor self-rated health. For women who decreased two BMI-units (4–5 kg), the OR for reporting poor health was 1.35 (95% CI: 1.11–1.64). Weight loss among overweight female nurses, did not result in better health ratings. Poor self-reported health combined with normal weight at first examination was associated with higher odds of later weight gain (OR: 1.29, 95% CI: 1.10–1.51).

Conclusion: Weight changes, both weight loss and weight gain, had negative influence on health-ratings. Further, poor self-rated health
Aspects of knowledge, attitudes and practices of medical practitioners on obesity and weight management in three urban centres in Kenya

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Background: To determine aspects of knowledge, attitudes and practices of medical practitioners on obesity and weight management in three urban centres in Kenya.

Methods: A cross sectional survey of a randomly selected sample of 485 Medical Practitioners (MPs) from three urban centres in Kenya. Four hundred and thirty (89% response) questionnaires were fully completed and returned. Data was obtained on the demographics of the study population, knowledge of nutrition and obesity, awareness of obesity as a health problem, assessment, management (diet, exercise and pharmacology) and practices regarding obesity as well as how the MPs would like their knowledge of obesity improved.

Results: The MPs considered weight management as important and believed they had an important role to play. Despite the fact that 15% and 53% of the MPs had completed training on obesity and nutrition respectively, they were still not confident enough to give nutrition advice to their patients. Only 2.2% of all the MPs referred their patients to dieticians for weight management. The MPs had poor knowledge of weight loss drugs yet they actively prescribed these drugs. Only 36% and 25% of the MPs actively assessed and managed obesity respectively.

Conclusion: The MPs gave patients advice on diet and exercise and prescribed weight loss drugs. However, the outcome of this study indicates that, they were not confident and they did not have the necessary knowledge to manage obese and overweight patients.

PO0501
Season of birth in bulimia nervosa: results from the national women’s study

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Background: Studies of birth patterns in anorexia nervosa (AN) have shown relative increases between March and August, while studies in bulimia nervosa (BN) have largely negative. No studies of BN have been reported in large representative, non-clinical samples of U.S. women.

Methods: A national, representative sample of 3,006 adult women completed a structured telephone interview including screenings for BN and other psychiatric disorders. The sample was the 3rd wave of a longitudinal study generated by multi-stage geographic sampling procedures that have been described previously. The survey included questions about month, date and year of birth. Season of birth was also calculated. Differences across month and season of birth between subjects with (n = 85) and without BN (n = 2898) were compared using chi-square analyses.

Results: There were significant differences between subjects with and without BN across both season (P < 0.033) and month of birth (P < 0.003). Fall was the season with the highest relative number of BN births, while spring had the lowest followed by summer. The months with the highest relative rate of BN births were January and October, and the months with the lowest relative rates were July and March.

Conclusion: In a national representative study of non-treatment seeking subjects significant differences in both season and month of birth were found for subjects with BN. These results differ from those reported for AN, and possible explanations will be discussed.

PO0502
Metabolic syndrome and birthweight-results from the AusDiab study


The University of Queensland, Queensland, Australia

Aim: To evaluate the associations between birthweight and the MS in the general Australian population.

Methods: Questions about birthweight by self-report were added to the second round of the AusDiab study, which is a cross sectional study of a nationwide stratified sample of 11 247 Australians aged 25 years or over. This study presents analysis of survey results from Victoria. Features of the MS, by the US National Cholesterol Education Program were modelled against BW as a continuous variable and as a categorical variable of low birthweight (LBW), <3 kg.

Results: Five hundred and thirty three of 815 participants reported their birthweight, and 480 considered their birthweight estimate reliable. Of these, Birthweights ranged from 1.0 to 5.9 kg with a mean (SD) of 3.4 (0.6) kg, and 117 were of LBW. For each kg increase in birthweight, adjusted for age and sex, the OR (95% CI) for MS was 0.77 (0.54–1.1), P = 0.16. However, MS was strongly correlated with birthweight when adjusted for age, sex, physical activity, and current body weight, so that the OR (95% CI) for MS for each kg of birthweight was 0.5 (0.31–0.76), P = 0.002, and for people with LBW was 3.9(1.4–10.6), P = 0.008. Glycosated haemoglobin and other glycaemic indices were negatively associated with birthweight (Al Salmi 2006).
PO0503
Glucose disorders and birthweight-results from the AusDiab study
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Aim: To evaluate the associations between birthweight and DM in the general Australian population.

Methods: Questions about birthweight by self-report were added to the second round of the AusDiab study, which is a cross sectional study of a nationwide stratified sample of 11 247 Australians aged 25 years or over. This study presents analysis of survey results from Victoria. Fasting plasma glucose (FPG) and glycated haemoglobin (HbA1c) were modelled against birthweight as a continuous variable and a categorical variable of low birthweight (LBW), <3 kg. High HbA1c was defined as HbA1c ≥ 7 mmol/L and high FPG as FPG >6.9 mmol/L.

Results: Five hundred and thirty three of 815 participants reported their birthweight, and 480 considered their birthweight estimate reliable. Of these, Birthweights ranged from 1.0 to 5.9 kg with a mean (SD) of 3.4 (0.6) kg, and 117 were of LBW. After adjustment for age and sex, FPG and HbA1c were strongly correlated with birthweight and the relationship was strengthened with adjustment for physical activity and current body weight. For each kg of higher birthweight, with adjustment for age and sex, the OR (95% CI) for high FPG and high HbA1c for each kg of birthweight were 0.39 (0.18–0.87), P=0.02 and 0.62 (0.41–0.96) P=0.03 respectively. The OR for LBW people of high FPG was 2.4 (1.2–4.6), P=0.01 and of high HbA1c was 7.2 (1.9–27.6), P=0.004.

Conclusion: LBW was associated with a higher risk of developing DM in this cohort, with and without accounting for current weight.

PO0504
White cell counts on metabolic syndrome
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Many evidences in recent studies paid more attention on metabolic syndrome as the main cornerstone for the culprit to chronic health related disease. As presented in late obesity conference, we reported the prevalence according to WBC (White blood cell) counts based the cross-sectional clinical epidemiological study. High sensitive CRP (C-Reactive Protein) was known for the reliable marker of metabolic syndrome, because it was recognized more stable and sensitive than other inflammatory marker such as WBC, ESR and so on. In contrast, it is not so common for high-sensitive CRP to be applied in all patients for relatively expensive cost. For these reason, a cheaper marker would be needed, we, therefore, explored WBC counts possibility to replace for a high sensitive CRP as an inflammatory marker in metabolic syndrome in Korean adults. The whole biochemical and anthropometric parameters of 1000 subjects visited at health care centre of Gil hospital, Gachon medical school. Now we aimed to examine demographic characteristics and the metabolic clusters in metabolic syndrome defined by NCEP ATP III: blood pressure, blood sugar, HDL-cholesterol, uric acid according to White blood counts. 978 (626 men and 352 women) subjects, aged 46.74 ± 9.83 years, with BMI (Body Mass Index) of 23.73 ± 3.21, were done by WBC counts and these mentioned variables after keeping fast overnight. Their data were reviewed and analyzed through chi-square test and student t-test by SPSS version 13 for Windows. The numeric data were shown as mean ± SE of mean, while P < 0.05 were considered as significant for proportion. While the prevalence of metabolic syndrome in our study was 10.2%, the proportion of metabolic syndrome in high WBC group was higher than that of low WBC group; 17.8%, 6.85%, respectively BMI, systolic blood pressure, diastolic pressure and fasting blood sugar, TG (Triglyceride), uric acid in the high WBC counts group were very significantly higher than those in the low WBC counts group whereas HDL-cholesterol in the low WBC counts group was very significantly lower than high WBC counts group. We found the metabolic clusters to express metabolic syndrome and BMI were very significantly higher in the group with high WBC counts than low WBC counts. In conclusion, WBC counts could be considered as a reliable marker of metabolic syndrome in Korean adult.

PO0505
Ursolic acid and its derivative as novel inhibitors of protein tyrosine phosphatase 1B enhance insulin receptor phosphorylation and stimulate glucose uptake
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Protein tyrosine phosphatase 1B (PTP1B) is a key element in negative regulation of insulin signalling pathway, and may play an important role in diabetes and obesity. We identified ursolic acid, a natural pentacyclic triterpenoid widely existing in traditional Chinese medicine herbs, as a novel inhibitor of PTP1B through screening an extract library of traditional Chinese medicine herbs used in clinic for Diabetes. Through modification, we designed and synthesized a derivative with a K_i of 283 nM. As competitive inhibitor of PTP1B, ursolic acid and its derivative also inhibit T-cell protein tyrosine phosphatase and src homology phosphatase-2, but not leucocyte common, antigen-related phosphatase, protein tyrosine phosphatase a and e, which all are possibly involved in insulin pathway. The derivative has been proved to be able to enhance insulin receptor phosphorylation in CHO/hIR cells and stimulate glucose uptake in L6 myotubes.

PO0506
Study of eating behaviour changes in fasted and non-fasted state
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Introduction: Eating is a facultative behaviour. Regarding the health status in Ramadan with its special eating regulation from sunrise to sunset provides an opportunity to study eating time and its episodes along with the numbers and intervals between the meals.

Methods: A group of healthy young females with 20 ± 1.5 years were studied their eating pattern in Ramadan (fasted period) and usual month (non-fasted period) by using 24 h recall questionnaires. Eating time and its episodes fasting hours and missing meals were recorded.

Results: Findings were showed that 60% of the subjects during fasting regulation skipped one meal daily. The most missing meal were Dinner (after sunset, 45%) and Sahar (before sunrise, 15%). Average daily fasting hours were 13.3 ± 2.4 h in fasted and 9.3 ± 1.2 h in non-fasted periods, with significant differences (P < 0.01). Mean eating episodes in non-fasted and fasted states were 5 and 3.9 times,
It has been concluded that the post absorptive duration from 7 to 9 AM. Eating breakfast in contrast with fasted period showed a wide range periods were four and two times per day, respectively. The time of higher values for n-3 PUFA, followed by the Koreans and Mongolians. While the Mongolians consumed meat more frequently. In fatty acid and n-3 PUFA. The Japanese and Koreans ate fish more frequently, and n-3 PUFA. The Japanese and Koreans had higher values for triglyceride than their Mongolian counterparts. Multiple regression analysis showed that triglyceride levels had a great magnitude of correlation with increases in the 18:1/18:0 ratio for the Japanese and Mongolians, and n-3 PUFA remained significant for the Mongolians. In conclusion, our results indicate a link between HTG and obesity, insulin resistance, age, the 18:1/18:0 ratio in plasma and n-3 PUFA, in Northeast Asians. HTG is ethnic-specifically associated with an increase in the 18:1/18:0 ratio or a decrease in n-3 PUFA in plasma for the Japanese, Koreans and Mongolians.

PO0507
Factors affecting on abdominal obesity in urban population aged 20–70 years, in the north of Iran
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Background and objectives: Obesity is an undesirable outcome of changing of life style and behaviours. This study was aimed to determine the prevalence rate of central (abdominal) obesity and the associated factors.

Materials and methods: We conducted a population based cross-sectional study with sample of 1800 females and 1800 males with respective mean ages of 37.5 ± 13.0 and 38.5 ± 14.2 years of urban population aged 20–70 years living in the north of Iran in 2004. The demographic and life style data were collected with a designed questionnaire. Diagnosis of central obesity was confirmed by the WHO standard recommended method by determining waist circumference (WC). Logistic regression model was used to estimate the age adjusted odds ratio and its 95% confidence interval.

Results: The overall prevalence rate of central obesity was 28.3% (9.6% for male and 46.2% for female; P < 0.0001). In both genders, particularly in the females, the rate of central obesity was raised by increasing age. There was an inverse relation between the risk of central obesity and marriage age, the high level of education (OR = 0.20, P < 0.0001), severe occupational activity (OR = 0.39, P < 0.0001), the level of exercise (in subjects with >5 h exercise per week, OR = 0.67, P < 0.001) and high level of leisure time activity. Marriage, history of parental obesity and parity >5 were associated with increased risk of central obesity.

Conclusion: With respect to these findings, low level of activity and education, parity, family history of obesity, marriage at earlier age and aging are responsible for central obesity.

PO0508
Lifestyle and obesity-related metabolic disorders in north-east Asia
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Asians have a lower frequency of obesity than do Caucasians, but have an increasing tendency toward diabetes. In obesity-related disorders, accumulated evidence suggests that hypertriglyceridaemia (HTG) is independently associated with cardiovascular disease. The hypertriglyceridaemic effect of fish oil has been confirmed in Caucasians. Recent evidence indicates that stearyl-CoA desaturase (SCD) activity induced with high carbohydrate diets increases plasma triglyceride levels. We examined and analyzed the health data of 1,384 Japanese, Koreans and Mongolians aged 30–60 years for obesity, metabolic disorders including HTG, the ratio of plasma oleic acid to stearic acid (the 18:1/18:0 ratio), as a plasma marker of SCD activity and n-3 PUFA. The Japanese and Koreans ate fish more frequently, while the Mongolians consumed meat more frequently. In fatty acid composition, the Japanese of both genders showed remarkably higher values for n-3 PUFA, followed by the Koreans and Mongolians. The Japanese, Korean and Mongolian ≥30.0 BMI respectively were 3%, 4% and 20%. The Japanese and Koreans had higher values for triglyceride than their Mongolian counterparts. Multiple regression analysis showed that triglyceride levels had a great magnitude of correlation with increases in the 18:1/18:0 ratio for the Japanese and Mongolians, and n-3 PUFA remained significant for the Mongolians. In conclusion, our results indicate a link between HTG and obesity, insulin resistance, age, the 18:1/18:0 ratio in plasma and n-3 PUFA, in Northeast Asians. HTG is ethnic-specifically associated with an increase in the 18:1/18:0 ratio or a decrease in n-3 PUFA in plasma for the Japanese, Koreans and Mongolians.

PO0509
Breastfeeding lowers overweight risk at 7 years through lower weight gain in first year of life
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Breastfed children appear to have a lower weight gain in the first year of life. However, it is unclear how breastfeeding influences body mass index (BMI) after the weaning period and subsequently the development of overweight. We studied the association between breastfeeding and BMI at 1 year of age and between breastfeeding and BMI development from 1 to 7 years. We used data of 2179 Dutch children born in 1996/1997 who participated in the Prevention and Incidence of Asthma and Mite Allergy (PIAMA) birth cohort study. Parental reported weight, height and duration of breastfeeding were used. The association between breastfeeding and BMI at 1 year of age was analyzed by linear regression. A random coefficient analysis was used to study breastfeeding and BMI development from 1 to 7 years. Breastfeeding (more than 16 weeks compared to no breastfeeding) was statistically significantly negatively associated with BMI at 1 year of age after adjustment for gender, birth weight and maternal BMI, β = −0.23 (SE = 0.09). The BMI model showed that after 1 year of age the effect of breastfeeding was negligible if BMI at 1 year of age was taken into account. BMI at 1 year of age was a strong predictor for the development of BMI after 1 year of age. These results suggest that the protective effect of breastfeeding on later BMI acts through a lower BMI at 1 year of age.

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PO0510
Effect of an ad lib low energy density diet vs. a low glycaemic index diet on cardiovascular risk factors as part of a comprehensive weight-loss program
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Multiple studies show that cardiovascular risk can be reduced with weight loss. However, there is a question as to whether risk reduction
can be further impacted by altering the dietary intervention. This study compared a commercially available, ad lib, low energy density diet (ED) with a previously published, ad lib, low glycaemic index diet (GI) when provided as part of a comprehensive weight-loss program (Weight Watchers). Forty non-diabetic obese participants were randomly assigned to follow the ED ($n = 20$) or GI ($n = 20$) diet. Subjects received brief nutrition instruction on the diet and then jointly attended weekly group meetings for 12 weeks. Both groups received identical instruction in physical activity and behaviour modification as part of the weekly meetings. Both groups had significant decreases ($P < 0.05$) in body weight, waist circumference, body fat, cholesterol, HDL, insulin, and HOMA insulin resistance. There were no changes in either group for systolic blood pressure, diastolic blood pressure, triglycerides, LDL, fasting glucose or glucose tolerance. In addition, there were no significant differences between the groups in any of the variables evaluated. These data indicate that ED and GI diets are equally effective at improving cardiovascular risk factors when incorporated into a comprehensive weight-loss program.

**Funding Disclosure:** Weight Watchers International.

**PO0511**

Eating behaviour and body mass index among 16–18 year old adolescent students

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**Background:** Promoting healthy eating through a school health program requires better understanding of eating behaviour and the relation with body mass index (BMI).

**Objective:** To assess the eating behaviour and habits among adolescents.

**Method:** Overweight and obesity were assessed by BMI based on measured height and weight, using cut-off points as proposed by Cole et al., in a community sample of 994 adolescents attending secondary education (BMI: 21.6 kg/m$^2$, z = 3.4). The Dutch Eating Behaviour Questionnaire and a Food Frequency Questionnaire were used to assess eating behaviour and habits.

**Results:** Overweight or obese adolescents reported to eat significantly less snacks ($P < 0.001$), to drink diet soda more often (54.2% respectively 34.7%, $P > 0.001$) and to never eat breakfast more often (24.6% respectively 10.7%, $P < 0.001$) than normal weight adolescents. Obese adolescents more often tried a diet in the past year (63%) compared to overweight (41%) and normal weight (14%) adolescents ($P < 0.001$). Obese and overweight adolescents scored significantly higher in restrained eating than their normal weight peers ($P < 0.001$) but lower in externally induced eating ($P > 0.001$). Restrained eating behaviour was associated with dieting (0.509, $P < 0.001$), a lower frequency of snack eating ($R = 0.341$, $P < 0.001$) and more skipping breakfast ($R = -0.087$, $P = 0.01$).

**Conclusion:** Overweight and obese adolescents report to eat fewer snacks but often skip breakfast, which is associated with restrained eating behaviour, and score strikingly low on externally induced eating. In order to make healthy eating part of a school program, more research is needed on eating behaviour and eating habits.

**PO0512**

Bridge the gap: consumer knowledge and behaviour regarding calories in the context of diet, weight and health

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**Background:** Successful interventions to improve health through changes in diet and physical activity must be based on an accurate understanding of existing attitudes, knowledge and behaviour within the target population. The International Food Information Council (IFIC) Foundation conducted a national survey of the general population to gain this understanding and establish a base from which to measure change over time.

**Method:** A national survey ($n = 1060$) was conducted online among Americans ages 18 and older. Data was weighted to the U.S. census by age, income, and gender to create a representative sample. The survey was fielded between November 7 and 20, 2005.

**Results:** While Americans report looking for calorie information on food package labels, nearly 9 out 10 Americans are unable to accurately estimate the number of calories they should eat in an average day. Only 29% of Americans identified that calories in general are the cause of weight gain, vs. other basic food components such as fat, carbohydrates and protein. In the broader category of health, 75% of Americans described their overall health status as good, very good, or excellent, while only 34% describe their diet as healthful.

**Conclusion:** Although Americans are generally aware of calories in terms of diet and weight management, there is a significant gap between this awareness and their reported behaviour. In order to work effectively in the area of preventing obesity, health professionals must develop effective intervention strategies and messages that address consumer gaps in the area of diet and overall health.

**PO0513**

Demystifying the effects of choice at fast food restaurants

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**Background:** Fast food consumption has been widely invoked as a probable contributor to obesity. The high energy density and large portion size of many fast foods suggest that regular consumption could upset energy equilibrium, resulting in overweight and obesity. However, fast food companies now offer healthy choices and provide nutritional information so that consumers can make healthier, informed decisions. The aim of this study was to compare ‘meals’ and healthy options between and within fast food chains in a way easily interpretable by consumers.

**Method:** Signature meals and ‘healthy’ options were chosen from six major fast food chains. Nutritional information was obtained from the corporations. To provide a standardised format for comparison, a Daily Macronutrient Guideline Amount (DMGA) was developed using the Australian Guide to Healthy Living.

**Results:** Across fast food chains, a ‘medium-sized’ meal contributed to 43.9% of the DMGA for total energy and 68.9% of saturated fat on average. Healthy choices and the removal of a sugar-sweetened drink were both associated with substantial reductions in the percentage of DMGA accounted for.

**Conclusion:** A large proportion of DMGA is contained within a medium-sized meal meaning that poorly informed decisions could have significant impacts on weight. However, there is great variability in the healthiness of choices that can be made across and within fast food restaurants. Presentation of nutritional information in terms of DMGA (or equivalents) warrants consideration as a means
of making the implications of those food choices more transparent to consumers for everyday eating.

PO0514
Body composition and pattern of food intake in a cohort of young men
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Background: The prevalence of overweight (BMI 25.0–29.9 kg/m²) and obesity (BMI ≥30.0 kg/m²) in Australian men was 48.2% and 19.3%, respectively, in 2000. A link between dietary pattern and obesity has been suggested. The aim of this study was to assess the body composition and pattern of food intake in a convenience sample of Australian men.

Method: Body composition was assessed by dual-energy X-ray absorptiometry (DXA) and pattern of food intake was assessed by 4-day food record in a cohort of 38 healthy men aged 18–25 years.

Results: Using BMI cut-points, 31.6% and 10.5% of the participants were considered as overweight and obese, respectively. The mean body fat of the participants was 18.7%, ranging from 6 to 37%. Mean energy intake (EI) was 2725 kcal with carbohydrate, protein, fat and alcohol accounting for 48%, 17%, 32% and 3% of energy intake, respectively. Obese (body fat >20%) and non-obese men had similar EI and eating patterns. Saturated fatty acids, MUFA and PUFA accounted for 12.8%, 11.9% and 4.5% of EI, respectively. The mean reported consumption of dietary fibre (25.8 g/day) was below the recommended dietary allowance (RDA) for men 50 years and younger of 38 g/day. Mean values for vitamin and mineral intake were between the RDA and upper limit, except for niacin.

Conclusion: Interventions to improve body composition in adults should address dietetic patterns.

PO0515
The difference of the dietary intake according to self-reported 24-h dietary recalls between normal weight and obese women
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Background: The aim of the study was to detect any information from the self reported nutritional data on which can be established an interventional program for the dietary treatment of obese persons.

Methods: One hundred and ninety normal weight and 260 obese (based on the BMI) middle aged female were asked for the reporting of 24-h dietary recall (DR). Energy, macro- and micronutrients content of 24 DRs were calculated using NutriDAN software. Non-pair, one side Student T-test was used for the statistical analysis.

Results: Although the obese patients reported statistically significantly lower energy content, probably due to underestimation, their reported absolute intake of fat did not differ whereby relative contribution of fat to the total energy was significantly higher in comparison to the group of normal weight women (38.9 vs. 34.3% of total energy, P value <0.001). Simultaneously a lower intake of protein, carbohydrates, fibre, calcium, and other micronutrients in obese women group was also detected.

Conclusion: The study confirmed the difference in reported nutritional intake between obese and normal weight middle aged women.

PO0516
Breakfast consumption among university students and its relation to the nutritional state
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University represents an important transition among youngsters. The relation between the consumption of breakfast and its benefits for health is reported in literature. Thus, the purpose of this research was to verify breakfast consumption among students who entered a public university in the city of Sao Paulo and its relation to the nutritional state. This transversal study was carried through with 56 students in graduation courses, age range 19–23, both genders. The nutritional state was evaluated by the Body Mass Index, according to the WHO criteria (1995). Students were guided to carry through an eating register for three non-consecutive days, including a weekend day. Registers were calculated from a program of support developed by the Federal University of Sao Paulo. Breakfast consisted of any drinking or food consumed between 5–9 AM. The relation caloric percentage of the breakfast vs. total caloric value of the day was compared to Fisberg (2003) and Assis (1997) recommendation. Macronutrient distribution was confronted to FAO (WHO, 2003) proposition. In the sample, 12.5% reported not having a breakfast habit. In the overweight group and in the standard one, 25% and 73.2%, respectively, only 15.4% and 6.5%, respectively, had this meal according to the caloric recommendation. Concerning macro-nutrients, 51.8%, 57.1% and 53.6% of students consumed inadequately carbohydrates, proteins and lipids, respectively. In conclusion, breakfast did not follow the caloric recommendation and did not represent the macronutrients adequate distribution. Quantitative analysis of breakfast did not influence students’ nutritional state.

PO0517
Habitual early protein intake and body mass index, body fat percentage and skinfold thickness at age 7: results from the DONALD study
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It has been proposed that a high protein intake during infancy and early childhood increases the risk for subsequent overweight. We prospectively examined the relation of habitual protein intake between 6–24 months of age to body mass index (BMI), body fat percentage (%BF) and skinfold thicknesses at age 7. Analyses included 143 boys and 148 girls participating in the Dortmund Nutritional and Anthropometric Longitudinally Designed (DONALD) Study who had completed at least one 3-day weighed dietary record in both infancy (6–12 months) and early childhood (18–24 months). Weighted summary indices reflecting habitual, energy-adjusted protein intake (g/day) were created, and mean standard deviation scores (SDS) of BMI, triceps and subscapular skinfolds and %BF were compared between sex-specific tertiles (T1–T3) of protein intake. Maternal characteristics, breastfeeding and anthropometry at baseline and siblings in the dataset were adjusted for. In girls, higher protein intake tended to be associated with higher BMI-SDS (T1: 0.06 ± 0.13; T2: 0.13 ± 0.13; T3: 0.21 ± 0.13 SDS; \(P_{\text{trend}} = 0.05\)) and higher %BF (T1: 15.4 ± 1.1; T2: 17.6 ± 1.1; T3: 17.3 ± 1.1 %; \(P_{\text{trend}} = 0.09\) at age 7. In boys, no relation between early protein intake and later BMI-SDS existed (\(P_{\text{trend}} = 0.42\)). However, boys in the higher tertiles of protein intake also tended to have a higher %BF at age 7 (T1: 15.8 ± 1.0; 16.7 ± 1.0; T3: 16.8 ± 1.0%; \(P_{\text{trend}} = 0.08\)). Early protein intake was not related to later skinfold SDS in either girls or boys (\(P_{\text{trend}} = 0.1\)). In conclusion, there was no consistent association between protein intake in the first years of life and BMI, %BF or skinfold thicknesses at age 7.
PO0518
Protein-enriched but not carbohydrate-enriched dairy fruit drinks, consumed in the morning, reduce food intake at lunch
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Research suggests the satiating efficiency of a snack drink may depend on energy density, volume, time of consumption and macronutrient content. This study compared iso-energetic dairy fruit drink preloads (~300 kcal), differing in macronutrient composition and consumed at two time intervals in the morning. Using a counterbalanced within subjects design, 18 unrestrained lean males (18–35 years) consumed 300 mL of carbohydrate-enriched, protein-enriched and low energy control (78 kcal) dairy fruit drinks, 120 min and 30 min before an ad-libitum lunch. Subjective satiety (hunger, fullness) and sensory ratings were recorded throughout the experiment and lunch food intake was measured. Significantly less energy was consumed at lunch after the protein preload (679 kcal) compared to the control (728 kcal, P < 0.027) and carbohydrate-enriched preloads (753 kcal, P < 0.022). However, this was not sufficient to show complete energy compensation. Preload time of consumption did not impact upon any measures. Only satiety ratings at the beginning of the lunch varied significantly by preload type, mirroring differences in test meal intake. These findings are consistent with previous research that protein is more satiating than carbohydrate. However, further research is needed to test longer term effects of drinks in the regulation of energy balance.

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PO0519
Junk food consumption: an indicator of changing dietary habit in Iranian children
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Background: Widespread consumption of junk foods deprives children of necessary nutrients during the critical first 3 years of life as well as providing free calorie producers. Urbanization and media propaganda have caused traditional nutritious snacks to be replaced by low-quality and high-calorie junk foods.

Materials: To assess the extent of this problem in Iran, this study was conducted as part of the Anthropometrics National Indices Survey (ANIS). 8493 urban and 7925 rural children under 3 years were chosen to determine their dietary intake (type and daily/weekly frequency) by a 51 food items food frequency questionnaire. This included food groups, junk foods, fruit juices, and traditional food items. The data were collected during interviews with mothers and analyzed by SPSS software.

Results: Consumption of junk food during the preceding week was observed in 47.1% and 51.0% (6–11 month-old) and in 90.3% and 88.7% (12–23 month-old) of urban and rural children, respectively. Whereas conventional snacks were consumed by 36.2% and 23.7% (12–23 month-old) and 34.7% and 28% (12–35 month-old) of urban and rural children. Weekly frequency of consumption of junk food was higher than major food items such as meat and eggs (9 vs. 3 times weekly).

Conclusion: Replacement of conventional snacks (mainly natural products) with industrial and processed products is attributable to industrialization and urbanization, increased media coverage, and lifestyle changes in both urban and rural regions. We recommend education of the parents on making wiser choices for children’s snacks, as this is a major component of their diet.

PO0520
Dietary mis-reporting in weight-stable subjects during an experimental trial, and influences on biomedical outcomes
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Background: Dietary mis-reporting is a common and pervasive problem to most dietary studies. However, the interaction between inclination to mis-report, actual dietary mis-reporting and compliance in intervention studies has not been explored.

Methods: Forty-eight (16 men) healthy adults aged 20–55, with a BMI 20–29, consumed 125 g/day of salmon for a 4-week period followed by a 4-week period with no-fish. Subjects were instructed to maintain dietary and physical activity patterns during the study. Blood pressure, anthropometric and body composition with fasting blood samples to determine traditional and novel CHD risk markers and plasma fatty acids were obtained before and after each period. A seven non-consecutive day food diary including weekends was used to assess food intake. Dietary mis-reporting was assessed using two commonly used cutoff points <1.2 or <1.35 for the energy intake to basal metabolic rate ratio (EI:BMR).

Results: Three different manoeuvres were explored as possible ways to identify and exclude bias associated with veracity of diet reporting. On average, plasma EPA rose by 96 mmol/mL but six subjects showed changes under 20 mmol/mL. Eleven subjects had reported EI <1.2 (BMI and 16 subjects reported an intentional inclination to misreport. Dietary mis-reporters complied with fish consumption and therefore were benefited in their metabolic profile in the same way as acceptable reporters. Statistical significance was not achieved, perhaps because of the smaller sample size.

Conclusion: Declared inclination to mis-report was common among participants, but inclination to mis-report does not accurately reflect the actual reporting of implausible diets.

PO0521
Urban South African adolescents are consuming ‘western’ diets
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Background: Nutrition transition is recognised as a change in dietary pattern from a traditional low fat, high fibre diet to a high fat, low fibre diet. This change has been accompanied by an increase in nutrition related non-communicable diseases (NCDs). The impact on health is a rising concern because the transition is not confined to adults but is also being increasingly observed in children and adolescents. The evidence on which this is based comes mostly from national aggregate data on adult samples and there is a dearth of information about the aetiology and characteristics of nutritional...
PO0522
Consumption of fruits, vegetables, soft drinks, and high-fat-containing snacks among a group of adolescent girls in Iran

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Background: It is demonstrated that diets high in fruits and vegetables has a strong and consistent pattern for decreasing the risk for many cancers and cardiovascular disease, diabetes, obesity, and stroke. The purpose of this study was to assess fruit, vegetable, soft drink, and high-fat-containing snack consumption among the group of high school adolescent girls in the northwest of Iran.

Methods: A descriptive, cross-sectional study was carried out on 232 students which selected through a stratified random sampling. The food frequency questionnaire used. Serving of food group consumption were calculated by using 24 h recall. Foods were grouped in the five main food categories. Means, standard deviations (SDs), and frequencies were calculated using SPSS.

Results: Mean of fruits intake was 1.6 serving per day while daily mean intake of vegetables was 2.25. Intake of fruit and vegetable in these subjects is less than WHO recommendation in these age groups (3–5 serving per day for vegetables and 2–4 serving for fruits). Just 37.2% of adolescents consumed fruit and vegetable every day. At least 49% of these samples reported consuming one soft drink, and 45% consumed one portion of high-fat-containing snacks daily.

Conclusions: Our results demonstrated over low intake of fruits and vegetables and excessive consumption of soft drinks and high-fat-containing snacks, leading to the possibility of costly health complications later in life.

PO0523
Adverse profile of dietary nutrients and anthropometry in adolescent girls in Tabriz, northwest of Iran

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Objective: To assess nutrient profile and anthropometry measurement among Iranian intermediate school adolescents.

Methods: This cross-sectional epidemiological descriptive study was performed on 232 female adolescents aged 14–18 years selected thorough stratified random sampling method from high school students in the city of Tabriz, one of the largest cities in northwest of Iran. Subjects completed three 24-h dietary recalls. Weight, height, and waist and hip circumferences were measured.

Results: The diets averaged approximately 61% of energy from carbohydrates, 12% energy from protein, and 27% energy from dietary total fat. Lower intake of monounsaturated fatty acids (MUFA) and low consumption of fiber (12.7 g/day), a high intake of saturated fatty acids were significant observations. In 30.6% of subjects the energy derived from fat was more than 30% of total calorie intake and about 20% of them received more than 10% of their calorie from saturated fat and dietary cholesterol intake in 12.5% of these adolescents was more than 300 mg/day. Mean body mass index (BMI) was in a high range (21.3 ± 4.01 kg/m2) and a high prevalence of abdominal obesity (13.8%) was observed.

Conclusion: The findings suggest that high fat diet and central obesity is prevalent among female adolescents in this major city of Iran. Such adverse dietary and anthropometric factors are predictors of early and accelerated chronic diseases in this population.
**Conclusion:** There is a high prevalence of overweight and obesity in the adolescent population studied (13.8%). The study shows an association between overweight and obesity and nutrient intake.

**PO0525**

The relationships between anthropometric parameters, nutritional value of diets and antioxidant capacity in overweight and obese cardiovascular patients

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**Background:** Antioxidant capacity of the human body seems to become a new biomarker of potential risk of some civilization diseases.

**Objective:** The objective of this study was to examine the possible role of nutritional density of diets and anthropometrical parameters level on antioxidants status of 22 obese women with diagnosed cardiovascular heart disease (age 63 years ± 4).

**Methods:** The weight, height, body mass index (BMI), waist/hip ratio, skinfold thickness and FM% calculated from anthropometrical parameters, lipid profiles (total cholesterol, LDL-c, HDL-c, triglycerides), pro- and antioxidant nutrients supply in diet (total fat, PUFA, antioxidants vitamins) evaluated by 24 h recall and total antioxidant status (TAS), glutathione-peroxidase (GPx) in blood samples of cardiovascular overweight or obese patients (BMI ≥25.0 kg/m²) was examined.

**Results:** Significant correlation between TAS and selected nutrients: PUFA (r = 0.47; P < 0.05); vitamin C (0.48; P < 0.05), percent energy derived from carbohydrates (0.49; P < 0.05) supply was observed. Negative, statistically significant (P < 0.05) correlation between TAS and FM% as well as anthropometrical parameters (skinfold thickness: biceps, triceps, abdominal, subscapula), GPx, total cholesterol was found.

**Conclusions:** The results showed that the total antioxidants status of obese CHD patients well reflects their dietary habits and nutritional status and therefore should be frequently controlled.

**PO0526**

The influence of television viewing on snacking behaviour and body weight

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**Rationale:** Content analyses and dietary consumption studies have noted that foods with the highest consumption frequencies are also the most heavily advertised. As dietary behaviours have been shown to track from childhood into adulthood it is important to understand how advertising influences specific aspects of diet such as snacking.

**Methods:** An internet-based survey was completed by 613 university students. Multiple linear and logistic regression analyses were used to analyse the relationship between TV viewing, energy dense (ED) snack consumption, snacking while viewing TV, and BMI.

**Results:** Four significant relationships were found. The number of hours of TV viewed was significantly related to the consumption of energy dense snacks, R² = 0.06, P < 0.0005, and to increased BMI scores, R² = 0.08, P < 0.0005. Recognition of TV advertisements for ED snacks predicted consumption of similar snack types, R² = 0.033, P < 0.0005. Finally, for each additional hour of TV viewed, participants were 2.2 times (95% CI = 1.9–2.6) more likely to report snacking while viewing.

**Conclusions:** These results suggest that TV viewing, advertising, and snacking are influential factors on bodyweight. Further study is required to understand the motivations for choosing specific snacks in different populations and how these motivations are influenced by advertising.

**PO0527**

Increasing meal frequency lowers risk of non-communicable disease risk factors?

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The frequency and size of meals consumed influence the thermogenic effect of foods, and may lower incidence and control obesity and other risk factors of non-communicable disease (NCD). This study aims at assessing the association between meal frequency and incidence of NCD risk factors. Subjects were 592 people aged 19–50 years, randomly selected from among participants of the Tehran Lipid and Glucose Study. Food patterns were assessed and frequency of meals recorded using the two-day 24-h recall and the validated food frequency questionnaires. Four subgroups were established: subjects with less than 6, 6–7, 8–9 and more than nine meals per day were divided into groups 1–4, respectively. Anthropometric indices, blood pressure and lipid profiles were measured. Age, sex, BMI, WHR, smoking and total energy intakes were adjusted. The four groups included 190, 135, 185, and 82 subjects, respectively. No significant difference was observed in the intake of macronutrients. With increasing meal frequency, the chance of high total cholesterol, triglyceride and LDL-cholesterol decreased: Hypercholesterolemia: OR = 9.14 (%95 CI = 2.14–36.77), OR = 3.93 (%95 CI = 2.15–13.55), OR = 1.18 (%95 CI = 1.09–9.41), hypertriglyceridemia: OR = 3.64 (%95 CI = 1.98–4.30), OR = 2.67 (%95 CI = 1.80–3.46), OR = 2.44 (%95 CI = 1.44–2.98), and high LDL- cholesterol: OR = 9.27 (%95 CI = 5.27–16.30), OR = 5.61 (%95 CI = 2.79–11.55) in groups 3, 2 and 1, respectively. The intake of fibre was increased in the fourth group (9.7 ± 3.7 g/day, P < 0.001). Increasing meal frequency decreased the risk of non-communicable disease.

**PO0528**

Relation of dietary macronutrients and waist circumference in 3–13 year old children: Tehran Lipid and Glucose Study (TLGS)

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The prevalence of paediatric abdominal obesity is increasing. The purpose of this study was to identify predictors of abdominal obesity among macronutrient intakes in a group of Tehranian children. 355 children aged 3–13 years (boys 149, girls 194) were selected randomly among participants of the Tehran Lipid and Glucose Study. Children with waist circumference (WC) over 90th percentiles were considered overweight. Dietary intake was assessed by trained interviewers using two non-consecutive 24-hour recalls. Under-reports of energy intake were excluded from the study. Dietary composition was assessed in terms of calorie-adjusted amount of macronutrients intake and absolute dietary intakes. The average WC of children 5–8 year and 9–13 year were 52.9 ± 5.6 and 62.9 ± 10.1 cm, respectively. Prevalence of overweight in girls did not differ significantly from boys. Absolute and adjusted dietary protein intakes were positively associated with WC in boys (β = 0.63, P < 0.001 and β = 0.55, P < 0.001). In girls only the absolute amount of fat intake contributed to WC (β = 0.32 P < 0.001 and β = 0.3, P < 0.01). Energy-adjusted and absolute amounts of carbohydrate intake were found to be negatively associated with WC in boys (β = –0.23 up to –0.3, P < 0.001). It is concluded that in boys protein and carbohydrate and in girls fat intake may be associated with WC.

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PO0529

Targets for reducing high sugar drink consumption in an obesity prevention program in adolescents

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Background: Reducing high sugar drinks including soft drinks and fruit drinks (fruit juices and cordials) is important for obesity prevention in adolescents. The objective of this study was to use survey data to inform specific strategies to achieve a reduction in high sugar drinks consumption in a community based obesity prevention project.

Method: Participants were 1767 adolescents (response rate of 49%) aged 12–17 years from 5 schools in Geelong, Victoria. Baseline data were collected on nutrition and physical activity knowledge and behaviours.

Results: On the day prior to the survey, 18% of adolescents did not consume high sugar drinks however the mean intake of the 82% who did was 660mL (52% fruit drinks, 48% soft drinks). Seven percent were considered high consumers (>1000 mL/day). In terms of usual intake, 24% and 11% reported having fruit drinks and soft drinks respectively on a daily basis. The availability of soft drinks in the home was strongly positively related to their consumption (P < 0.0001). Age was not related to consumption of high sugar drinks (r = 0.657). Uncertainty about the sugar content of fruit drinks was also apparent.

Conclusion: Prevention strategies should target the large proportion of adolescents who drink moderately high amounts of high sugar drinks (average of 2 cans/day) rather than the minority who are very high consumers (>1L/d). Strategies should also concentrate on reducing high sugar drink availability in homes and schools and include education about the sugar content of fruit drinks.

PO0530

Dietary patterns and obesity among children

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Background: Links between specific foods and the risk of obesity are not well established. Dietary patterns may be a better predictor of obesity risk. Our aim was to identify and examine major dietary patterns and their relation to the risk of obesity among Iranian elementary school children aged 7–12 years.

Method: Parents of 400 children completed a FFQ. Weights and heights of children were measured. We conducted factor analysis to identify dietary patterns. Logistic regression (in which BMI was categorized into obese and non-obese) was used to estimate odds ratios (ORs) and 95% CIs.

Results: We observed 3 major dietary patterns in our study population: Factor 1 ( sweets, soft drinks), factor 2 (vegetables, fish, fruits, poultry) and factor 3 (meat, rice) pattern. Factor 1-pattern scores were significantly associated with increased risk of obesity (highest vs. lowest tertile OR = 2.4, P = 0.01). There was a suggestion of an inverse association between the factor 2 pattern and obesity risk (highest vs. lowest tertile OR = 0.74; P = 0.08).

Conclusion: Our data suggest a positive association between unhealthy pattern and the risk of obesity.
PO0534
Validation of a child and adolescent food-frequency questionnaire in Australia
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Background: To address the gap in validated tools to measure dietary intake in Australian children and adolescents, a self-administered semi-quantitative food-frequency questionnaire was designed for older children and adolescents. The questionnaire was modified from the Youth/Adolescent Questionnaire (1) after conducting focus groups and piloting in a sample of children from the Hunter Region of Australia. The aim of this study was to evaluate the comparative validity of the Australian Schools Eating Survey (ASES).

Methods: The questionnaire was administered twice to a sample of 122 children and adolescents (aged 9–16 years) at an interval of approximately 4 months, and four 24-hour dietary recalls were collected during this period. Pearson correlation coefficients were calculated on nutrient data.

Results: Validity was evaluated by comparing the average of the four 24-hour recalls to the average of the two of ASESs. Correlation coefficients between the mean energy-adjusted nutrients computed by the two methods ranged from 0.25 for zinc to 0.57 for tolate, similar to that found by Rockett for youth in the USA.

Conclusion: A simple, self-administered, semi-quantitative food-frequency questionnaire completed by older Australian children and adolescents can be used to provide information about eating patterns in this age group.

References:

PO0535
Meal patterns and behaviour related to eating have been associated with BMI in children
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Several unhealthy eating patterns have been associated with overweight in children. Aim of the present study was to evaluate meal patterns and behaviours related to eating in a randomly selected group of children 10–12 years old. Two hundred sixty five children from primary schools of Athens area, agreed to participate. They underwent full nutritional assessment, including anthropometry, dietary and physical activity evaluation. Of all children 4.7% reported that they never eat breakfast, whereas consumption of full breakfast every day. BMI values of children eating full breakfast every day were statistically lower compared with those reporting less frequent breakfast consumption (19.4 ± 3.4 kg/m² vs. 20.8 ± 3.9 kg/m², P = 0.01). The same was also evident for dinner consumption (20.0 ± 3.6 kg/m² and 21.2 ± 4.1 kg/m² respectively, P = 0.02). Furthermore, normal weight children were more likely to consume their main meals at the dining room than their overweight counterparts. On the other hand, a significant correlation was found between BMI and fast food consumption (rank correlation coefficient = 0.14, P = 0.005). Regression analysis revealed that the only eating behaviour significantly related to body fatness as this was assessed by BMI, was fast food consumption. In conclusion, results of the present study indicate that meal patterns, conditions related to the act of eating and fast food consumption are related to BMI through their influence on energy balance.

PO0536
Overweight women identified as low energy reporters: what are their characteristics?
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Much research has been done to recognize putative factors for underreporting, one of the parameters affecting quality of dietary data. Aim of the study was to identify potential dietary, physical activity and biochemical correlates of low energy reporting among overweight women. One hundred forty-nine women (BMI=25 kg/m²) took part in this study (mean age 50.2 ± 12.2 yrs). Body composition was assessed by anthropometry and dual x-ray absorptiometry. Dietary intake was evaluated through 3-day food records that were analysed for nutrient intake, meal patterns, number of food mentions. Blood samples were also taken. Based on the Goldberg cut-off points, 53% of the women were low energy reporters (LERs). LERs had significantly higher BMI and % body fat, compared to non-LERs, as well as higher blood triglycerides, glucose and lower HDL-cholesterol. Percent of energy derived from protein was higher in LERs (18.2 ± 3.7%) vs. non LERs (15.8 ± 3.2%, P < 0.001). After adjusting for total energy intake, food mentions were significantly lower in LERs compared to non-LERs (16.0 ± 0.7 vs.19.3 ± 0.7, P = 0.005). Stepwise regression analysis using the ratio energy intake to basal metabolic rate as a dependent variable revealed that number of food mentions, number of meals and snacks, % of energy derived from protein and BMI explained 56% of the variation in this group of overweight women. In conclusion, low energy reporting is very common among overweight women and caution should be taken when evaluating meal patterns, food intake as well as diet-health interactions.

PO0537
Individual differences in sensitivity to food stimuli: relationship between cognitive biases and trait eating behaviour
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Evidence suggests that motivational states, including hunger, are associated with biases in the cognitive processing of motivationally relevant stimuli. We investigated biases in attentional orienting and symbolic approach to food-related cues and examined the relationship between these measures and trait eating behaviour (as measured by the Power of Food Scale, PFS, and Dutch Eating Behaviour Questionnaire, DEBQ). Female participants were exposed to food-related and matched control pictures. To assess attentional bias, we used a visual probe (VP) task. To assess biases in symbolic approach, we used the stimulus-response compatibility (SRC) task. Analysis revealed that scores on the external scale of the DEBQ were positively correlated with both measures of cognitive bias (VP: P < 0.064; SRC: P < 0.034). There was also a trend for subjective hunger scores (P < 0.08) and scores on the PFS subscale 2 (P < 0.07), which measures the influence of food related stimuli, to positively correlate with the SRC bias. This finding of a relationship between cognitive biases for food cues and measures of eating behaviour is consistent with current models of motivation and suggests that intake driven by food-related cues should also be affected by individual differences in the reactivity of the approach system.
PO0538
Factors influencing the consumption of seafood among young children in Perth
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This study investigated the factors that influence the consumption of seafood between pre-primary and Year One school children in the Perth metropolitan area. Focus groups were conducted with mothers of young children to gain insights into the enablers and barriers to regular seafood consumption in children, and the knowledge, attitudes and perceptions of their mothers to including seafood as a regular part of their children’s diet. Findings indicated that all children had tried fish and seafood products, with some being exposed to a wide variety from an early age. Across focus groups, several dominant factors were apparent in influencing the frequency and type of seafood purchased and consumed. Perceived cost, freshness, availability/accessibility, and the level of confidence to prepare and cook a meal to suit all family members were significant determinants of whether these products featured regularly on the household menu. The influence of others in the family, particularly their husband or partner, also tended to impact upon the likelihood of serving fish and seafood, and the types of products mothers were willing to serve. Findings from this qualitative study form the first phase in a proposed longitudinal research project that aims to develop, implement and evaluate a comprehensive school-based resource package encouraging regular, seafood consumption (particularly fish) in primary school-aged children.

PO0539
City of Mandurah food security project
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A food security survey was completed by 99 food outlets from a lower socio-economic area in the City of Mandurah in Western Australia. The purpose of the survey was to investigate the range, variety and availability of foods in the Mandurah region as well as examining specific in-store characteristics such as the types of displays/promotions currently in-store and food storage issues. The primary owner or operator of the food outlet provided information about: the variety of foods available; the main types of foods purchased; the knowledge and availability of healthy food choices; and factors influencing the choice of foods available. The results for this study indicated that the majority of outlets surveyed pre-prepared most of their food. Sandwiches, rolls and salads were considered healthy food options regardless of the content of the filling or the dressings used. Respondents stated good service and consumer demands were the main drives behind the type of foods provided in their outlet. Meat, salad and bread combinations were very popular food choices of clients however few outlets offered a choice of bread type other than white or wholemeal. High fat pastries and dressings were popular client choices as were soft drinks and flavoured milks. The findings clearly indicate the need for further research in the area of food security in lower socio economic areas as one of the means of addressing the significant incidence of overweight and obesity in these populations. Other recommendations include extending the audit and capacity building initiatives with food outlet operators.

PO0540
Successful diet clinic for obesity using our diet balance sheet
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Aim: We devised a diet balance sheet (DBS) for management of obesity. The eighty kcal was referred to as one arbitrary unit (AU). Each meal contained 400 kcal. The DBS consisted of 2.0 AU of protein, 0.5 AU of vegetable, 0.5 AU of fruit or potato, 1.5 AU of carbohydrate and 0.5 AU of oil. The efficacy of our DBS as educational material for body weight control was assessed.

Method: Ninety-four women aged 58.9 ± 7.9 years and with BMI 22.5 ± 4.2% were registered to our weight reduction program. One class consisted of about 18 registrants. Their body weight and BMI at the baseline were 66.8 ± 8.0 kg and BMI 28.0 ± 2.8 kg/m², respectively. Each class of education ran roughly once a month. They were instructed how to use the DBS during a study period of six months. At the end of each class the level of achievement was assessed with a score of ‘excessive’, ‘proper’ or ‘poor’ intake of each food.

Results: At the end of study they reduced body weight by 8.3 ± 4.2%, BMI by 2.1 ± 1.0 kg/m² and body fat by 6.5 ± 4.3%. 80% of women succeeded in weight reduction by over 5%. All participants could change from ‘excessive’ to ‘proper’ intake of diet at one month. However ‘poor’ intake of diet remained in unsuccessful women for 6 months.

Conclusion: Our DBS was confirmed to be effective as the diet education material for obese and pre-obese clients. It is expected to be applicable widely for management of other lifestyle-related diseases.

PO0541
Evaluating diverse models for the regulation of food advertising to children on television
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Television food advertising is recognised as contributing to an obesogenic environment for children. Discussions in Australia about how broadcasting regulation can contribute to the fight against obesity often involve reference to regulatory systems in other jurisdictions, especially those where the regulation is strict, for example Quebec and Sweden. This paper will provide detailed comparative information on the regulatory systems relating to television food advertising to children in Australia, Canada (including Quebec), the US, the UK, Sweden and Norway. The impact of European regulatory standards will also be canvassed. This information is based on a study tour undertaken by the presenting authors in May-Jun 2005. The various schemes will also be evaluated for their effectiveness, by means of: discussion of the merits and implications of various regulatory structures eg government regulation, industry self-regulation; appraisal of a variety of regulatory ‘triggers’ e.g. the target audience of the advertising, the time it is shown; and evaluation of the effectiveness and proportionality of various consequences of non-compliance with regulations e.g. adverse publicity, fines. In particular the paper will draw attention to factors that can act as weak points in a system, for example imprecise definitions (when is an advertisement ‘aimed at’ children?) and limited participation by certain groups of stakeholders. Finally, elements of a best practice model will be suggested. This part of the paper will be informed by the outcomes of a stakeholder forum to be held in late March 2006.
PO0542
NUTRIOSE®, a resistant dextrin, and MALTISORB®, a sugar alcohol, two key products for healthy diets and obesity management.
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Diabetes prevention is a major health concern in obesity management. Obese people are up to 80 times more likely to develop Type 2 Diabetes. NUTRIOSE® and MALTISORB® can offer numerous advantages for healthy diet. They can be used for replacing the bulk of the sugar and, in the case of maltitol, most of the sweetness, together with inducing low glycaemic and insulinoemic responses. As a non-viscous, soluble and process stable dietary fibre, NUTRIOSE®/C210 (low GR) can easily be incorporated in drinks. Concentrated dilutable fruit drinks formulated with it elicits a glucose response of 10% compared to similar standard commercial product, when consumed after dilution in water. Moreover, it brings a beneficial intake of about 1/3 of the recommended daily intake in fibres. MALTISORB®, a sugar alcohol, can also fully or partially substitute sugar in foods such as chocolate, ice cream or biscuits, keeping the sweetness and the pleasure of consuming the product, whilst giving a significant reduction in the glycemic response (low GR). Both NUTRIOSE® and MALTISORB® make it possible to reduce the postprandial peak in blood glucose level. Also, because of the weak insulinogenic effect, the rate of decrease of this level is slowed making it longer before returning to baseline. Additionally, fermentation of these products in the colon gives them an ‘extended energy release’ and a satietogenic profile, without digestive discomfort at the recommended doses. These nutritional characteristics make NUTRIOSE® and MALTISORB® two potential key ingredients for foods and beverages in obesity management and diabetes prevention.

PO0543
Assessment of daily physical activity with accelerometers, an evaluation against doubly labelled water
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The complex nature of physical activity makes it difficult to accurately measure its aspects and assess the impact on outcome parameters like energy expenditure. Here, the focus was on the ability of different accelerometers to assess daily physical activity as compared with the doubly labelled water technique, which is considered the golden standard to measure energy expenditure under free-living conditions. Seven different accelerometers were identified: Lifecorder; Tritrac-R3D; Caltrac; Actigraph/CSA/MTI; Actiwatch AW16; ActiReg and Tracmor. Many accelerometers have been tested under laboratory conditions during standardized activities, in field settings against portable calorimeters or in the controlled environment of a whole room calorimeter. Most accelerometers show good to very good correlations (r = 0.74–0.95) with energy expenditure during walking and running on a treadmill or with other defined activities. An increasing number of accelerometers have also been validated against doubly labelled water under unconfined conditions in daily life. The Actigraph/CSA/MTI and the Tracmor were the two most extensively validated accelerometers. Correlations between accelerometer output and PAL ranged from 0.31 (Tritrac-R3D) to 0.96 (CSA) but the latter was based on only seven subjects. The Tracmor showed consistently high correlations between PAL and accelerometer output ranging from 0.72 to 0.79. The best results were found for the Tracmor, however, this accelerometer is not commercially available yet. Of those commercially available, only the Actigraph/CSA/MTI has been proven to correlate reasonably with doubly labelled water derived energy expenditure.

PO0544
Atrial natriuretic peptide, the hidden partner in the control of lipid mobilization in humans: sex-related differences in the contribution of lipolytic pathways
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Background: Atrial natriuretic peptides (ANP and BNP) stimulate human fat cell lipolysis through a cGMP-dependent activation of hormone-sensitive lipase. Experiments were designed to delineate the contribution of this new and unsuspected pathway.
Methods and results: The contribution of the different lipolytic pathways (i.e. catecholamines, ANP and insulin) to lipid-mobilization was studied in the subcutaneous adipose tissue (SCAT) of overweight men and women, using in situ micro dialysis. Exercise bouts (i.e. 1-hour at 30%, 50% and 70% VO2max) were performed in a randomised fashion. Extra cellular glycerol (ECG) and cGMP concentrations were determined. Local adipose tissue blood flow changes were monitored. Contribution of catecholamine and ANP-dependent pathways was delineated using β- and 2A-adrenergic receptor antagonists (alone or associated) added to dialysis probes. Exercise-dependent increment in EGC was observed in both sexes but the contribution of catecholamine and ANP-dependent pathways was strikingly different. Overweight women mobilize more lipids than men during exercise. A1-antilipolytic effect was functional in SCAT of men and only at 70% VO2max in women. Whatever the sex, a part of exercise-induced lipid mobilization resisted to local β-adrenergic receptor (AR) blockade.
Conclusion: The striking finding of the study is that during low-to-moderate exercise periods, lipid mobilization in SCAT is not related to catecholamine-dependent stimulation of β-adrenergic receptors but rather to a decrease in plasma insulin and an increase in plasma ANP concentrations. Contribution of non-adrenergic pathways in the control of lipid mobilization in SCAT is demonstrated. Selective local blockade of β- and 2A-ARs in SCAT was necessary to reveal such pathways.

PO0545
Body composition, physical activity pattern, cardiovascular fitness and blood lipid profile in a cohort of young men
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Background: A high incidence of cardiovascular disease (CVD) is consistent with the explosive increase in the prevalence of obesity. Physical inactivity is one of the primary CVD risk factors and aerobic fitness is an important independent predictor of CVD in men.
Method: Body composition, energy expenditure, physical activity, cardiovascular fitness and blood lipids were quantified in a cohort of 38 healthy Australian men aged 18–25 year. Body composition was assessed by dual-energy X-ray absorptiometry, resting metabolic rate (RMR) assessed by continuous open-circuit indirect calorimetry, energy expenditure (EE) assessed by 4-day physical activity records, and cardio respiratory fitness measured by maximal oxygen uptake (VO2max). The blood lipids were assessed by enzymatic reaction.
Results: Obese (body fat ≥ 20%) and non-obese men had similar RMR (2013.4 × 1837.9 kcal) and mean daily EE
Blood lipid levels above the limit was found in a high percentage of young men.

Conclusion: Blood lipid levels above the limit was found in a high percentage of young men.

PO0546
Physical inactivity: prevalence and associated variables in obese subjects
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Few questionnaires measuring various dimensions of physical activity have been tested in obese populations. We assessed physical activity and we associated data obtained by the International Physical Activity Questionnaire (IPAQ) with selected obesity-related variables in 85 obese subjects (28 men, age 41 ± 12 years, BMI 37.1 ± 7.0 kg/m² and 57 women, age 40 ± 12 years, BMI 36.0 ± 8.3 kg/m²) who completed the short last 7-d version of the IPAQ assessing vigorous, moderate-intensity, walking activity and sitting. We assessed body composition and fat distribution by DEXA and anthropometry and the presence of depression by using the Zung scale. Using the IPAQ, 50.0% of men and 49.1% of women were classified as insufficiently active (<600 MET.min/week). Total Activity Score correlated significantly and negatively with BMI, waist circumference, total fat mass % and Zung score in men and women, but with trunk fat mass (% and kg), and the presence of weight fluctuations (yo-yo phenomenon) only in women. Inactive (<150 MET.min/week) men and women had significantly higher BMI and total fat mass % than insufficiently or sufficiently active subjects. Inactive women had higher trunk fat mass (% and kg) and Zung score than the other women. Age and marital status correlated with physical inactivity in men and women. In conclusion, the prevalence of insufficient physical activity was high in this population. Total adiposity, age and marital status (in men and women), abdominal adiposity, depression and weight fluctuations (in women), were correlated with habitual physical activity assessed by the IPAQ questionnaire in this population of obese subjects.

PO0547
Validation and demonstration of a novel dashboard to simplify the analysis of MTI/CSA accelerometer data
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Heading: Epidemiology/Prevention: Physical activity patterns
Background: MTI/CSA accelerometers are an objective and reliable means of recording the physical activity (PA) of children. However, manual processing of the data is time consuming and vulnerable to error. There is pressing need for a 'dashboard', a macro based on menu choices, which set the criteria for the cleaning and capture of data in advance.

Method: The EarlyBird PA Dashboard is an Excel macro designed to automate the steps routinely taken when manually processing PA files. Its menu allows the user to:i) select thresholds for up to 5 intensities,ii) select up to seven daily time periods,iii) set threshold for and 'patch-in' strings of zeros due to non-wearing in waking time,iv) select clock-time for start and end of day,v) 'patch-in' unrealistically high PA,vii) display 'patched-in' data and % contribution to whole PA.('Patching-in' means replacing cells with the mean activity recorded during the same time period on other equivalent days)

Results: A PowerPoint animation is used to demonstrate the dashboard. The macro processes a week's activity file in approximately 3 mins compared to 10–15 mins manually. Based on MTI/CSA files of 100 children (7–10 year), the mean macro/manual differences in total, low, medium and high intensity PA were all less than 3.0% (P < 0.05, Power>99%). The mean difference in total PA alone was just 0.5%, where 95% of individual differences were within 4.5%.

Conclusion: The Early Bird PA dashboard is reliable, and takes less than a quarter of the time to process the files.

PO0548
Physical activity and breast cancer risk: The European Prospective Investigation into Cancer and Nutrition (EPIC)
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There is convincing evidence for a decreased risk of breast cancer with increased physical activity. Uncertainties remain concerning the role of different types of physical activity and potential effect modifiers for this association. We used data from 218, 169 pre- and postmenopausal women from nine European countries, aged 34–80 years at study entry. Hazard ratios (HRs) from multivariate Cox regression models were estimated, using metabolic equivalent (MET) values-based physical activity variables categorized in quartiles, adjusted for age, study centre, education, body mass index, smoking, alcohol use, age at menarche and first pregnancy, parity, and current HRT-use. The physical activity assessment included recreational, household, and occupational activity. A total physical activity index was estimated based on cross-tabulation of these separate types of activity. During the 6.4 years of follow-up, 3,423 incident invasive breast cancers were identified, 869 cases in premenopausal women and 2,554 in postmenopausal women. There was an overall reduction in postmenopausal breast cancer risk with increasing total physical activity. Non-occupational activities (RR 0.83, CI 0.73–0.93, highest quartile versus lowest quartile, trend P = 0.002), specifically household activity (RR 0.81, CI 0.70–0.93 highest versus lowest quartile, trend P = 0.001) was associated with a significantly reduced risk. Among premenopausal women only household activity was significantly and inversely associated with breast cancer risk (RR = 0.71, CI 0.55–0.90, highest versus lowest quartile, trend P = 0.003). Occupational activity was unrelated to breast cancer risk irrespective of menopausal status. This large European cohort study provides additional evidence for a protective effect of physical activity on breast cancer risk.
PO0549
Factors associated with obesity among workers in Thai metropolitan waterworks authority
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Background: A number of studies demonstrated the influences of psychological factors on obesity. To examine the relationship of psychological factors (depression and stress), socio-demographic characteristics, knowledge, attitude and behaviour towards obesity among Thai Metropolitan Waterworks Authority (MWWA) officers, a cross-sectional study was conducted during July and September 2004.

Method: Two hundred and eighty-eight obese and 106 non-obese officers, aged 20–60 years, were recruited. Data were collected by self-administered questionnaires.

Results: The univariate analyses demonstrated that psychological factors were not risk factors for obesity but male, older age; laboured-occupation, lower education level, and unhealthy behaviour might associate with obesity. However, by using logistic regression model, only older age and unhealthy behaviour were found to be independent risk factors. Volunteers in the age groups of 40–49 and 50–59 years had significantly higher risk of being obese than the age group of less than 40 years. Volunteers who had unhealthy behaviour had significantly higher risk than those who had healthy behaviour while persons who had moderately healthy behaviour also had increased risk, but to a lesser extent. Obese subjects reported consuming significantly more food during stress. Watching television, videos, or playing computer continuously for more than 3 h, were assuming significantly more food during stress.

Conclusion: Unhealthy behaviour had significantly higher risk than those who had healthy behaviour while persons who had moderately healthy behaviour also had increased risk, but to a lesser extent. Obese subjects reported consuming significantly more food during stress. Watching television, videos, or playing computer continuously for more than 3 h, were assuming significantly more food during stress. However, unhealthy behaviour seemed to be the most important and modifiable risk factor of obesity. Future research regarding behavioural modification should be implemented at both community and country levels.

PO0550
Changes in energy expenditure from leisure time physical activity in Australian adults with age, birth cohort and period
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The aim of this study was to determine the individual effects of age, period and birth cohort on energy expended in leisure time physical activity (LTPA) by Australian adults from 1990 to 2000. Self-reported weight, height and time spent in LTPA i.e. walking, moderate activity and vigorous activity, from three National Health Surveys (1990, 1995, 2000) were used in the analysis. Adults were categorized into twelve age-groups, (five year intervals from 20–24 years to >75 years), three survey periods (1990, 1995, 2000) and 14 birth cohorts, (five year intervals from pre-1915 to 1976–80). Individual’s basal metabolic rates (BMR per minute) were calculated. MET values (metabolic equivalents) of 3.3, 4.0 and 8.0 were assigned for walking, moderate and vigorous activity respectively. The energy expended in LTPA was calculated by multiplying BMR by MET minutes for each activity and then summing to give daily expenditure. Linear regression models were fitted to the data. Those subjects reporting no LTPA were excluded from the analysis (33%). Age (P < 0.0001) and cohort (P = 0.043) showed independent effects on LTPA energy expenditure such that expenditure decreased with age and cohort. Energy expenditure from LTPA was unchanged with period from 1990 to 2000 although BMR increased. In conclusion, the separate effect of birth cohort in addition to age needs to be considered when designing population programs aimed at increasing energy expended in LTPA for the control of obesity. The estimation of trends in energy expenditure for all physical activity should be a focus of further research.

PO0551
Physical activity levels in 9–10 year old schoolchildren in Northeast England
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Background and Introduction: It is thought that inadequate Physical Activity Levels (PAL) may be responsible, in part, for the rising levels of obesity in children. The objective of this study was to investigate the PAL of children across various socio-economic status (SES). The results are part of a larger study -peas@tees- examining patterns of eating and activity in schoolchildren.

Methods: Six schools, within the North-East of England (UK), were selected using ranks averaging SES. Participating children (n = 246) wore an accelerometer (Actigraph, GT-256) over 5 consecutive days (weekend plus 3 weekdays). Total daily moderate to vigorous intensity physical activity (MVPA) was calculated using cut points by Puyau1 (3200 cpm) and a threshold approximating the Freedson/Trost2 cut point for this age group (1100 cpm). Each threshold estimated the percentage of children meeting the recommendations of moderate to vigorous physical activity (60 mins/day).

Results: Boys were more active than girls (766 + 268 vs. 641 + 202 counts/min; 95% CI for the difference 63–186 cpm). On average, 97% of children were sufficiently active using the 1100 cpm threshold, however, only 7% of children met the recommendations using the Puyau threshold. There was no influence of SES on the proportion of children meeting this criterion.

Conclusions: According to the 1100 cpm threshold for MVPA, most children are sufficiently active. Conversely, the majority is inactive if the Puyau criterion is applied. The prevalence of activity assessed using accelerometry is entirely dependent on the thresholds used to define MVPA.

References:

PO0552
Fitness and body mass index of English 9–10 year olds: a serial cross-sectional study, 1998–2004
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Objective: To examine the changes over time in fitness and body mass index (BMI) of children.

Design: Serial cross-sectional, population-based study.

Setting: Primary Schools in Liverpool, UK.

Participants: A total of 15 891 children (8108 boys; 7783 girls), representing 55% of 9–11 year old children in the annual school cohorts between 1997/8 and 2002/3.
Main Outcome Measures: Weight, height and derived BMI (weight/height²) adjusted for age and sex (British 1990 revised reference) using standard deviation scores (SDS). Fitness as cardio-respiratory endurance measured using the 20 m multi-stage shuttle run test (20mMST).

Results: 20 mMST score fell in boys from 48.9 (47.9 to 49.9) in 1998/9 to 38.1 (36.8–39.4) in 2003/4, and in girls from 35.8 (35.0–36.6) to 28.1 (27.2–29.1) over the same period. High BMI predicted unfitness in boys and girls (P < 0.0001), but more strongly in girls (P < 0.001). The fall in fitness was independent of the rise in BMI (P < 0.0001).

Conclusion: All children have become less fit, irrespective of their BMI. Public health measures to reduce obesity among children should aim to raise fitness levels among all children, not just the obese and overweight.

PO0553
Cycling for active transport and recreation: gender differences in motivations, supports and constraints
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Background: International comparative studies report a negative association between prevalence of walking and cycling for transport and rates of obesity and overweight. Car-oriented countries such as the US, UK and Australia, which have low rates of cycling for transport, also have substantial gender differences in utilitarian cycling that are absent in western European countries with high rates of utilitarian cycling. In view of the multiple health, environmental and transport benefits of utilitarian cycling, it is important to know why few women cycle for transport in countries such as Australia.

Methods: 1432 males and 692 females responded to an online survey of a random sample of members and associates of Bicycle Victoria, a large state-based cycling advocacy organization.

Results: Overall, ‘health and fitness’, ‘building physical activity into a busy lifestyle’, and ‘fun and enjoyment’ were important reasons for cycling. Females rated ‘environmental concerns’, ‘encouragement from family and friends’ and ‘cycling as a cheap and convenient form of transport’ as more important than males. Females were more likely than males to report traffic-related constraints on cycling including ‘concerns about cycling in traffic’, ‘agression from motorists’, and ‘inhaling car fumes’. Females were more likely than males to use off-road paths rather than on-road cycling lanes or roads with no cycling lanes.

Conclusions: Cycling for transport has considerable appeal for women seeking to incorporate physical activity into their busy lifestyles. Poor cycling infrastructure, traffic conditions and driver attitudes and behaviours are major constraints that need to be addressed to increase utilitarian cycling for women.

PO0554
‘Fit and fat’? Relationship between body fatness and BMI in a health-insured population
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Background: Body Mass Index (BMI) is widely used as a proxy for adiposity and associated health risks. However, the relationship between BMI and body fat (BF%) may vary according to level of fitness thereby affecting its interpretation.

Aim: To investigate the relationship between BMI and BF% according to fitness level in a health-insured population.

Methods: Individuals (n = 2445) presented for health risk appraisal for insurance purposes. Assessment included a step test, BF% (near infrared reactance), BMI, and health behaviour questionnaires. Five fitness levels were categorised from ‘poor’ to ‘excellent’. Regression analyses were performed to determine relationships between logBMI and BF% according to fitness category.

Results: BMI ranged from 15 to 56 kg/m² and BF% 6–46%. The relationship between logBMI and BF% was similar for all categories, except ‘excellent’ (P = 0.014). At a given BMI, BF% was modestly lower in the ‘excellent’ compared to other fitness categories (BF% = –61.4 + 58.3 logBMI for men and BF% = –56.9 + 63.6 logBMI, for women). Regression equations for the relationship between BF% and logBMI in all other fitness categories were:

- ΔBF% = –61.7 + 58.5 logBMI (SEE = ±4.0, adjusted R² = 0.402 for men) and BF% = –56.2 + 62.7 logBMI (SEE = ±3.4, adjusted R² = 0.576 for women).

Conclusion: The relationship between BMI and BF% is only modestly altered, at the highest fitness levels in this population, suggesting that individuals can be both fat and fit.
Hypothesis: Our hypothesis is that physical activity is decreased in older compared to younger lean, sedentary, healthy adults.

Design: Twenty-two lean healthy sedentary elderly and young subjects completed 10 days of weight maintenance feeding and physical assessment using a Physical Activity Monitoring System.

Results: The mean ± SD age of the elderly and young subjects was 75 ± 3 years and 38 ± 9 years, respectively. The BMI of the elderly subjects was 24 ± 1 kg/m² and of the young 22 ± 2 kg/m². Fat-free mass of the elderly was 49 ± 11 kg and the young 50 ± 9 kg. The elderly subjects sit on average 122 min per day more (P < 0.05) and stand 95 min per day less than the young subjects (P < 0.05). Free living walking velocity is not different between the two groups (P = 0.3). The elderly subjects; walk on average 130 min less per day, each walking period is on average 2.9 min shorter, and overall walk an average of 2.8 miles less per day than the young subjects (P < 0.05).

Conclusions: Lean healthy elderly sit more, stand less and walk less both in duration and distance compared to the young subjects. Understanding how physical activity changes with healthy aging may be helpful in improving the health of our aging and obese population.

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PO0560
Triaxial accelerometer for assessment of physical activity in 5 to 6-year-old children
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Decreased physical activity may be a contributor to obesity for preschool children. As far as we know, there are no data regarding the validity of triaxial accelerometry for assessment of physical activity in this age group. The purpose of the present study was to derive a regression equation that estimates energy expenditure (EE) from triaxial accelerometer counts that can be used to delineate low, moderate, and high intensity activity in preschool-aged children. EE for 27 girls and boys (6.0 ± 0.3 year: 5–6 year) was assessed for nine activities using indirect calorimetry by the Douglas bag method. EE was then estimated using a triaxial accelerometer (ActivTracer, GMS, Tokyo) placed on each subject’s hip. In general, the horizontal accelerometer counts provided a better assessment of physical activities than vertical axis accelerometer counts. Significant correlations were found between the synthetic, vertical and horizontal accelerometer counts and observed EE for all activities by linear regressions. These linear regression equations overestimated EE for low and high intensity activities. On the other hand, non-linear regression equations demonstrated a better relationship between the accelerometer counts and EE than did linear regression equations. These models improved the overestimation of EE for activities. The results suggest that the triaxial accelerometer with the non-linear model is a good tool for assessing daily EE in preschool-aged children.

Funding Disclosure: This study is supported by a Grant-in-Aid for Scientific Research from the Ministry of Education, Science, Sports and Culture of Japan.

PO0561
Self-selected exercise intensity is similar during non weight-bearing and weight-bearing exercise in overweight women, but is too low to elicit health benefits
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Background: The ACSM physical activity guidelines for cardiovascular maintenance recommend aerobic, weight-bearing activities undertaken at moderate intensity (~60% VO2max) on most days of the week for 20–60 min. However, due to a limited exercise tolerance associated with the overweight population, exercise intensity and duration are often below the recommended levels for improvements in cardiovascular fitness. Aqua jogging is a popular alternative to weight-bearing exercise in overweight or obese individuals, as it reduces the load placed on the hips and knees. The purpose of this study was to investigate whether self-selected, non weight-bearing exercise intensity is adequate to maintain cardiovascular health.

Methods: Two self-paced exercise sessions, 30 min of aqua jogging, and 30 min of treadmill walking, were undertaken by 40 recreationally active, overweight (BMI = 26.8 ± 0.7 (SEM) kg/m2) women. On completion of the exercise sessions, a maximal oxygen consumption test (VO2max) was undertaken. Indirect calorimetry was used to measure oxygen consumption and to determine maximum heart rate. Heart rate (HR) and rating of perceived exertion (RPE) were obtained during the exercise sessions.

Results: There were no significant differences (P > 0.05) between average HR and exercise intensity (percent VO2max) during the self-paced aqua jogging and treadmill walking exercise sessions. However, the average RPE was significantly higher (P < 0.05) for treadmill walking.

Conclusion: Non weight-bearing and weight-bearing exercises appear to provide an equivalent cardiovascular challenge, but self-selected exercise intensities are low in overweight women. Recreational exercisers need to be encouraged to undertake exercise of varying intensities to obtain improved health benefits.

PO0562
Gender, age group and socio-economic differences in physical activity and inactivity patterns of adolescents in urban areas of Ho Chi Minh City
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Objective: To describe the variation in physical activity and inactivity patterns by gender, age group and socio-economic status among junior high school students in urban areas of Ho Chi Minh City (HCMC).

Methods: A cross-sectional survey was conducted in 2004 among 2684 junior high school students of HCMC using multi-stage cluster sampling. Data was collected on anthropometry, socio-economic status, dietary intake, and time spent for travelling to school, watching television, playing computer/video games and after class study. A physical activity score was also calculated. Level of physical activity was divided into two groups: physically active and insufficiently active.

Results: Less than one fifth of the students bicycled or walked to school with a higher percentage found in the oldest group of adolescents (26.3%, 95% CI: 13.6, 39.0) or adolescents from the poorest households (26.2%, 95% CI: 17.6, 34.8). However, the increase in time spent in sedentary behaviours across household wealth groups was slightly higher in boys than in girls. There was a tendency for girls and the oldest group of adolescents to spend more time studying. Approximately 76% (95% CI: 72.2, 79.5) of the students were physically active. Boys and younger students tended to be more active than girls and the older students. Similar trends were found for students from poorer families and for students residing in semi-rural areas.

Conclusions: Efforts to reduce overweight adolescents should focus on increasing activity levels of adolescents, especially females, older students and those from richer families or living in urban areas.
PO0563
Physical activity in obese and non-obese school children in Central Java, Indonesia
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Background: Childhood obesity is a troubling health problem because it is associated with other risk factors for disease. Although childhood obesity is increasing rapidly, even in developing countries, especially in urban areas, there are few studies of physical activity in children, especially Asian children. This study compared the physical activity patterns of obese and non-obese school children living in a city in Indonesia.

Method: Anthropometry and blood pressure were measured in 75 school children (37 obese and 38 non-obese, 12–13 years old). The total energy expenditure (TEE) and step frequencies (STP) were estimated for seven consecutive days using an accelerometer.

Results: Age and height did not differ significantly between the obese and non-obese groups in either boys or girls. Body mass (BM) and fat mass (FM) were significantly greater in obese boys and girls than their non-obese counterparts: the differences in BM were 19 and 26 kg in boys and girls, respectively, and 14 and 18 kg for FM (both P < 0.0001). Obese children had significantly higher blood pressure (both systolic and diastolic) than non-obese children (P < 0.005). By contrast, there was no significant difference in physical activity level (PAL) or STP between the groups in either sex.

Conclusion: Although obese children were considerably heavier than non-obese children, the physical activity indices were similar in both groups. However, obese children had significantly higher blood pressure, reflecting emerging health problems. Longitudinal studies are needed to further evaluate the relation between physical activity and the development of obesity in childhood.

PO0564
The Effect of a low glycemic index diet during pregnancy on obstetric outcomes
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Background: Pregnancy is a condition where the GI concept may be of particular relevance because maternal glucose is the main energy substrate for intrauterine growth.

Objective: The aim was to compare the effects of a low GI and conventional dietary strategy on pregnancy outcomes in healthy women. Compliance and acceptability were also investigated.

Design: Volunteers were assigned alternatively to receive dietary counselling that encouraged either low GI carbohydrate foods (LGI) or high fibre, moderate-to-high GI foods (HGI) and studied 5 times between <16 weeks gestation and delivery. Of the 70 women who met the inclusion criteria, 63 completed the study (32 in LGI and 31 in HGI). Primary outcomes were measures of foetal size.

Results: Compared with the LGI group, women in the HGI group gave birth to infants who were heavier (mean 3408 vs. 3644 g respectively, P = 0.051) with higher birth centiles (48 vs. 69, P = 0.005) and higher ponderal index (2.62 vs. 2.74, P = 0.03). There was no effect of diet composition on maternal weight gain, method of delivery or indirect measures of insulin sensitivity. Mean diet GI fell significantly in the LGI group but not the HGI group. Compared with baseline, only the low GI group reduced intake of saturated fat, and were more likely to agree that their diet was easy to follow.

Conclusions: Since birth weight and ponderal index may predict chronic disease in later life, a low GI diet may favourably influence long-term outcomes.

PO0565
A commercial program for weight-loss is more effective than exercise alone on measures of body composition and adiposity
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Obesity increases the risk for coronary heart disease, diabetes, and other health conditions. Weight loss via caloric restriction is often accompanied by undesirable loss of fat-free mass (FFM). Exercise alone (EO) can preserve FFM, but its ability to produce weight loss is limited. The purpose of this study was to compare the effects of a comprehensive weight loss program (WW) vs. EO on measures of weight loss and body composition. Seventy-eight overweight and obese individuals (mean age 39.1 ± 6.6 years) were randomised into either a WW (n = 43) or EO (n = 34) group. The EO group received an exercise prescription in line with the Surgeon General’s recommendations for physical activity. The WW group received a comprehensive weight-loss program that including structured diet and exercise components plus weekly meetings. Body composition was assessed using air displacement plethysmography. There were no differences at baseline between the groups in body mass (186.61 ± 19.73 vs. 177.68 ± 21.30 lbs) or any other variables. Significantly greater changes were seen in WW compared to EO for body weight (−9.55 ± 10.77 vs. −1.29 ± 8.06 lbs, P < 0.001), waist circumference (−3.85 ± 3.78 vs. −1.45 ± 4.80 cm, P < 0.05) and fat mass (−12.13 ± 13.20 vs. −1.98 ± 8.13 lbs, P < 0.001). However, FFM was maintained similarly in both groups. A comprehensive weight-loss program was more effective at reducing measures of adiposity than EO. The greater weight and fat loss coupled with the preservation of FFM suggest that this comprehensive approach confers a greater health benefit than common single-pronged approaches.

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PO0566
Psychosocial factors influencing food choice: implications for obesity
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Background: The apparent epidemic of overweight and obesity in Western societies brings with it a range of co-morbid disorders such as diabetes, cardiovascular disease, some cancers, and a number of psychological issues. Much research highlights energy imbalance as one of the causal factors for obesity with high-density fast foods being considered particularly problematic.

Method: Drawing on Ajzen’s (1988) theory of planned behaviour (TpB), surveys were conducted in a two-stage process examining the attitudes, cognitions, and perceptions associated with frequent fast food consumption. In an attempt to increase the predictive validity of the TpB in terms of frequent fast food consumption, phase one included qualitative methods aimed at collecting information about additional influencing factors.

Results: Findings from stage one provided indication of the role of affective reactions to fast food as well as individual differences in outcome expectancies and cost/benefit evaluations of frequent fast food consumption as significant factors. Stage two is currently in progress with results to be advised.
PO0567
A comprehensive approach to addressing Australia’s weight problem – the National Heart Foundation of Australia’s plan

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The National Heart Foundation of Australia (Heart Foundation) is Australia’s leading cardiovascular health charity. Given the relationship between excess weight and cardiovascular disease, strategically addressing Australia’s weight problem is a key health priority for the Heart Foundation. Over the past three years, the Heart Foundation has worked to identify the best way for the organisation to make a difference to the increasing levels of overweight and obesity in Australia. This involved a review of interventions, a review of Australian activities, consumer research and extensive internal consultation. As a result of this process a national action plan for the organisation was developed. The Action Plan covers children, young, mid-age and older adults, Aboriginal and Torres Strait Islander Peoples and people living in disadvantaged circumstances. The priority action areas of the plan include: working with government, communication, a walking initiative, a food industry initiative, a children and families initiative and research. The focus of the plan is primarily on the prevention of unhealthy weight gain through increasing physical activity levels and improving eating behaviours. The Heart Foundation has dedicated significant resources to the implementation of this plan over the next couple of years and by the end of 2007 will have implemented and evaluated this plan. The key outcomes we seek to achieve over this time are more ‘walk-friendly’ environments, more responsible promotion of food and beverages in Australia, primary school environments that support healthy eating and physical activity, a healthier food supply and more evidence about what works.

Funding Disclosure: The implementation of the Heart Foundation’s action plan is fully funded by the Heart Foundation as at March 2006.

PO0569
Evaluating the impact of a community-wide healthy lifestyles coalition

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Background: Many communities are responding locally to the obesity epidemic by forming coalitions to promote physical activity and healthy eating. Cost effective approaches are needed to target these interventions and to evaluate the overall effectiveness of coalition efforts.

Objectives: To describe approaches for targeting and evaluating the impact of a community-wide healthy lifestyles program in Marshfield, Wisconsin.

Methods: Measures included conducting an abbreviated Behavioural Risk Factor Surveillance Survey (BRFSS) of 1500 Marshfield adult residents and ongoing monitoring of BMI in school children. A cross-sectional survey was also conducted to determine the availability of healthy restaurant options within the community.

Results: The BRFSS survey indicated high levels of obesity, physical activity and low levels of fruit and vegetable consumption in area adults. BMI measurements in children show 16% of local children were overweight in 2005 (>=95% BMI percentile for age and gender), showing a doubling of overweight rates since the 1980s. The restaurant survey indicated that healthy entrees were available in 52% of restaurants but were identified on menus in only 24% of restaurants.

Conclusions: The approaches described here can be employed in other communities to target and evaluate health promotion programs. In the United States, using standardized questions from the BRFSS can provide a relatively low cost local community health assessment. The overall effectiveness of coalition activities over time can be evaluated by monitoring BMI in children and by conducting follow-up BRFSS surveys to measure changes in local health conditions and behaviours over time relative to state and national trends.

PO0570
Developing obesity prevention interventions in partnership with local communities and organisations

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Background: The eat well be active Community Programs aim to contribute to the healthy weight of children and young people (0–18 years) through increasing healthy eating and physical activity behaviours. The Programs are based in metropolitan and rural locations and are funded $1.5million over three years by the South Australian Department of Health. Experts highlight that successful public health interventions must be developed from community’s priorities and be implemented and evaluated in collaboration with communities.

Methods & Results: Almost five hundred community members and local organisation staff participated in consultations to determine the barriers to healthy eating and physical activity and relevant strategies to address the identified barriers. This paper will present the data gathered through the consultation process. Together with the best available evidence of effectiveness, the consultation data was prioritised to form the Program’s intervention plans. Interventions were selected for importance to the community, potential impact and achievability. Strategies were prioritised using principles including equity, sustainability and use of a multi-sectoral community development approach. This paper will describe the portfolio of policy, infrastructure and programs that forms the intervention plans.

Conclusion: Meaningful and diverse community involvement has led to the development of well supported, feasible and locally relevant intervention plans. Significant and enthusiastic community involvement in the Programs’ current implementation and evaluation suggests early community ownership and a positive future for the Programs.

Acknowledgements: To Southern Adelaide Community Health Service, Murray Mallee Community Health Service, Health Promotion Branch of Department of Health, Dr Dollman of University of South Australia, Dr Verity and Dr Magarey of Flinders University.

PO0572
Changes in weight screening following the introduction of a structured approach to weight management in UK primary care: the Counterweight Programme

Counterweight Project Team

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Background: Weight screening and recording data provide a critical first step for development of weight management in general practice.

Method: The Counterweight Programme is a national multi-centre trial aimed at improving obesity management in primary care. Specialist dieticians trained and supported practice nurses in the implementation of a structured weight management programme in...
PO0573
Development of national guidance on the prevention and management of obesity
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Background: Obesity is a priority for action in England (1) but there is significant variation in service provision (2). Many health professionals are uncertain about what interventions are effective as there is no central guidance (3). Guidance produced in other countries to date has only fully addressed either prevention or management.

Methods: The National Institute for Health and Clinical Excellence (NICE) - responsible for providing national guidance on the promotion of good health and the prevention and treatment of ill health in England - was commissioned to develop the first comprehensive, integrated guidance on obesity prevention and management, covering the health service and the wider community (such as schools, workplaces and local communities). The National Collaborating Centre for Primary Care led on the clinical aspects and the Centre for Public Health Excellence at NICE led on the public health aspects of the guidance development. The Guidance Development Group was split into two sub-groups to give full consideration to clinical and broader public health issues. Standard NICE methodology for clinical guidelines was employed (or adapted) as appropriate.

Results: The complementary nature of the work was fully recognised and final recommendations (including cost considerations) were developed jointly to ensure an integrated approach. The draft recommendations and care pathways will be discussed.

Conclusion: Standard methodology for the development of rigorous clinical guidance can be adapted to develop complementary, integrated public health guidance on obesity. No conflict of interests

References:
2. Dr Foster, Primary Care Management of Adult Obesity. January 2005; www.drfoster.co.uk

PO0574
Weight loss online: results from a community trial evaluating a weight control website in an obese sample
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The Internet offers a novel tool for the delivery of weight loss programmes in obesity treatment. This study highlights the first study in the UK to evaluate effectiveness of a website based on traditional dietary, physical activity and behavioural features in promoting weight loss in an obese sample in a community setting (www.uk-weightcontrol.co.uk). A randomised controlled trial was conducted to investigate the ability of the intervention website to produce a weight loss greater than that from usual care. Participants were randomised to the Intervention (n = 111) or usual care group (n = 110). Objective measures of weight, height, waist and hip were recorded at baseline, 6 and 12 months. Data on physical activity, quality of life, dietary practices, self-efficacy and data on use and views of the website were collected. Repeated measures ANOVA’s were used to investigate change over time. Fifty-nine participants (53%) reported using the website at six months with 32 (29%) still using it at 12 months. Based on intention to treat analysis (ITT), a significant weight loss over time was identified in both groups (P = 0.01), but no significant difference in weight loss between the two groups was revealed (difference=0.6 kg; CI = -1.4, 2.7, P = 0.55). No significant between group differences for any measures were established. The results of this research suggest that the intervention website provided no additional benefit in terms of weight control in this sample. The small sample size and high attrition limited the findings. Larger interventions are needed to establish the usefulness of Internet-based tools in obesity management.

PO0575
Advising of overweight and obese persons in primary health care in Lithuania
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Background: Primary health care has a unique opportunity for prevention and management of obesity. The purpose of the study was to assess the participation of health professionals in advising overweight persons using the data of Lithuanian Health Behaviour Monitoring.

Methods: Data from cross-sectional postal surveys of 2000, 2002 and 2004 were analysed. Nationally representative random samples were drawn from the population register. Each sample consisted of 3000 persons aged 20–64 years. The response rates varied from 74.4% to 61.7%. The odds of receiving advice on diet and physical activity were calculated using multiple logistic regression analyses according to a range of sociodemographic variables, perceived health, number of visits to doctors and body-weight status.

Results: The prevalence of obesity (BMI >30 kg/m2) was 16.2% and the prevalence of overweight (BMI >25 kg/m2) was 48.8%. Only 22.4% of men and 29.4% of women reported that they were advised to change diet. The proportion of persons who received advice on physical activity was even lower. The odds of receiving advice increased with age. Persons with poor health were five times as likely to be advised as those with good health. Doctors were more likely to give advice when BMI was high. Those being advised to change diet and to increase physical activity were more likely to make attempts to reduce weight.

Conclusion: There is an obvious need for training and education of health professionals in counselling of overweight patients focusing on methods of dietary and physical activity advice.

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PO0576
Eat Well, Be Active: healthy kids for life - Queensland government’s strategic partnership approach
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Method: The process for developing the action plan, and the suite of initiatives in the final action plan, were based on three presumptions: The factors in Queensland’s social, economic and physical environments which help to drive weight gain are influenced by a range of agencies; and require a multi-faceted multi-level coordinated approach. The approach is on promoting healthy weight, through balancing optimum nutrition and physical activity, rather than focussing on overweight and obesity. High-level auspicing of the action plan is pivotal in driving implementation across all agencies.

Results: The Eat Well, Be Active action plan outlines over 100 initiatives across six agencies and is focussed on complementary activities under two action areas: Reaching kids where it counts and supporting parents and carers; and Creating healthier communities for kids. An Eat Well, Be Active Implementation Steering Group is achieving better alignment of different agency initiatives and ensuring a consistent evidence-based approach to promoting healthy weight of children and young people.

Conclusions: Co-ordinating existing and new Queensland Government single-agency and joint-agency initiatives through one action plan capitalises on each agency’s strengths, expertise, areas of influence and existing investments; provides a consistent approach; and minimises duplication of effort.

PO0577
Assessing ‘community readiness’ for obesity prevention in youth
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Background: The setting of this study is the Pacific OPIC (Obesity Prevention in Communities) Project, a 4-country study that aims to improve the capacity of families, schools and community organisations to sustain the promotion of healthy eating and physical activity and a healthy body weight amongst youth.

Method: The Community Readiness Tool, used mainly in community drug prevention efforts, was adapted to assess readiness along six dimensions for obesity prevention. Reliability was tested through inter-rater agreement statistics expressed as intra class coefficients (ICC). 20 key informants from the intervention area in Fiji were selected for interview representing different segments of the community (schools, local government, health professionals, spiritual community and social services). Each interview took about 20–45 min and was recorded and then independently scored in duplicate according to a standardized protocol. Six dimensions were assessed exploring the community’s knowledge about obesity, existing community efforts; community knowledge of these efforts; leadership; community attitudes and resources related to obesity prevention.

Results: Mean dimensional scores did not differ between the two raters. Overall agreement was substantial (ICC 0.60) but varied between the six dimensions from the lowest on community attitudes (0.03) to almost perfect agreement on leadership (0.89) with the reminder-producing moderate to substantial agreement ICCs.

Conclusion: The reliability testing confirms applicability of the community readiness model to issues around community based obesity prevention and should be applied to prioritise community based action plans (intervention) and evaluation of these.

PO0578
A tailored approach to nutrition education has advantages over a non-tailored approach for promoting vegetables but not fruits via an internet-based program for young adults in the US.
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Two versions of an interactive, Internet-based educational intervention were developed and compared for effectiveness in increasing young adults’ readiness to consume recommended amounts of vegetables and fruit. Intervention messages were adapted from print-based materials that had been developed for a larger study, based on the Transtheoretical model of behaviour change and the U.S. Food Guide Pyramid. Participants (n = 111) from four states in the U.S. were randomly assigned to a treatment or a control group, receiving either a stage-tailored Internet program or a more generic Internet program. Assessment data were collected at baseline, immediate post-viewing, and 30–60 days post-viewing. Fifteen (13%) subjects dropped out between interviews one and three. Stage distributions for fruits and for vegetables in treatment and control groups did not differ at baseline. However, stage distributions for vegetables and fruits were different, with 67% in action or maintenance for fruit consumption and only 39% in action or maintenance for vegetables at baseline. Chi square analyses show that only the treatment group made overall progress from pre-action to action/maintenance for vegetables, while both groups showed progress for fruit. In this study, tailored messages were more useful than more generic messages in motivating learners to eat more vegetables, but the advantages of stage-tailored educational messages were not as clear for fruit.

PO0579
Obesity Day and ADI – an Italian experience
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Every year on the 10th October since 2001, ADI – the Italian Association of Dietetics and Clinical Nutrition (1,412 members, 56% medical specialists and 44% dietitians) – has been organizing in Italy an event called the ‘Obesity Day’. The ‘Obesity Day’ aims at raising awareness about obesity, as well as delivering a strong message to mass media and the management of health corporations about the role played by Dietetics and Clinical Nutrition Services. 3.5 million people followed the informative contributions spread by press, radio and television. 153 Italian Dietetics Centers joined the initiative. All participants receive a free briefing note and practical advices concerning weight control, as well as a questionnaire to fill in. The questionnaire consists of 14 questions to be answered in an average time of 8 min. After 5 years of activity, 25,342 questionnaires have been completed. The average age of the sample was 48 years, average BMI was 27.8, 65% consists of women. Surprisingly, only 38% of the people who started a diet turned to a specialist, whereas the
PO0580

Childhood obesity, healthy eating and active living - what are Australians thinking?

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New South Wales Health

To inform interventions and initiatives to address childhood overweight and obesity, the New South Wales Health Department commissioned a series of qualitative research studies into the knowledge, attitudes and behaviours of parents, children and young people regarding obesity, physical activity and healthy eating. We know that parents are more aware than ever that childhood obesity is a big problem in Australia. However, the current attention and media focus on childhood obesity has exposed their increasing sensitivity to criticism and public scrutiny about the weight of their own children. Our research reveals parents' perception of obesity as a 'cruel and derogatory tag' when applied to a child and the denial, defensiveness and excuses commonly attached to this issue. Key insights from this research have increased our understanding of: (i) Community attitudes and knowledge of healthy weight, overweight and obesity; (ii) What children are eating and how active they are; (iii) What parents really know about healthy eating and physical activity; (iv) What hinders and helps parents to encourage better eating and activity habits for their children; (v) The extent that children choose or influence food purchases, and (vi) What messages, supports and advice parents want to help them improve their family's healthy lifestyle habits. This presentation will highlight the potential for changing the development and implementation of obesity prevention initiatives in New South Wales, by targeting parents and other key influencers in children's lives to promote, model and reinforce healthy eating and activity behaviours for children.

PO0582

Smoking, nutrition, alcohol, physical activity and overweight and obesity (SNAP-O) consistent messages project

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Australian Government Department of Health and Ageing Representative

There are several messages which Federal, State and Territory Governments, non-Government organisations (NGOs) and relevant stakeholders use to encourage people to quit smoking, have a healthy diet, reduce alcohol intake and be more physically active. There are also a number of products that exist to communicate key messages on smoking, nutrition, alcohol, and physical activity (SNAP) to the consumer target audiences. Examples of these products include the National Health and Medical Research Council's (NHMRC's), Food For Health suite, The Australian Guide to Healthy Eating suite, the NHMRC's Eat Well for Life suite, and the National Physical Activity Guidelines for Australians, to name just a few. These products are valuable sources of information for those people who are already interested in leading a healthier lifestyle. However, some of these messages, particularly in respect of nutrition, change over time and can be confusing for consumers. The SNAP-O Consistent Messages project seeks to build on the previous product suites, and the messages already in use, to produce a consumer resource(s) which brings together the main message(s) from each SNAP risk factor plus overweight and obesity (SNAP-O). The resource(s) is intended to provide simple, authoritative, practical, consumer friendly, evidence-based information on smoking, nutrition, alcohol, physical activity, overweight and obesity for several target groups, including parents and carers of children, adults aged 18–49 and adults aged 50 years and over.

PO0581

A national action agenda to address overweight and obesity in adults and older Australians

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Australian Government Department of Health and Ageing Representative

Insufficient physical activity and an unhealthy diet are the primary modifiable behavioural risk factors associated with the burden of overweight and obesity in adults and older people in Australia. The significance of these risk factors cannot be underestimated in an environment where cardiovascular disease is Australia's leading cause of premature death and disability. All Australians, especially overweight and obese people, can benefit from being more physically active and undertaking a balanced diet in line with current Australian recommendations. A review of evidence for interventions to address overweight and obesity in adults and older people was sponsored by the Australian Government Department of Health and Ageing, on behalf of the National Obesity Taskforce, and was undertaken by the Centre of Overweight and Obesity (COO) at the University of New South Wales. COO used an evidence-based consensus approach and embarked on a national consultation with other major stakeholders. The review made specific reference to older people, people with established risk, people living in rural and remote Australia and Aboriginal and Torres Strait Islander peoples. The process of developing a framework of actions needed to be inclusive of distinct population groups, as well as take into consideration the range of unique geographical circumstances under which some Australians live. A series of national consultations with major stakeholders and specific site visits to remote locations allowed for views and circumstances of individuals and geographic distance were taken into consideration.

PO0583

Understanding men's weight loss: the experience of GutBusters and Professor Trims in Australia

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Men in most western countries, including Australia, are now more overweight than women. Yet while there are several commercial and not-for-profit organisations providing weight loss for women and children, there are few long-standing programs available for middle-aged men. The development, purchase by Weight watchers (Int) and closure of GutBusters in Australia, after 10 years, showed that men's programs do not offer the same commercial viability as those for women, even though the published success of GutBusters shows that once men move from a pre-contemplation to a decision stage of readiness, they are far more successful at achieving goal weight losses than women. There is little published research to show why men are such a difficult target group to reach. That which is available is largely qualitative and includes data from market and social research bodies. Weight control organisations are unlikely to share commercially sensitive information, and Government Health Departments have typically neglected men because of their inability to attract them to health programs in general. Data from the GutBusters program and now Professor Trims Weight Loss for Men, reveals...
a number of factors that may help explain the difficulty of getting men to commit to weight loss, and health initiatives in general. Awareness of these factors can help in developing a more acceptable approach to weight loss programs for men.

PO0584

The prevalence of overweight and obesity in Tehrani headed household women in low income families

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Introduction: Obesity epidemic with various health consequences is becoming a major health problem in many developing countries, especially in women. This study was carried out to assess the prevalence of overweight and obesity in Tehrani headed household women in 2005.

Methods: In a descriptive cross sectional study 126 women with mean age 31 ± 4.8 years; weight 67.2 ± 15 kg and height 156.9 ± 8 cm in the Health Centers of Tehran were studied, randomly. Demographic data were gathered by a questionnaire. Weight was measured to the nearest 0.5 kg using a calibrated bathroom scale. Height was measured to the nearest 0.1 cm using a flexible measuring tape. BMI < 20; 20–25; 25–30 and > 30 kg/m2 were classified as underweight, normal, overweight and obese, respectively.

Results: The mean BMI was 27.3 ± 6. Overweight and obesity observed in 39 and 26 % of subjects, respectively. Obesity in > 35 years old women (35%) was more than in age groups < 25 and 25–34 years (17 & 25%) respectively. 41 and 42% of subjects in > 35 years old women (35%) was more than in age groups < 25 and 25–34 years.

Conclusion: The results show a relatively high prevalence of overweight and obesity in these subjects. The administration of the educational programs to improve nutritional knowledge of this population is necessary.

PO0586

Trends in overweight (OW) and obesity (OB) in students in Rio de Janeiro City – RJC, Brazil: 1999–2003

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Background: Prevalence of OW among Brazilian older children and adolescents tripled in the 1974–1997 period (4.1 to 13.9%). Trends of OW and OB afterwards are unknown in this country. This study presents the trends of OW and OB among students in RJC in the 1999–2003 period.

Method: A random cluster (classes) sample of the students enrolled in grades 1–8 in the 1040 public schools existing in RJC was studied in each year (1999: n = 3417; 2003: n = 2792). OW and OB were defined using the sex- and age-specific body mass index cutoffs recommended by the International Obesity Task Force (OW includes OB). Maternal level of education (MLE) was used as a proxy of socioeconomic status.

Results: Overall prevalence of OW (16.0%) and OB (5.0%) was the same in the two surveys. Girls were significantly more likely than boys to have OW (OR = 1.29; 95% CI = 1.11–1.50). In 2003, inverse association was found between age and OW for both sexes from age ≥ 7 years on. No association was found between OB and age range of the students. Among older girls (age ≥ 14 year), OW decreased from 19.0% to 10.8%. In both surveys, direct association was found between OW and MLE for both sexes and between OB and MLE for boys. Among boys, OW and OB prevalence ratios between the extreme ranges of MLE increased, respectively, from 1.6 to 2.7 and from 1.9 to 3.2.

Conclusion: The trends in overweight and obesity in Brazilian youths in the 1999–2003 period.
PO0587
A novel adolescent weight management program: experience, opportunity and the future. Results of an evaluation following the RE-AIM model
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Kaiser Permanente (KP) Georgia offers a weight management, group medical appointment clinic, named Operation Zero (O.Z.), for children and adolescents with a BMI% ≥ 85th. This study evaluated the implementation experience and facilitation barriers of two models of the O.Z. program. The models differed by variables for facilitation, scheduling, staffing and participant’s financial input. This study compared the models along constructs of the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) model and identified the variables that drive success. This presentation will highlight findings utilizing the RE-AIM framework. The successful adoption of O.Z. centered on effective championing, organizational support and the perceived need for an effective treatment option such as O.Z. Effective facilitation of the program required implementing the key components of the models. Effective facilitator training was a critical resource. As O.Z. is a complex, labour-heavy program to coordinate and deliver, delineation of roles and responsibilities provided an advantage for implementation. Attrition was a barrier encountered in both models. Regarding maintenance, O.Z. garnered organizational support to guarantee its immediate continuation. Sustained funding was dependent on documented participation, data assessing program effectiveness based on long-term criteria, continued support from champions, effective communication about O.Z. within KP, packaging of O.Z. and cost-effectiveness. The two models of O.Z. each possess advantages. The variables central to a model’s success included charismatic facilitation, retention of participants and ease of costs and scheduling. Program improvements were implemented and O.Z. was dissemination to another KP region.

PO0588
Healthy body mass index and waist circumference in the elderly: implications of obesity cutoffs in Taiwanese
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Background: Several standards of body mass index (BMI) and waist circumference (WC) have been suggested, but still debatable, for discriminating healthy and obese individuals.

Methods: A stratified systematic cluster sampling of 1,420 subjects (795 males and 625 females) aged ≥ 65 years living in Tainan city was investigated. The BMI (kg/m²) and WC (cm; WHO suggestion) were measured. The modified NHANES III definition of health was categorized from tier 0 (no criteria) to 5 (noncurrent smoker, no known history of obesity-related comorbidities, blood pressure < 140/90 mmHg, fasting glucose < 126 mg/dL, serum cholesterol < 200 mg/dL, triglyceride < 150 mg/dL, HDL-cholesterol < 40 mg/dL (M)/< 50 mg/dL (F)).

Results: The value of BMI and WC were changed substantially with the highest 95th value as 30.3 and 104.5 for males and 30.6 and 100.0 for females in all tiers. The 50th, 75th and 95th percentile value of healthy BMI (tier 4/5) were 23.3/22.6, 26.0/25.1 and 30.3/29.5 for males; 23.3/23.4, 26.4/25.2 and 29.3/27.7 for females. The 50th, 75th and 95th percentile value of healthy WC (tier 4/5) were 83.5/81.0, 93.0/89.5 and 103.3/103.9 for males; 83.2/81.0, 87.5/85.5 and 96.1/87.0 for females.

Conclusions: The WHO obesity cutoffs of BMI and WC should be lowered for elderly Taiwanese. The BMI cutoffs could be suggested by three action levels as 30.0, 30.5 and 30.6 for both genders. The corresponding WC cutoffs could be suggested by three action levels as 81.0, 90.0 and 104.0 for males and 81.0, 85.0 and 90 for females, respectively.

PO0589
Are we on track? Is public policy on child obesity prevention working?
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The 2002 NSW Obesity Summit and the Government’s response in the form of a cross-agency action plan have placed the NSW State Government at the forefront in public policy efforts to prevent childhood obesity. One of the key initiatives was the establishment of the NSW Centre for Overweight and Obesity, as a focus for public health research generally and with specific responsibility for evaluating this action plan. In recognition of the significance of policy implementation processes, a mid-point evaluation of this policy was conducted in 2006, and is the subject of this paper. This evaluation acknowledges the complexities of policy implementation, the role of stakeholders and practitioners in influencing what actions occur, and the changes in social and organizational contexts that may require revised approaches. Based on analysis of program documentation and interviews with key informants, the mid-point evaluation has identified the strengths and weaknesses of the plan and subsequent implementation processes. In applying the WHO Stepwise Planning and Implementation Framework, our analysis suggests that this Government Action Plan has a mix of predominately core and expanded actions. It then draws on the latest research to recommend the adoption of ‘desirable’ actions. The evaluation assesses the extent of cross-agency collaboration, the impact on organisations’ priorities and infrastructure, and the potential for sustainable changes and longer-term effects on overweight and obesity.

PO0590
The APPLE project: process evaluation of an obesity prevention programme in children
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Effective lifestyle intervention programmes are urgently required to combat childhood obesity. Concomitant process evaluation allows researchers to modify interventions where appropriate and provide critical information for future initiatives. We recently completed the APPLE (A Pilot Programme for Lifestyle and Exercise) project, a two-year community-based obesity prevention programme, which aimed to optimise opportunities for non-curricular physical activity and healthy eating in children aged 5–12 year. Process evaluation data were gathered through interviews with key informants (research team, school principals/teachers/boards of trustees, parents, children and other community representatives), written documents and direct observation of APPLE activities. At 1 year, the intervention was successful at enhancing physical activity and reducing weight gain in intervention children (adjusted mean BMI z-score 0.12 (95% CI: –0.22 to –0.02) units lower compared with control children). Benefits of APPLE as highlighted by the process evaluation included increased confidence and leadership among children, enhanced variety and exposure to different activities, greater inclusion of younger, less able children into activity, improved integration with other school activities and less playground bullying. Barriers which hindered progress included insufficient appropriate and effective communication between research and community-based staff, employment issues, a greater reluctance by schools to tackle nutrition issues (compared with physical activity), and difficulties for schools to balance their curriculum and activities with those of the research project.
Although APPLE was moderately successful at reducing weight gain in children, it could be even more beneficial if the issues we identified, which are likely to apply in other settings, could be successfully overcome.

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**PO0591**

**Evaluation of the territory-wide health promotion programme on fruits and vegetable consumption among Hong Kong people**

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**Background:** The World Health Organization recommends a daily minimal intake of 400 grams fruits and vegetables to maintain health. However, a population-based survey conducted in 2004, showed that only 17.7% of the respondents ate five servings of fruits and vegetables a day. Thus, the Department of Health, Hong Kong has launched a mass media campaign to promote fruits and vegetables consumption starting from June 2005. Messages have been disseminated via various channels, such as the use of media, dissemination of printed material, hotline, internet, organizing poster campaign and promotional activities in markets and supermarkets.

**Study objective:** To evaluate the effectiveness of the campaign which aimed to raise the awareness and change the knowledge and practice in consuming fruits and vegetables among local adults.

**Method:** The outcome of the programme is evaluated by pre- and post-campaign survey held in April 2003 and October 2005 respectively.

**Results:** Six months after the launch of the Campaign, 78% of over 2000 respondents of the survey were aware of the Campaign. There was also significant increase in average level of consumption from 3.1 to 3.3 serving per day. Percentage of people who ate five servings of fruits and vegetables or more per day, has increased from 16.1% to 20.1%. The effect were observed across all age groups, gender, educational level and income groups.

**Conclusion:** This campaign is quite successful in promoting fruits and vegetables consumption.

**PO0592**

**A 6 months lifestyle program with counselling by e-mail/internet or phone; effects of a RCT on body weight and body mass index**

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**Background:** New approaches, able to reach the population on a personal level, are needed to prevent obesity. This study evaluates in a RCT the effectiveness on body weight and body mass index (BMI) of a novel method based on distance counselling (i.e., personal coaching by phone or e-mail/internet), in an overweight working population.

**Method:** 1386 overweight employees (67% male; mean age 43.9 ± 8.6 years; mean BMI 29.6 ± 3.5 kg/m²) were randomized to a control group receiving general information on overweight and lifestyle (n = 460), a phone based intervention group (n = 462) and an internet based intervention group (n = 464). The intervention took 6 months and used a cognitive behavioural approach, addressing physical activity and diet. The primary outcome measures, body weight and BMI, were measured at baseline and at 6 months. Statistical analyses were performed with multiple linear regression.

**Results:** The intervention group (i.e., phone and e-mail combined) lost 1.5 kg and their BMI was reduced by 0.5 kg/m² over the control group (P = 0.000). The phone group lost 0.5 kg more than the internet group (P = 0.179). Of the intervention group, 25.0% lost more than 5% of their initial weight vs. 10.4% of the control group. Age, gender, educational level, country of birth (Netherlands vs. other), marital status, use of medication for cardiovascular risk factors or diabetes, and BMI did not modify or confound the relationship between weight loss and group allocation.

**Conclusion:** Distance counselling results in short term weight loss. There is no significant difference for counselling by phone or e-mail.
PO0594
Factors affecting successful implementation of a weight management programme in UK primary care: the Counterweight Programme
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Background: Multiple factors influence the uptake of weight management programmes.
Method: The Counterweight programme is a multi-centre trial aimed at improving obesity management in primary care. Practice staff were trained and supported by specialist dietitians to deliver an evidence-based, structured weight management service in 65 practices in seven areas of the UK. A qualitative study to explore the primary care staff (n=26) experience was conducted by an independent research team. Sample practices were chosen to represent those both successful and unsuccessful in the recruitment and follow-up of patients in the Counterweight programme. Barriers and motivators to successful programme implementation were assessed.
Results: Motivating factors to successful implementation were: perceived ownership of the programme, having a practice obesity ‘lead’ committed to weight management, committed and enthusiastic practice nurses, training and ongoing support by Counterweight dietitians, provision of programme materials and resources, integration into practice routine and commitment from all practice staff especially General Practitioners (GPs). Barriers to successful implementation were: competing priorities for practice time, low level of commitment from GPs, high staff turnover, perceived scepticism over commercial sponsorship despite programme being funded by an independent grant-in-aid, external pressure to take part and limited evidence of effectiveness of obesity management in primary care.
Conclusion: The successful implementation of a structured weight management programme must involve all clinical staff from the outset. Motivated GPs are essential to provide leadership, which in turn increases likelihood of success.
Funding: Educational grant-in-aid by Roche Products Ltd.

PO0595
Prevalence of underweight, overweight and obesity in a group of young females in Tehran, Iran
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Objective: Overweight, as a main feature of epidemiological transition, has increased in most developing countries over the last two decades. The present study was carried out to assess the prevalence of underweight, overweight and obesity in female students at a medical university in Tehran, Iran.
Method: In a cross-sectional survey, 346 female students aged 19–25 years were selected by random stratified sampling from eight schools of a medical university in Tehran, Iran. Anthropometric measurements were taken with subjects wearing light clothing without shoes. Underweight, overweight and obesity were defined as BMI $<$ 18.5, 25 $\leq$ BMI $<$ 30 and BMI $\geq$ 30, respectively.
Results: The mean of BMI among female students was 22.2 ± 3.2 kg/m², which increased with age ($P < 0.0001$). The prevalence of underweight, overweight and obesity were 8.1, 10.7 and 3.2%, respectively. The mean BMI was significantly higher in married students ($P < 0.0001$). A negative significant correlation was found between BMI and family size ($r = -0.10$, $P = 0.03$).
Conclusion: The results showed that about one-fourth of female students had abnormal BMI. Since the subjects in our study showed different stages of malnutrition (undernutrition and overnutrition), proper monitoring and nutritional care should be available to them.

PO0596
Biochemical responses to a residential weight loss camp for overweight and obese children
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Background: Prevalence of the metabolic syndrome has risen in children from 4.2% to 6.4% in 8 years (Dun<sup>C</sup> et al., 2004). Given this and the evidence that dietary modification and physical activity can favourably modify cardiovascular risk factors, the current study assessed the impact of an 8-week residential weight loss camp intervention on various biochemical and body composition variables.
Methods: Fifty-one overweight and obese children (19 boys and 32 girls), mean age of 14.4 ± 2.0 years, BMI of 33.7 ± 7.2 kg/m² and waist circumference of 95.5 ± 13.3 cm were resident at the camp intervention. Body composition and a range of biochemical variables were measured before and after the intervention (mean stay 31 ± 13 days).
Results: Significant reductions ($P < 0.001$) were observed in all body composition variables, with BMI and waist circumference reduced by 5.6% and 5%, respectively. Significant reductions ($P < 0.01$) were observed for all biochemical variables except adiponectin. The following changes were achieved, T/C-HDL-c ratio ($0.34 ± 0.76$ pre to $2.99 ± 0.64$ post), triglycerides ($1.06 ± 0.41$ mmol/L pre to $0.83 ± 0.32$ mmol/L post), HOMA-IR (measure of insulin resistance) ($3.46 ± 2.27$ pre to $2.72 ± 1.77$ post), C-reactive protein (measure of inflammation) ($3.06 ± 2.79$ mg/L pre to $1.71 ± 2.06$ mg/L post), and leptin ($125.0 ± 69.3$ ng/mL pre to $55.7 ± 50.5$ ng/mL post).
Conclusion: Our programme achieved significant improvements in a variety of bio-chemical and body composition variables in a matter of weeks. This demonstrates the potential of this form of intervention for acute improvements. Further research is required to investigate the durability of these effects and the relationship with morbidity and premature mortality in adulthood.

PO0597
Significant improvements in body composition, and abdominal obesity in children attending a residential weight loss camp
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Background: Few childhood obesity treatment programmes use rigorous clinical methods of evaluation to assess the outcomes of the intervention. Therefore this study reports the acute clinical outcomes of a residential weight loss camp programme using anthropometry, Air-Displacement Plethysmography derived total body composition, and Intra Abdominal Adipose Tissue (IAAT) and Subcutaneous Abdominal Adipose Tissue (SAAT) using Magnetic Resonance Imaging.
Methods: 28 children attending the Carnegie weight loss camp (age = 13.4 ± 1.3 years) were compared with 18 overweight children (age = 13.4 ± 1.3 years). All children were assessed for body mass, stature, percentage body fat, SAAT and IAAT before and after the 6-week programme. Children on the camp programme were exposed to physical activity (5 h each day), dietary modification (1300–3300 kcal/day) and behaviour modification (six lifestyle education classes). All comparison children were free living during the summer vacation period.
Results: Significant ($P < 0.001$) between group differences were evident between the intervention and comparison groups on all variables pre to post camp. Children attending the camp had improvements in all variables including: 7% ↓ body mass, 7% ↓ body
PO0598
Resilience in obese children attending a residential weight loss camp
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Background: The lack of effective treatment and prevention programmes for childhood obesity necessitates a greater understanding of successful adaptation processes. Resilience, an individual’s capacity to change and deal with setback, may be influential in long-term weight management but has rarely been explored. This study investigated resilience in obese children attending a residential weight loss camp.

Methods: Eighty-three campers (BMI 33.7 ± 7.4 kg/m², age 14.4 ± 1.9 years) were compared to 20 lean non-campers (BMI 19.43 ± 1.9 kg/m², age 15 ± 0.5 years). The daily weight loss programme included six 1-h skill-based fun physical activity sessions, moderate dietary restriction and group-based educational sessions. The comparison group undertook unmonitored summer activities. Resilience was measured using a fully validated adolescent scale (scores 25–175; high scores indicate greatest resilience).

Results: Mean loss in body weight for campers (pre vs. post) was 4.9 ± 3.3 kg (P ≤ 0.05). Resilience differed between the campers (119 ± 17.3) and the comparisons (129 ± 13.5) at baseline (P ≤ 0.05). Both groups increased resilience scores from pre to post-camp; lean comparisons showed the greater increase (7.4 ± 11.9 vs. 5.3 ± 15).

Conclusion: Obese children seeking treatment appear to have reduced resilience compared to their lean peers. The residential camp environment provides new experiences for campers, e.g., being away from home, learning new skills and losing weight, indicating that this environment can foster resilience. Follow-up research is necessary to determine if children’s resilience increases leading to effective behaviour change and weight management.

PO0599
Obesity and other risk factors for non-communicable disease in Iran
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Introduction: Non-communicable disease, as a public health problem became evident in developed and developing countries. Iran is an example of countries in eastern Mediterranean region, which is undergoing a nutritional transition and the majority of death is from non-communicable diseases.

Methods and materials: This article is review of the three national surveys in Iran on ‘National Health and Disease’ (1999), ‘National Food consumption’ (1995), and ‘Analytical Report on Edible Oils Consumption’ (2002).

Results: The results show that 34.8% of deaths were due to CVD in 2000. The prevalence of over weight and obesity were as high as 50% among men and 66% among women in 40–69 age groups. Hypertension affected 10.2% of the total population. This rate reached to 27% and 41.4% in 45–69 and >70 age groups respectively. In addition Hyperlipidemia prevalence (>200 mg/DL) was 25.7%. Diabetes prevalence based on personal given history was 1.5%. Fat and carbohydrate consumption were 30% and 40% more than recommended amounts respectively. 90–90% of edible oils were hydrogenated oil. Mean Elaidic acid rats (Tran’s fatty acid) in hydrogenated oils were 30%, 23.8% and 27.2% in 1999–2001. This rate was reported 38.3% in 2002. Mean tran’s fatty acid intake (15.6–30 g/day) was far away from recommended amount (< 5 g/day). The population’s sedentary life style was also becoming as a public health problem, with 70–80% being physically inactive.

Conclusion: Non-communicable diseases and their related morbidity and mortality are becoming a significant serious public health problem in Iran. Development and implementation national policies to modify food consumption pattern is highly recommended to decrease the risks of NCDs.

PO0600
Factors inhibiting compliance and use of a weight loss website in a sample of participants in an internet-based weight control trial
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High attrition rates and low compliance are common in Internet-based weight loss trials, hampering the generalisability of results and interfering with the ability of such trials to effectively evaluate the use of Internet-based tools in weight control. Qualitative investigation of the barriers to using Internet-based tools in weight loss trials was undertaken in a sample (n = 15) of obese volunteers after participating in a randomised controlled trial evaluating the effectiveness of a website designed for weight control. High attrition and low compliance were evident in this trial. Interviews were semi-structured and aimed to address participants’ views of taking part in the trial and barriers to use of the intervention website. A grounded theory approach was used in data analysis. Technical issues relating to the age, setting or specification of the actual computer, were reported by some participants as a barrier to using the website. A more commonly reported barrier was the need to use a computer skill, lack of experience and access to the Internet or a computer. Other barriers to compliance with the intervention included barriers commonly reported in weight loss trials such as lack of motivation and social support as well as unmet expectations. Assessment of participants’ views of barriers to use of the weight control website help provide explanation for the high attrition and low compliance evident in this online weight control trial. Assessment of participants’ experiences and practices during community weight control interventions should be considered in future development and evaluation of such novel intervention tools.

PO0601
National prevalence of obesity among Iranian adults
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Background: Obesity is directly linked with mortality and many chronic diseases. The prevalence of overweight and obesity has risen dramatically and it has evolved to a widespread health problem in developed countries, and a growing concern in developing countries.

Methods: A national comprehensive survey on food consumption pattern and nutritional status of Iranian households were conducted by NNIFTRI (March 2001–October 2003). 7158 households (includ-
ing 35 924 individuals) were randomly selected. Demographic [sex, age (month)], anthropometric and dietary intake data were collected during 3 consecutive days visiting each household. Weight and height of all the household members were measured and recorded. Overweight was defined as body mass index over 25 and obesity as a BMI over 30 kg/m².

**Results:** Prevalence of overweight and obesity among Iranian adults (n = 18 405) were 30.9 and 16.3%, respectively, and its prevalence was higher among females (16.9% overweight, 12.1% obesity vs. 14% overweight, 4.1% obesity in males). Median BMI for male and female adults 19–30 years old were 22.8 and 23.7 kg/m², respectively. Mean BMI of adults in different age categories ranged within 22.2–28.6, and in females of 35–54 years old exceed the upper range of desirable BMI for age. Mean per capita energy intake in obese group was higher than adults with normal BMI. Percentage contribution of fat to energy intake was 1.5% higher in both obese and overweight group in comparison to normal (26.5% vs. 25%).

**Conclusion:** Results of this survey indicate that overweight and obesity is becoming a public health concern in Iran.

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**PO0602**


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Representative population surveys of school students were conducted in New South Wales, Australia, in 1985, 1997 and 2004. Height and weight were measured during each survey. Age, sex and postcode of residence were recorded. BMI [weight (kg)/height (m)²] was categorised as healthy or overweight/obese using IOTF definitions. Socioeconomic status (SES) was estimated based on postcode and organised into tertiles. Students were grouped as primary school (Grades 2, 4 and 6) and secondary school (Grades 8 and 10) and the analyses stratified by sex and SES. Average annual rate of change in the prevalence of overweight/obesity (AARC) was calculated. 1985–1997: Between primary and secondary school boys, the prevalence of overweight/obesity changed from 10.9 to 20.6 (OR = 2.11, P < 0.001; AARC = 0.81) and from 10.6 to 19.5 (OR = 2.03, P < 0.01; AARC = 0.74), respectively. Among primary and secondary school girls, the prevalence of overweight and obesity changed from 14.0 to 22 (OR = 1.73, P < 0.001; AARC = 0.67) and from 8.3 to 17.9 (OR = 2.43, P < 0.01; AARC = 0.80), respectively. 1997–2004: The prevalence of overweight and obesity changed from 20.6 to 25.7 OR = 1.34, NS; AARC = 0.73) and from 19.5 to 26.1 (OR = 1.47, P < 0.05; AARC = 0.94) among primary and secondary school boys, respectively. The prevalence of overweight and obesity changed from 22.0 to 24.8 (OR = 1.17, NS; AARC = 0.40) and from 17.9 to 19.8 (OR = 1.14, NS; AARC = 0.27) between primary and secondary school girls, respectively. There were no consistent associations between SES and change in the prevalence of overweight/obesity among boys or girls over either period. The prevalence of overweight/obesity is increasing more rapidly among boys and slowing among girls.

**PO0603**

**The success of a no-cost, low-budget, low-frequency obesity clinic in one of the fattest cities in the United States: an 18-month experience**

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**Background:** Recognized as one of the fattest cities in the United States, San Antonio, Texas is the home of an Air Force hospital that provides care to thousands of military retirees and dependents. We present the success of an obesity clinic aimed at assisting these veterans and family members in their struggles with weight management.

**Methods:** Patients with a body mass index of 35 kg/m² or higher were screened for metabolic aetiologies of obesity before being enrolled in a monthly group appointment. Sessions were creatively structured to promote lively discussion and to provide reliable and pertinent information on nutrition, exercise, and psychology.

**Results:** A total of 95 patients, with an average initial weight of 117.4 kg, attended our clinic from August 2004 to January 2006. Of the 68 patients who returned for a second visit, 43 (63.2%) lost weight and 25 (36.8%) gained. An aggregate of 185.9 kg was lost over the course of 509 visits (-0.4 kg per visit). The average weight loss was 2.7 kg (2.4% body weight) per patient, with a range of -40.8 kg to +9.5 kg. The patients who attended 2–7 appointments lost an average of 2.0 kg (n = 39), while those who attended 8–13 and 14–18 sessions lost 3.9 kg (n = 18) and 3.4 kg (n = 11), respectively. Indirect calorimetry routinely revealed resting energy expenditures that were significantly less than predicted.

**Conclusion:** Our results demonstrate that aggregate weight loss can be achieved in the setting of a low budget, low frequency clinic.

**PO0604**

**Study on dynamic changes of body mass index for adults in Henan province**

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**Abstract:** With rapid development in economy and social aspects in China, diet and nutritional status of residents undergone great changes. There is more and more evidence to indicate NCDs is in close relation with overweight (obesity). Henan, with about 96 million population, has been suffering the problem. This paper was aimed to analysis the dynamic changes of body mass index (BMI) of adults, and provide basis for health research and policy-making.

**Methods:** Using the random cluster sampling, a total of 480 households (urban 80, suburban 80, county neighbouring communities 80, rural 240) in 24 different sites were selected. The adults of selected households were subjects and followed. Data on height, body weight and household income etc were collected in autumn of every surveying year.

**Results:** The rates of BMI <18.5 cut-off point declined with years, they were 7.3% and 3.5% in 1989 and 2000, respectively. The rates of overweight and obesity showed a steadily increasing tendency, rose up sharply from 10.7% in 1989 to 25.2% in 2000, about 1.5% higher each year. The percentage of overweight and obesity altogether in 2000 ranked as urban 33.3%, county 31.7%, suburban 24.6%, and rural 21.4%.

**Conclusions:** The percentage of overweight and obesity increased quickly, have accounted for big part in population, and should be listed as one of major public health issues.
PO0606
Half of the men with lipodystrophy HIV syndrome had abnormalities of the glucose tolerance as a component of the metabolic syndrome
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Introduction: After the introduction of HAART, the HIV-Lipodystrophy-Syndrome characterized by body fat changes associated to metabolic disorders is increasingly described. The association of visceral obesity, hypertension, impaired glucose tolerance and dyslipidemia characterize the metabolic syndrome (MS).

Aims: (i) To evaluate the prevalence of MS using the NCEP-ATP-III-2002 and the new IDF-2005-criteria and (ii) To compare the prevalence of MS according to the presence of lipodystrophy.

Patients and methods: We observed 147 patients, 112 males and 35 females, with 46.0 ± 11.1 and 46.2 ± 13.2 years, respectively. We evaluated clinically the presence of lipodystrophy, anthropometric variables, waist circumference (WC), blood pressure (BP) and glucose, HDL-C and TG plasma levels.

Results: We observed ‘lipodystrophy’ in 73.2% (82/112) of ‘males’; BMI 24.4 ± 4.1 kg/m², WC 90.2 ± 10.7 cm, 12.5% (14/112) WC > 102 cm, 33.9% (38/112) WC > 94 cm; 75% (84/112) TG ≥ 150 mg/dL; 45.5% (51/112) HDL-C < 40 mg/dL; 34% (38/112) glucose ≥ 110 mg/dL; 50% (19/38) glucose > 100 mg/dL; 75% (84/112) BP ≥ 130/85 mmHg. We found ‘MS’ in 29.5% (33/112) and 26.8% (30/112) of the males according to NCEP-ATP-III-2002 and IDF-2005-criteria, respectively. We observed ‘lipodystrophy’ in 60% (21/33) of ‘female’: BMI 25.7 ± 7.5 kg/m², WC 90.9 ± 15.3 cm, 57.1% (20/35) WC > 88 cm, 80% (28/35) WC > 80 cm; 60% (21/35) TG ≥ 150 mg/dL; 65.7% (23/35) HDL-C < 40 mg/dL; 25.7% (9/35) glucose ≥ 110 mg/dL; 28.6% (8/28) glucose > 100 mg/dL; 40% (14/35) BP ≥ 130/85 mmHg. We found ‘MS’ in 45.7% (16/35) and 67.9% (19/28) of the females according to NCEP-ATP-III-2002 and IDF-2005-criteria, respectively. In the whole sample we observed MS in 49pts using NCEP-ATP-III or using IDF-2005-criteria.

Conclusions: MS is very frequent in these patients; the abnormalities of the glucose tolerance attain 50% of the men.

PO0607
Screening by waist and age has a powerful diabetes detection effectiveness: results from the best study (‘Belgian evaluation of screening and treatment of high risk patients based on waist and age’)
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Background: Abdominal adiposity is considered as a major risk factor (RF) for type 2 diabetes (T2DM), metabolic syndrome (MetS) and cardiovascular disease. Study objective was to determine cardiovascular RF’s in a Belgian middle-aged (40–75 years) population without previous CVD, selected upon the waist circumference (WC: male ≥ 94 cm, female ≥ 80 cm) as unique clinical criterion. The present analysis focuses on the relationship between waist and T2DM in this population.

Methods: Patients were consecutively recruited by 619 GPs early 2004. A central lab analysed fasting glucose, total, and HDL-cholesterol, and triglycerides. Complete data were obtained in 8587 patients (47% females; 24% smokers).

Results: 1527 individuals were diabetic patients (DP), with f glucose level averaging 8.5 mmol/L. Diabetes prevalence (f glucose ≥ 7 mmol/L) averaged 11% in men with WC 94–101 cm and 9% in women with WC 80–87 cm, but almost doubled in men with WC ≥ 102 cm (21%) and in women with WC ≥ 88 cm (19%). Univariate analysis (Pearson coefficient: 0.212; P < 0.001) and multivariate analysis confirmed this relationship between waist and glycaemia. About 89% of DP reported to have almost no physical activity, 84% had total cholesterol ≥ 4.5 mmol/L (175 mg/dL). Furthermore, 82% of DP had SBP above specific blood pressure target (2130 mmHg).

Conclusion: Over the age of 40, waist measurement is an easy, inexpensive and powerful tool to detect individuals at high risk for diabetes mellitus in general practice. Also other modifiable cardiovascular RF’s are present in such population.

PO0608
Predictors of success in an internet-based weight loss programme
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Background: Eighty percent of the Swedish population has computer access, which makes Internet an interesting treatment tool for obesity.

Method: A modified version of our clinical obesity screening questionnaire was administered online to 37 521 members. Body weight was asked for at baseline and every third month. Treatment success, attrition, and use of the various components of the programme were monitored prospectively online.

Results: At baseline, 39% were obese and 45% were overweight, with 86% of the members being women. After 6 months, 24% had dropped out of the program, while complete data at all time points were available from 11% of the original sample. However, the subjects with incomplete data did not differ significantly from subjects with complete data, either regarding baseline age, weight or height. During follow-up, subjects lost an average of 4.8 ± 5.2 (SD) kg. The overweight and obese members lost significantly more in relative weight (5.8 ± 5.8%) compared to normal weight members (4.0 ± 4.6%; P < 0.001). Twenty-eight percent lost 5–10% and 19% lost at least 10% of their initial weight. Relative weight loss (%) was independently and positively associated with being male, baseline BMI, total number of weigh-ins, diary visits and log-ins, but negatively associated with duration of overweight.

Conclusion: A sizeable, but seemingly random, dropout was observed, together with significant dose-response effects between activity in the programme and weight loss among completers. Given its low cost and high accessibility, this form of programme delivery is interesting to evaluate and further develop, especially regarding attrition.

PO0609
Bibliometric evaluation of obesity research in category of nutrition and dietetics
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Objective: To investigate the quantity and quality of studies on obesity in the category of nutrition & dietetics.

Methods: A bibliometric analysis based on the Science Citation Index (SCI) distributed by the Institute of Scientific Information (ISI) was carried out on obesity-related studies published between 1991 and 2004 in the ISI subject categories of nutrition & dietetics.

Results: Analytical results reveal that yearly production has increased and the United States (U.S.) produced 44% of the articles, followed distantly by the UK with 9.7% contribution. English was the dominant language with 99% of the articles. A summary of the
remaining most-frequently cited articles by year is provided. Four of them were published in American Journal of Clinical Nutrition. In addition, the 20 most used keywords in the field of obesity within the category of nutrition & dietetics is listed, which includes ‘leptin’, ‘children’, and ‘insulin’.

Conclusion: Obesity studies in the ISI subject categories of nutrition & dietetics has tripled in the last 15 years. The three top-ranking countries of publication were the United States, UK, and Italy. English remains the dominant language.

PO0610
Analysis of regional action plans regarding obesity prevention
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Background: In 2003, Québec’s Health Ministry released its National Public Health Program, which included objectives to fight chronic diseases by reducing prevalence of overweight and obesity in adults and by preventing overweight and obesity in children. Objectives on lifestyle habits were also set: increasing physical activity and fruit and vegetable consumption. Every 4 years, health regions have the mandate to produce regional action plans that specify the objectives they will implement. We developed a formative evaluation of the implementation at the regional of the National Public Health Program. In addition, the Health Ministry will soon launch its National Action Plan to Tackle Obesity.

Method: Regional action plans of 17 health regions that have implemented the National Public Health were evaluated using a logical model [Kellogg Foundation (2004)] and the ANGELO model [Swinburn et al. (1999)].

Results: Little similarity was found among the plans as no guidelines exist for their development and format. The plans: (i) used a 4-year timeline (2004–2007); (ii) were adapted to the region; (iii) had priorities that supported not the National Public Health Program; (iv) targeted population groups, age groups, or domains, and (v) used similar types of actions. More importantly, they did not include SMART objectives, health indicators or evaluation plans.

Conclusion: In addition to enhancing our understanding of the current content of regional action plans, this formative evaluation has informed us how to help the health regions to integrate and reach national objectives to tackling obesity.

PO0611
Early intervention to prevent childhood obesity: a pilot study
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Background: Preventing overweight and obesity in children is a clear health promotion priority. The age of onset and the degree of obesity in childhood is related to its persistence in adulthood. Studies have demonstrated that children as young as 2 years were already overweight, indicating that an early family-focused intervention is urgently needed. This study aimed to improve knowledge and behaviours of first-time mothers about healthy feeding and physical activity for children.

Method: A home-based intervention with 54 first-time mothers was implemented by a community early childhood health nurse. The program included five home visits during the child’s first year of life. At each visit, the intervention was tailored to the appropriate developmental stage of the child. One-to-one consultation was provided focusing on sustained breastfeeding, appropriate introduction of solids, avoiding food rewards and reduced soft drink consumption. Healthy food and physical activity were also promoted to parents. The effectiveness of this pilot was determined using a test-retest method. The 12-month post intervention data collection is currently underway.

Results: Changes in awareness and knowledge of childhood obesity, specific parenting practices, attitudes towards early intervention and family nutrition and physical activity will be measured and assessed.

Conclusion: The outcomes of this pilot will be extremely useful and inform our funded large-scale RCT. Our pilot explored the issues related to childhood obesity and enabled us to refine strategies for promoting healthy eating and physical activity for children. New measurement indicators developed during the pilot will be useful for future studies.

PO0612
Prevalence of the metabolic syndrome in the city of Beijing
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Objective: To estimate the prevalence of the metabolic syndrome in the city of Beijing.

Method: The prevalence of metabolic syndrome was defined by the NCEP-ATPIII (2002) and IDF (2005) criteria among 15 387 adults over 20 years in the city of Beijing.

Results: The unadjusted prevalence off metabolic syndrome were 9.9% (NCEP-ATPIII) and 14.04% (IDF) respectively, the age-adjusted prevalence off metabolic syndrome were 7.55% (NCEP-ATPIII) and 11.0% (IDF) respectively. Using 2000 census data, at least more than 90 million Chinese residents have the metabolic syndrome. The syndrome was more common in the older people, affecting about 20% of subjects who were over 50 years. The prevalence increased more than 20 times among subjects aged over 30 years compared with those below 29 years for both diagnostic criteria. The most common metabolic disorder of the syndrome presented by hyperlipidemia.

Conclusion: The prevalence of metabolic syndrome, diagnosed by both criteria, in China should be thought of a big challenge for public health. A program of health life style will be a wise choose for health promotion, especially starting in middle and young ages.

PO0613
Have Swedish disability pensioners become heavier between the years of 1980–2001? A longitudinal study of 29 194 Swedes
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Introduction: Obesity is increasing in the western world, with medical and social consequences. The study aim was to investigate how overweight (BMI ≥ 25.00 kg/m²) has changed between 1980–81 to 2000–01 among individuals with disability pension (DP) and without DP.

Method: The study was based on four cross-sectional surveys. In total, 14 505 men and 14 689 women, aged 18–64 years, were randomly sampled from the Swedish population. There were 714 men and 952 women with DP.

Results: Age standardized mean BMI increased from 25.89 kg/m² in 1980–81 to 26.88 kg/m² in 2000–01 among men with DP. For men without DP the increase was 24.24 kg/m² to 25.51 kg/m². Corresponding figures for women with DP was 24.85 kg/m² to 26.54 kg/m².
m² and for women without DP, 23.09 kg/m² to 24.26 kg/m². Prevalence of overweight increased from 55.3% to 67.8% among men with DP and for men without DP from 34.6% to 52.3%. For women corresponding figures were for DP, 42.0–55.9%, and without DP, 23.8–34.9%. The relative risk (RR) for overweight in 1980–81 among men with DP was 1.60 compared to men without DP. In 2000–01 the RR was 1.29. For women with DP in 1980–81 the RR was 1.76 compared to women without DP. In 2000–01 the RR was 1.60.

Conclusion: Overweight is increasing between both Swedes with and without DP during the period. Overweight was more common among men and women with DP. Men without DP increased their overweight most.

PO0614 Sustained weight loss in primary care by an interactive weight loss program Gonczi J Symbion Health Medecentre Obesity is a major public health problem however, no data were found on the proportion of obese adults presenting in primary care. Patients seek treatment for complications of obesity. To deliver causative management an Interactive Weight Loss Program (IWLP) comprising ad libitum, energy deficient diet incorporating functional foods and spontaneous physical activity has been used to achieve sustained weight loss.

Objective: To assess the (i) prevalence of obesity in adults in a suburban practice and (ii) to compare the efficacy of IWLP with conventional weight loss advice.

Results: In 2004 the prevalence of obesity was found to be 72% (565 of 783) of whom 19% (111) agreed to weight management. 54 patients complied with IWLP (IWLP group), 57 accepted standard advice (Advice only, AO). Mean change per month in monitored anthropometric measurements and biochemical parameters was significantly greater for IWLP group (P ≤ 0.0001, P = 0.09, respectively) then for AO group. Patients compliant with IWLP were found to have sustained weight loss beyond 24 months.

Conclusion: Although obesity is one of the commonest conditions in primary care, patients do not regard it as a disease needing treatment even when the risks and complications are explained. However general practitioners can facilitate sustained remission by involving patients to take responsibility and active part in making gradual changes in their lifestyle.

PO0615 The prevalence of metabolic syndrome in the elderly in Taiwan – a comparison among five proposed definitions Chang CJ, Yang YC, Lu FH, Wu CH, Wang RH and Wu JS National Cheng Kung University Hospital, Tainan, Taiwan, ROC

Purpose: To estimate the prevalence of metabolic syndrome in an elderly population in Taiwan by five different proposed definitions.

Method: We applied a stratified systematic clustered sampling scheme to select subjects aged 65 years or over from Tainan, the oldest city in Taiwan. From 2000 to 2001, 1438 out of 2146 (67.0%) eligible non-institutionalized subjects participated in the study (801 men and 637 women).

Results: For men, the age standardized prevalence of metabolic syndrome (MS) was highest by WHO definition (54.2%) then AHA (American Heart Association) (42.6%), Adult Treatment Panel (ATP) III-Asia Pacific (AP) (35.3%), IDF (International Diabetes Federation) (30.5%) and lowest by ATP definition (21.7%). For women, the age adjusted prevalence was highest by AHA (61.6%), then WHO (58.1%), IDF (55.9%), ATP-AP (51.8%), and the lowest by ATP (46.6%). The prevalence of MS was negatively related to the increasing age for both genders. Women had a higher prevalence of MS than men within each age group and by five different definitions.

Conclusion: The prevalence of MS were various from 37 to 53% depending on the different definitions and were decreasing with age. The classification disagreement is considerable and a universally accepted definition is needed for comparison.

PO0616 Body mass index and waist circumference cut-points indicative of metabolic risk factors in adolescents: CDC and international obesity task force (IOTF) BMI cut-points may be conservative Denney-Wilson E1, Booth ML1, Okely AD2, Hardy LL1, Dobbins TA3 and Baur LA1

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BMI and waist circumference cut-points to define overweight and obesity should be indicative of health risk. Although the two definitions of BMI used to categorise young people [the IOTF (Cole et al. 2000) and the CDC (Kuczmarski et al., 2002)], are based upon adult risk thresholds (IOTF) and large data collections (CDC) they are nevertheless arbitrary. There are no internationally accepted waist circumference cut-points. We used receiver operating characteristic (ROC) curves to predict the most appropriate cut-point for BMI and waist circumference in boys and girls based on the presence of metabolic risk factors. The SPANS biomarker sub-study was a representative sample of students (n = 500, mean age 15.4, 59% male) from Sydney, NSW. Fasting venous blood samples were analysed for insulin, glucose, total, HDL and LDL cholesterol, high-sensitivity C-reactive protein and alanine transaminase. Blood pressure, height, weight and waist circumference were measured and BMI calculated. Multiple logistic regression was used to determine the risk factors associated with BMI and waist circumference, and a ROC curve constructed for each significant variable. The true-positive rates ranged from 73% to 83% for boys; and between 72% and 75% for girls. The optimal cut-points suggested by the ROC curves were between 1.3 and 4.4 BMI points lower than the IOTF thresholds for overweight and the 85th centile of the CDC charts. This study suggests that risk factors for cardiovascular, endocrine and liver disease are present in adolescents who would not be categorised as overweight. Current definitions may underestimate the risk associated with excess adiposity in adolescents.

PO0617 Americans’ self-perceptions of overweight Shiftman S1, Pillitteri J1, Burton S2, Rohay J1, Harkins A2, Pettinico G3 and Foster G4

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Although overweight and obesity are defined on the basis of body mass index (BMI), self-perceptions of weight status, rather than BMI, determine whether people undertake weight loss or seek weight loss treatment. Using data from a random digit-dialed telephone survey of 3500 US adults, we evaluated the relationship between self-perceived weight status and BMI (from self-reported height and weight). 47% of adults considered themselves overweight, and 57% were overweight or obese by BMI standards. Most (89%) who considered themselves overweight were overweight or obese by BMI.
PO0618
Epidemiology of obesity in Iranian adolescents: a national perspective
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Objectives: Adolescents obesity persists into adulthood, leading to obesity related conditions later in life. It is a population health problem of growing concern and importance that can lead to public health consequences.

Methods: This paper aims to contribute to the epidemiological studies on adolescents by analysing the prevalence of overweight and obesity in accordance with the National Integrated Micronutrients Survey in Iran, in 2003. This cross-sectional study was carried out on 8800 adolescents aged 15–20 years. Height and weight were measured by trained interviewers, and the body mass index (BMI; weight (kg)/height (m)^2) was computed. Overweight and obesity were defined as BMI-for-age between the 85th and 95th percentiles and at or above of 95th percentile, respectively.

Results: The overall prevalence of obesity and overweight was 9.62%. Although the prevalence of overweight as well as obesity was higher in girls as compared to boys (5.3% vs. 8.7%, 2.4% vs. 2.8%), significant gender disparity was seen with girls of having overweight. In addition, significantly more adolescents from urban areas were obese than those from rural areas (3.2% vs. 1.8%). The overweight prevalence was not significantly different between urban and rural areas.

Conclusion: Findings of this study are in agreement with similar studies carried out on Iranian adolescents’ population, showing that prevalence in overweight and obesity increases during this phase and is more diffused among boys than girls. Clearly, the dramatic increase in the prevalence of obesity in adolescents in comparison with preschool age children represents a serious threat to public health in Iran, especially among girls of urban areas.

PO0620
Evolution of body mass index at 5 years in an adult population
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Background: Obesity and overweight are highly prevalent in our population. Hypothesizing that the prevalence of this health problem is increasing, we studied the BMI evolution at five years in an unselected adult Uruguayan population.

Method: A random sample of 1,521 adults was selected among 190,000 covered by our non-profit health care institution. Weight and height were measured at begin and after 5.1 ± 1.2 years. BMI was classified as normal (<25 kg/m^2), overweight (25–29.9 kg/m^2) and obesity (≥30 kg/m^2). Statistical analysis was performed using a chi-squared test for the mutual independence of the prevalence.

Results: Mean age was 51 ± 14 years; women represented 63%. At the first measurement there was 35.9% of normal BMI, 39.1% of overweight and 25.0% of obesity. At the second measurement, normal BMI was reduced by 3.5% to 32.4% (P = 0.042), overweight had a non-significant increase to 39.4% (P = 0.8) and obesity increases by 3.2–28.2% (P = 0.048).

Conclusions: At 5 years we observed an increase in the percentage of obese, with a reduction of individuals with normal BMI in this population.

PO0621
Coming face to face with a growing concern: monitoring the BMI of South Australians over 15 years
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Background: As the prevalence of obesity continues to increase among the population it is important to monitor prevalence over time in order to determine the impact of interventions and programs aimed at reducing the prevalence of obesity.

Method: Since 1991, self reported height and weight has been collected in the Health Omnibus Survey (HOS) which is an annual face to face survey of people aged 15 years and over, conducted across South Australia. The sample size is approximately n = 3000 each
PO0622
Overweight and obesity as risk factors for arthritis
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Background: Obesity has been recognised as a risk factor for various forms of arthritis, for example osteoarthritis of the knee. However the impact of being overweight on arthritis is not as clear.

Method: The South Australian Monitoring and Surveillance System (SAMSS) commenced in 2002 and surveys all ages across South Australia using Computer Assisted Telephone Interviewing (CATI). The prevalence of overweight and obesity is collected using self reported height and weight and the classification system of the World Health Organization for respondents aged 18 years and over. Self reported doctor diagnosed prevalence of arthritis is also determined.

Results: Using data from 2003 to 2005, overall self reported arthritis prevalence was determined to be 22.0% (95% CI 21.4–22.7) and the self reported prevalence of osteoarthritis 10.9% (95% CI 10.5–11.5). The overall self reported prevalence of respondents classified as overweight was 36.6% (95% CI 35.8–37.4) and obesity 18.4% (95% CI 17.8–19.0). The proportion of respondents with various forms of self reported arthritis classified as overweight was 39.4% (95% CI 37.8–41.1) and obese 25.4% (95% CI 23.9–26.9), both were statistically significantly higher than respondents without arthritis (P < 0.05). Overall 39.1% (95% CI 36.7–41.4) of respondents stating that they had osteoarthritis were classified as overweight and 25.6% (95% CI 23.5–27.7) were obese, a statistically significant higher proportion than respondents without osteoarthritis.

Conclusion: Arthritis and particularly osteoarthritis are prevalent conditions in Australia. Both overweight and obesity may impact on this prevalence and information provided by monitoring systems enables targeting of programs to address these issues.

PO0624
Obesity in adults: an emerging problem in urban areas of Ho Chi Minh City, Vietnam
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Background: The study was designed to assess the prevalence of overweight, obesity and underweight among Vietnamese adults living in urban areas of Ho Chi Minh City (HCMC), Vietnam.

Methodology: This cross sectional survey was conducted in the local health stations of 30 randomly selected wards, which represent all 13 urban districts of HCMC, over 2 months from March to April 2004. 1488 participants aged 20–60 years completed the interview, physical examination, and venous blood collection. Anthropometric measurements of body weight, height, waist and hip circumference were taken to construct indicators of adiposity including body mass index (BMI), waist circumference, and waist to height and waist to hip ratios. Blood pressure and biochemical indicators of cardiovascular disease and diabetes risk (lipid profile, fasting blood glucose) were also measured.

Results: The age and sex standardized prevalence of overweight and obesity using Asian specific BMI cut offs of 23.0 and 27.5 kg/m2 was 26.2% and 6.4% respectively. The prevalence of overweight and obesity was slightly higher in females (33.6%) than males (31.6%), and progressively increased with age. The age and sex standardized prevalence of underweight (BMI <18.5 kg/m2) among Vietnamese adults living in HCMC was 20.4%. The prevalence was slightly higher in males (22.0%) than females (18.9%).

Conclusion: The adult population in HCMC Vietnam is in an early ‘nutrition transition’ with approximately equal prevalence of low and high BMI. The prevalence of overweight and obesity of Vietnamese urban adults was lower than that reported for other East and Southeast Asian countries.

PO0625
The effects of age, period and birth cohort on prevalence of overweight and obesity in Australian adults from 1990 to 2000
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The aim of this study was to differentiate between the individual effects of age, period and birth cohort on prevalence of overweight and obesity in the Australian population during 1990 to 2000. The data on self-reported weight and height for adults from the National Health Surveys conducted in Australia in 1990, 1995 and 2000 were used in the analysis. Weightings were applied so that the data were representative of the entire population and age standardized to the 2000 population. Twelve age-groups, based on 5-year intervals from 20–24 years to >75 years, three survey periods and 14 cohorts, also based on 5-year intervals from pre1915 up to 1976–80, were used in the analysis. Log-linear models, for the prevalence rates of overweight and obesity (BMI > 25) and of obesity (BMI > 30) were fitted to the data assuming a Poisson distribution for the observed number of cases of overweight and obesity. Age (P < 0.0001), period (P =0.0005) and cohort (P = 0.0023) all showed significant independent effects on prevalence of overall overweight in the Australian population, such that prevalence rises with increasing age, recency of survey period and in cohorts born since 1960. Age (P < 0.0001) and period (P < 0.0001) demonstrated strong effects on prevalence of obesity but birth cohort (P = 0.07475) was not significant. The effects were similar for males and females. In conclusion, not only aging but the current lifestyle environment contributes to overweight and people born more recently appear to be more susceptible to the effects of this environment.

PO0626
Intra-national variation in trends in overweight and leisure time physical activities in the Netherlands since 1980: stratification according to sex, age and urbanisation degree
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Objectives: We investigated time trends in overweight and leisure time physical activities (LTPA) in The Netherlands since 1980. Intra-national differences were examined stratified for sex, age and urbanisation degree.

Design and methods: We used a random sample from the Health Interview Survey of about 140,000 respondents, aged 20–69 years. Self-reported data on weight, height and demographic characteristics were gathered through interviews (yearly) and data on LTPA were collected by self-administered questionnaires (1990–97, 2001–04). Linear regression was performed for trend analyses.

Results: During 1981–2004, mean Body Mass Index (BMI) increased significantly by 1.0 kg/m² (average per year = 0.05 kg/m²). Trends were similar across sex and different degrees of urbanisation, but varied across age groups. In 20–39 year old women, mean BMI increased by 1.7 kg/m², which was more than in older age groups ($P \leq 0.05$). Concerning LTPA, no clear trend was observed during 1990–97 and 2001–04, which was similar across sex and urbanisation degree, but varied across age groups. During 2001–04, 20–39 year old women spent $\approx$150 min/week less on LTPA compared to older women, while this difference was smaller during 1990–97.

Conclusions: Mean BMI increased more in younger women, which is consistent with the observation that this group spent less time on LTPA during recent years. Although the overall increase in overweight could not be explained by trends in LTPA, physical activity interventions should target the younger women. The influence of the ‘obesogenic environment’ seems to be similar across different degrees of urbanisation.

**PO0628**

Prevalence of obesity in children

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The purpose of research is to define the prevalence of obesity in various age groups of children in Almaty, Kazakhstan.

Material and Methods: In 2003, 528 school children at the age from 7 to 17 were examined with continuous method. They were measured for height, weight, waist and hips circumference to have subsequent calculation of BMI and waist/hip.

Results: The carried out anthropology has established that the obesity of school children in Almaty is found with the frequency of 18.8%, the overweight-11% against the data of 1996–15.2% and 9.8% respectively (R. A. Abedimova). The prevalence of overweight as well as the obesity in whole of school boys and girls increases as they become adult. Among the girls at the age of 10–12 there is greater number of plumps than among the boys. However, the prevalence of obesity of girls at the age of 13–15 is sharply decreases ($P < 0.05$) in comparison with the previous years and becomes much lower than at the boys of the same age ($P < 0.01$). The number of plump children notably decreases during their adolescence. Especially the sharp decrease of prevalence of obesity occurs among the girls ($P < 0.05$). The prevalence of obesity of 16–17 year teenagers of both sexes is reduced approximately to the identical figures ($P > 0.05$).

Conclusions: For the last 10 years in Almaty the prevalence of overweight and obesity in children is used to increase.

**PO0629**

How fat are our children? Discrepancy in prevalence data using different classification systems

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Background: The use of national and international classifications as well as the range of variables [BMI, waist circumference (WC), %body fat (PF)] on which overweight or obesity can be classified makes this a complicated area for interpretation. The objective of this study was to investigate the prevalence of overweight and obesity using each of these classification systems.

Methods: BMI, WC and PF (Tanita BIA) measurements were obtained in 2293 boys and 2178 girls, aged 11.6 ± 0.3 years, in Leeds, UK. Standardized values were calculated using National Centile Charts. BMI and WC overweight and obese prevalence were defined at the 91st and 98th centiles, respectively. In addition, the IOTF BMI criteria and the recently proposed UK Child Growth Foundation PF cut-offs were used.

Results: UK BMI centile charts identified 14.6% of boys and 14.7% of girls overweight and a further 12.0% of boys and 10.6% of girls obese. WC centile charts identified 17.9% of boys and 18.5% of girls overweight and a further 16.2% of boys and 25.4% of girls obese. IOTF BMI cut-offs identified 18.7% of boys and 21.5% of girls overweight and a further 3.1% of boys and 6.6% of girls obese. PF cut-offs identified 9.6% of boys and 12.0% of girls overweight and a further 11.9% of boys and 16.9% of girls obese.

Conclusion: IOTF BMI cut-offs substantially underestimated the prevalence of obese children compared to alternative classification systems. Furthermore, WC measurements suggest the prevalence of overweight and obesity may be considerably greater than previously indicated using BMI.
PO0630
Obesity prevalence and time trend among youngsters in China, 1982–2002
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Objective: To describe prevalence and trend of overweight and obesity among youngsters in China, 1982–2002, and to provide a basis for developing intervention strategies for obesity in China.

Design and methods: The data of children aged 7–17 years from three national surveys including ‘1982 China National Nutrition Survey’ (3334 boys and 4793 girls), ‘1992 China National Nutrition Survey’ (8048 boys and 7453 girls) and ‘2002 China National Nutrition and Health Survey’ (23 242 boys and 21 638 girls) were used in this study.

Results: Applying the Chinese criteria, overweight prevalence of Chinese youngsters aged 7–17 years was 1.7%, 4.0% and 4.6%, while the obesity prevalence was 0.2%, 1.9% and 1.8% in 1982, 1992 and 2002, respectively. Both the overweight and obesity prevalence and their increment were higher in urban areas and higher in boys.

Conclusion: The prevalence of overweight and obesity of Chinese children and adolescents was low in 1982. There has been a rapid increase since then, reaching epidemic proportions from 1992 on, especially in large cities.

PO0631
Binge eating disorder and the night eating syndrome: prevalence in subgroups of the Australian population, and association with body weight and psychopathology
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Background: Binge eating disorder (BED) and the night eating syndrome (NES) occur infrequently in the general population, but are relatively common amongst obese treatment seekers. The association between BED, NES, body weight, eating behaviour, and psychological factors has not been explored.

Method: Cross-sectional data on BED; NES; symptoms of depression; body image distress (BID); dietary restraint, disinhibition, and hunger; and demographics were collected from sub-groups of the Australian population via self-report questionnaires. Statistical analysis was performed using SPSS version 14.

Results: Group 1: 158 individuals in the general community (34 male, 124 female, mean age 41.3 ± 13.5, mean BMI 24.8 ± 5.1), Group 2: 93 individuals attending behavioural weight loss treatments (7 male, 85 female, mean age 55.1 ± 12.4, mean BMI 32.7 ± 7.3), and Group 3: 180 individuals seeking lap-band surgery (39 male, 141 female, mean age 44.8 ± 11.2, mean BMI 44.5 ± 6.8) provided data. BED rates were 1.9%, 5.4%, and 24.4%, and NES rates were 8.2%, 5.4%, and 20.6% in Groups 1, 2, and 3, respectively. Over one third of all BED also manifested NES (40%, n = 21). Analysis of 4 sub-groups: ‘BED only’, ‘NES only’, ‘BED & NES’, and ‘NoBEDorNES’, showed significantly higher levels of disinhibition, hunger, depression, and BID in both the ‘BED only’ and ‘BED & NES’ groups, yet low levels of these measures in the ‘NES only’ and ‘NoBEDorNES’ groups.

Conclusion: BED and NES are more common amongst the obese. A strong association exists between BED and NES, however, in persons manifesting both conditions, BED drives elevated levels of depression and BID, whilst NES alone is not associated with marked psychopathology, disinhibition, or hunger.

PO0632
Investigating spatial relationships and obesity: what role does area and individual level disadvantage play within the North West region of Adelaide, South Australia
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There is a growing interest in the association between small area and individual disadvantage, especially with respect to overweight and obesity. Recent findings suggest that those individuals living in disadvantaged areas are at greater risk of becoming overweight or obese despite their individual level of disadvantage (King et al., 2006). How the social and physical environment influences the obesity status of the individual is yet to be fully determined. We used data from the North West Adelaide Health (Cohort) Study (NWABS) to assess the spatial relationship between obesity and disadvantage. NWABS is a representative population cohort of n = 4000 within South Australia.

Two biomedical measures of obesity were used; body mass index (BMI) was calculated using measured height and weight; and waist and hip circumference measurements were used to define central adiposity through high waist circumference and waist-to-hip ratio. The north west region of Adelaide has a diverse ecological context containing areas of very high and low socioeconomic status. Statistically significantly higher proportions of individuals with a high waist hip ratio were found for individual disadvantage (27.2%) and small area disadvantage (22.5%). Spatial analysis found that of those participants with a high waist hip ratio and high individual disadvantage, 61.8% were living in the more disadvantaged areas. This research supports the need to focus on the physical and social environment in explaining obesity for disadvantaged populations and communities. This is part of ongoing and developing research investigating the effects of space and place on obesity and related health outcomes.

PO0634
The prevalence of overweight and obesity among Moscow adolescents
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Introduction: Childhood obesity is nowadays considered to be the worldwide epidemic with significant medical psychosocial and economic consequences. The prevalence of childhood obesity is increasing rapidly worldwide. About 25% of adolescents are overweight and 15% of them suffer with obesity. Obesity in childhood is regarded as a major risk factor for atherosclerosis and cardiovascular diseases.

Materials and methods: The study included 1000 Moscow teenagers aged 12–18 years attending secondary schools. The choice of schools included in the research was performed by random selection method. Body weight and height, which determine a child’s BMI status were evaluated according to IOTF reference cut-off points for children equivalent to adult BMIs of 25 and 30. (Cole et al. BMJ 2000; 320: 1240–3 and World Health Organization (2000) Technical Report 894.)
Results: Out of all children the research included 45.7% of boys and 54.3% of girls. The overweight (equivalent to BMI > 25 kg/m² in adults) was found in about 11.8% of all adolescents: 12.5% of boys and 11.2% of girls. The obesity (equivalent to BMI > 30 kg/m² for adults) was found in about 4.8% of all examined adolescents: 6.1% of boys and 2.6% of girls.

Conclusion: Similar trends towards excess weight gain among children and adolescents are being found in other parts of Europe. Further determination of the link to high-energy, low-nutrient diets and reduced physical activity levels and changes in the child’s immediate social environment is required.

PO0635
Continued increase in the prevalence of overweight and obesity among Danish women – no increase among Danish men
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Background: The prevalence of overweight and obesity in Danish adults increased substantially between 1987 and 2001. The aim of this study was to investigate whether this trend has continued.

Methods: The study included self-reported weight and height of 7029 women collected in three cross-sectional surveys in 2001, 2003 and 2006, and of 4995 men collected in two cross-sectional surveys in 2001 and 2005. The participants were 16–98 years. Prevalence and changes in prevalence of overweight and obesity stratified by sex and age groups were determined using weight and height adjusted for misreporting of true body weight and height. Moreover, the prevalence among young men was also assessed from measured height and weight in all young Danish men attending draft boards.

Results: The prevalence of obesity in women increased from 16.3% in 2001 to 19.6% in 2006 (P < 0.003), and the prevalence of overweight increased from 34.5% in 2001 to 40.9% in 2006 (P < 0.0001). The largest increase was among the 16- to 49-year-old subjects. In men the prevalence of obesity was 12.5% in 2001 and 12.8% in 2005 (NS) and the prevalence of overweight was 44.2% in 2001 and 44.5% in 2005 (NS). In the young Danish men the prevalence of obesity was stable in 2003, 2004, and 2005 (7.0, 7.3, and 7.2%).

Conclusion: The prevalence of overweight and obesity in Denmark continued to increase in women between 2001 and 2006. In Danish men the prevalence of overweight and obesity did not increase further between 2001 and 2005.

PO0636
Body mass index as a diagnostic tool for obesity
Pettersson J, Neovius M, Linne Y and Rössner S
Abbott Scandinavia AB, Stockholm, Sweden; Obesity Unit, Department of Medicine, Karolinska Institute, Karolinska University Hospital, Huddinge, Sweden

Background: BMI cannot distinguish between fat mass and fat free mass.

Aim: To investigate the degree of BMI-based misclassification of obesity (BMI ≥ 30) in adult females.

Methods: BMI and percentage body fat (%BF; BodPod) were measured in 465 adult females (46.9 ± 4.6 years; 24.5 ± 4.2 kg/m²; 34.5 ± 8.4%BF). The relation between BMI and %BF was investigated by regression analysis and the diagnostic characteristics sensitivity (true positive rate) and specificity (true negative rate) were assessed. True positives were defined as >40%BF.

Results: The variation in BMI explained 67% of the variation in %BF, after adjustment for age. For each additional BMI-unit, a 1.6%BF increase resulted (P < 0.0001). 25.6% were classified as obese by %BF but only 9.2% by BMI. The total number of misclassifications was 78 (16.7%). In the group of females with %BF ≥ 40% (n = 119), 13.4% were classified as normal weight, 51.3% were classified as overweight and merely 35.3% were classified as obese by BMI. Only one of the non-obese was a false positive. The sensitivity was 33.5%, the specificity 99.7%, and the positive and negative predictive values were 81.7% and 97.7%, respectively.

Discussion: BMI was found to have a low sensitivity and a very high specificity, when defining true obesity as ≥40%BF. Despite the low sensitivity and positive predictive value, BMI is often used as a decision variable for qualification to different forms of obesity treatment and in Sweden also for obtaining reimbursement. In this study 64.7% of the truly obese females (≥40%BF) were outside indication (BMI < 30) for prescribing pharmacotherapy against obesity.

PO0637
New IDF criteria of metabolic syndrome almost duplicate the prevalence of metabolic syndrome in a manufacturing population of Aveiro district
Freitas P, Carvalho D, Sobral C, Prazeres Silva JA and Medina JL
Departments of Endocrinology, Hospital São João; Faculdade de Medicina da Universidade do Porto and Labour’s Medicine C.A.C.I.A. SA

Introduction: Metabolic syndrome (MS) is constellation of several factors, namely abdominal obesity, hyperglycaemia, hypertension and dyslipidemia associated with increased cardiovascular risk.

Aims: To evaluate the prevalence of MS in labourers of the Renault-Cacia-factory and to compare the results according to the NCEP-ATP-III-2002 and the new IDF-2005-criteria.

Material and methods: Workers were informed about the screening and volunteered. Anthropometric variables, blood pressure and fasting plasma levels of glucose, LDL-C, HDL-C and triglycerides were evaluated. Results were expressed in mean (SD and percentages.

Results: From a total sample of 1100 workers, 164 (15%) shown up. The age was 43.9 (9.5 years for women and 47.7 (6.4 years for men. BMI was 25.2 (3.5 in women and 28.2 (3.1 kg/m² in men. We observed MS in 17% (28/164), being 13.3% of females (4/15) and 17.4% of males (26/149) according to criteria of NCEP-ATP-III; and we observed MS in 31.1% (51/164), being 33.3% of females (5/15) and 30.9% of males (46/149) according the IDF-2005-criteria. We found a high prevalence of blood pressure ≥ 130/85 mmHg (50.3% of men and 26.7% of women) and hypertriglyceridemia (26.7% in women and 38.9% in men).

Conclusions: The prevalence of MS in this population is very high (17%) using NCEP criteria and almost duplicate when we used the new IDF criteria.

PO0638
Prevalence of abdominal obesity in South Asians
Sohal PS
Surrey Memorial Hospital

Cardiovascular disease is the leading cause of death among South Asians in Canada. The incidence of diabetes is at least threefold higher in South Asians as compared to Caucasian Canadians. Recent studies have suggested that insulin resistance and metabolic syndrome may be responsible for the excessive cardiovascular risk in South Asians. The objective of this study was to understand the prevalence of abdominal obesity in South Asians. The data for this study was collected by a random health survey (n = 192: male = 77 and female = 115), which was completed by adults (range 22–85 years) South Asians (Immigrants from Indian sub-continent) in the community of Greater Vancouver, British Columbia. Waist cir-
cumference (WC), body weight, height and body mass index (BMI) of the subjects were measured. Using the NCEP ATPIII cut-off criteria for abnormal waist circumference (male ≥ 102 cm and female ≥ 88 cm) 40% of males and 70% females had high WC. Overall, 58% subjects had abnormal WC. Using the World Health Organization cut-off criteria for abnormal waist circumference for South Asians (male ≥ 90 cm and female ≥ 80 cm) 86% of males and 90% females had high WC. Overall, 88% subjects had abnormal WC. BMI data indicated that 74% subjects were overweight (BMI ≥ 25) and 30% subjects were obese (BMI ≥ 30). The study indicated that the prevalence of abdominal obesity appears to be very high in South Asians, which may explain the high incidence of diabetes and heart disease in this ethnic population.

PO0639
Significance of height in value of waist circumference and BMI in diagnosis of obesity
Halmy L1, Paksy A2 and Csatai T3
1Hypertension and Lipid Disorders Decentre, Centr. Hosp. of Min. Int., Hungary; 2Platon Health Ltd.; 3National Police Headquarters Au: Please provide the city, state and country for the second and third affiliations in the abstract number PO0639.

Introduction: The different risk of abdominal obesity is determined by waist circumference. This parameter does not show any connection with age in recommendation of WHO. Our aim was to study the role of height in diagnosis of obesity.

Method: We studied in all Hungarian counties in 17919, 19–49 year old policemen the effect of height on waist circumference and the connection between BMI and height measuring the body weight, height, waist and hip circumferences.

Results: n = 17 919

Conclusions: Beside the high prevalence of visceral obesity we observed strong correlation between the waist circumference and height. Elevation of height the waist circumference increased 0.39 cm/height cm. Between tall policemen the waist was higher gradually but the values of BMI diminished, therefore the waist circumference can cause false positive, the BMI false negative results.

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<th>Waist circumference</th>
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<td>94–101 cm</td>
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<td>≥102 cm</td>
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<td>Waist/hip ≥ 0.95</td>
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<td>Correlation: waist-height r = 0.556 P &lt; 0.001</td>
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PO0640
Trends of overweight and obesity among adolescents in urban areas of Ho Chi Minh City between 2002 and 2004
Hong Kim T1, Dibley MJ2 and Sibbritt D2
1Department of Community Health, University Training Centre, Ho Chi Minh City, Vietnam; 2Centre for Clinical Epidemiology and Biostatistics, Faculty of Health, University of Newcastle, Callaghan, NSW, Australia

Objective: To assess changes in the prevalence of overweight and obesity among adolescents in urban districts of Ho Chi Minh City (HCMC) between 2002 and 2004.

Methods: Data were analysed from two surveys with representative samples of junior high school students of HCMC in 2002 and 2004. Gender and age specific BMI cut offs recommended by the IOTF were applied to define overweight and obesity. In the 2002 survey, there were seven schools from wealthy and 13 schools from less wealthy urban districts, with 352 and 631 students respectively. In the 2004 survey, there were 17 schools from wealthy and 14 schools from less wealthy urban areas, with 1252 and 1426 students respectively.

Results: In the 2 years period there was a dramatic increase in the prevalence of overweight and obesity from 6.7% and 0.8% in 2002, to 11.7% and 2.0% in 2004, respectively. During this period, the prevalence of underweight decreased rapidly from 13.1% to 6.6%. There was a consistently increasing trend in the prevalence of overweight from the 2002 to 2004 across gender, age group, school locations and family economic status groups.

Conclusions: Urban areas of Ho Chi Minh City currently confront a nutrition transition with the double burden of underweight and overweight in adolescents. A long term follow up of these subjects should be undertaken to have a better understanding of the risk factors underlying this rapid increase in overweight and obesity, and to identify potential preventive interventions for overweight and obesity in this population.

PO0641
Is it really impossible to calculate the obesity prevalence rate from reported body weight and height?
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1Vrije Universiteit, Amsterdam, The Netherlands; 2National Institute of Public Health and the Environment, Bilthoven, The Netherlands; 3Municipal Health Centre of West-Brabant, The Netherlands

Background: It has been hypothesized that reported body weight and height can replace measured data when estimating the obesity prevalence. Some authors proposed equations to estimate the obesity prevalence rate from reported body weight and height. Our aim was to study consistency across studies in under-estimation of the obesity prevalence and to study the validity of published equations to calculate the obesity prevalence from reported body weight and height.

Method: The literature has been searched for (i) studies that calculated the obesity prevalence on basis of both measured and reported body weight and height, and (ii) studies that published an equation to calculate the obesity prevalence from reported body weight and height. Those equations have been used to calculate the obesity prevalence rate among 1809 men and 1882 women aged 20–59 years, who participated in a Dutch monitoring survey between 1998 and 2002.

Results: Among the 11 studies found, under-estimation of the obesity prevalence varied from 0 to 64% when based on reported body weight and height. Applying equations that were found in seven studies, to our monitoring survey lead to errors varying from an over-
estimation of the obesity prevalence by 7% to an under-estimation by 74%.

Conclusion: There was large inconsistency across studies in under-estimating the obesity prevalence from reported body weight and height. Published equations cannot be used to calculate the obesity prevalence from reported body weight and height in other surveys. Reported data cannot replace measured body weight and height when calculating the obesity prevalence.

PO0642
Methodological modifications required to conduct obesity prevention research in school settings for children with an intellectual disability

Gibbs L, Baxendale A, Webb L and Waters E
School of Health and Social Development, Deakin University, Melbourne, Australia

Background: Children who have an intellectual disability (ID) are at a much greater risk of obesity than those without. However, very limited research has been conducted into how the methodology used in obesity prevention research should be modified to better suit the needs of these children.

Method: A range of obesity prevention research measures were piloted in a Special Development School (SDS) for children with intellectual disabilities in Melbourne. The measures included child height and weight, a lunchbox survey, playground survey, school environment questionnaire, and parent questionnaires. Additional qualitative interviews and focus groups with parents and staff were conducted to develop an understanding of the different needs of this school community.

Results: A range of issues were identified in the SDS setting that impacted on the capacity of data collectors to collect reliable and valid data for each of the quantitative measures used. The issues included reduced comprehension and attention span of students, varying physical disabilities, idiosyncratic eating and physical behaviours, and a small sample population. The qualitative measures were found to be an appropriate methodology in this setting for developing an understanding of obesity prevention issues.

Conclusion: The pilot highlighted the unsuitability of existing obesity prevention quantitative measures for this population group. Developing an accurate profile of overweight and obesity in these school communities would benefit from development and evaluation of modified research tools and protocols such as combined weighing of teacher and child, replacement of lunchbox survey with teacher report of food intake, and greater reliance on qualitative measures.

PO0643
Increase in obesity prevalence in the Czech Republic

Kunesova M1, Lajka J1,2, Hainer V1, Hlavaty P1, Kabrnova K1, Kalouskova P1, Parizkova J1 and Wagenknecht M1
1Obesity Management Centre, Institute of Endocrinology; 2Stern/Mark, Prague, Czech Republic, mkunesova@endo.cz

Background: The prevalence of obesity has increased in men and women in the Czech Republic since 2000/1. Higher prevalence of obesity in subjects with family history of obesity (in one or both parents) was shown. In family with at least one obese parent the risk ratio of obesity was 1.4. Mean time per week spent by physical activity was significantly lower in 2005 in comparison with 2000/1.

Conclusion: The results show persisting increase in obesity prevalence and in waist circumference in the Czech population in last 5 years.

Funding disclosure: Supported by the grant NB 7782-4 IGA Czech Ministry of Health and by the donation of Ministry of Health.

PO0644
Secular trends in the prevalence of adequate cardiorespiratory fitness among children and adolescents in NSW, Australia from 1997–2004

Okely T1, Booth ML2, Denney-Wilson E2, Hardy LL2 and Dobbins TA3
1Child Obesity Research Centre, University of Wollongong, Wollongong, Australia; 2NSW Centre for Overweight and Obesity, University of Sydney, Sydney, Australia; 3School of Public Health, University of Sydney, Sydney, Australia

Background: Results from a population study in the Wollongong region of Australia showed that CRF is not declining with the concomitant population increase in the prevalence of obesity among our young people. These results were not in support of previous reports of declines in CRF among boys or girls from 1997–2004. These results suggested that children and adolescents in NSW, Australia from 1997–2004 had a much greater risk of obesity than those without. However, very limited research has been conducted into how the methodology used in obesity prevention research should be modified to better suit the needs of these children.

Method: A range of obesity prevention research measures were piloted in a Special Development School (SDS) for children with intellectual disabilities in Melbourne. The measures included child height and weight, a lunchbox survey, playground survey, school environment questionnaire, and parent questionnaires. Additional qualitative interviews and focus groups with parents and staff were conducted to develop an understanding of the different needs of this school community.

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Conclusion: The pilot highlighted the unsuitability of existing obesity prevention quantitative measures for this population group. Developing an accurate profile of overweight and obesity in these school communities would benefit from development and evaluation of modified research tools and protocols such as combined weighing of teacher and child, replacement of lunchbox survey with teacher report of food intake, and greater reliance on qualitative measures.

PO0645
A pilot study for a randomized-controlled study of effects of fruit intake and promotion of healthy nutritional habits on cardiovascular risk factors in children

Chellappah J1,2, Tonkin A1, Douglas E1 and Reid C1,2
1Department of Epidemiology & Preventive Medicine, Monash University; 2Baker Heart Research Institute, Melbourne, Australia. September 2005

Objectives: To assess if a school based intervention of providing fruit daily in the classroom was effective in reducing risk factors for obesity and cardiovascular disease.

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Design: Pilot study of a clustered randomized control trial. Fruit was served daily in classroom, as well as regular progress reports distributed to parents together with healthy eating promotional packs to parents. Setting: One primary school from Melbourne, Victoria. Participants: 23 children aged 9–11 years; 13 males and 10 females. Intervention: Ready availability of fruit serves daily in classroom, as well as regular updates and distribution of health eating promotional packs to parents. Main outcome measures: Body mass index, waist to hip ratio, body fat percentage, cardiovascular endurance, blood pressure, blood glucose and cholesterol levels, and family attitudes and food habits. Results: Significant reductions were seen in body fat percentage and improvements in cholesterol levels over the fruit intake intervention period, sustained for 16 weeks after the intervention period. Questionnaire data also suggested that dietary choices and canteen choices of the children improved over the fruit intake intervention period. Conclusion: A simple intervention involving readily available fruit on a daily basis can prove to be a convenient healthy dietary choice alternative for children. The pilot study suggests the feasibility of a randomized trial testing the effect of providing fruit daily in the classroom on the risk factors for obesity and cardiovascular disease in children.

PO0646

Q4: live outside the box

Kajons N1, Andrew L1 and Whatman J2

1Central Coast Health Promotion Unit, NSCCAHS, Australia; 2Central Coast Public Health/Community Nutrition Team, NSCCAHS, Australia

Background: Recent studies of childhood overweight and obesity on the Central Coast, Australia has put the rate of overweight/obese young people at over 30% (1). Despite a wealth of research on the size of this problem, we identified a distinct lack of large scale, practical strategies to deal with the issue. Q4, in a practical way, has started to address this imbalance. Q4 is a unique campaign aimed at lifting the profile of this serious problem in the local community. Method: Over 2 weeks, students achieved points for eating fruit, vegetables and a healthy breakfast, increasing physical activity, and decreasing ‘extra’ foods and TV watching. Parents were involved by signing their children’s diary. A crucial aspect of the campaign was maintaining a media presence. Strong support from local media outlets saw regular coverage on local TV, radio, and in the print media. An interactive website was set up to support the competition (www.healthpromotion.com.au).

Results: 69779 Central Coast primary schools have participated in Q4 over the past 2 years. 2004 saw 17 000 students participate from 45 primary schools. In 2005, 70 primary and secondary schools entered, with 23 500 students. Results of data collated from participating students indicated significant behaviour changes in all measured areas during the campaign.

Conclusion: Through Q4, awareness of childhood overweight and obesity was raised beyond the Central Coast school population to families and, with the help of a strong and consistent media profile, this has set the platform for ongoing community action.


PO0647

Health promotion and nutritional education for children and adolescents enrolled in two public schools in Southern Brazil

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1Catholic University of Parana, Brazil; 2Centers for Disease Control and Prevention, Atlanta GA

Once thought of as a problem of affluent countries only, obesity is now becoming an epidemic in developing countries. The purpose of this study was to evaluate a school based health promotion programme for children and adolescents. The participants were 731 students from 7 to 18 years old, enrolled in two public schools from São José dos Pinhais, Brazil. Previous data revealed that 10.4% and 6.3% of these students were overweight and underweight, respectively. Girls were at greater risk of overweight (13.3%) and boys more likely to be overweight (7.1%). Due to these findings, a school based health promotion programme, focused on hygiene and healthy eating habits was implemented. The intervention employed strategies linked with play and cultural and economic realities. Among the creative educational strategies, theatre play was the most effective for improving knowledge for every age group after 3 months. On the other hand, students showed no interest in participating in class room intervention activities, like games or printed activities. It was possible to identify improvements in knowledge concerning the pyramidal food groups, avoidable types of food (high fat and energy content) and personal hygiene habits. However, no changes in food habits or nutritional status were observed in the first year of the study. More research is needed in order to understand the dynamics of life among these children and adolescents so that it will be possible to employ more effective strategies to promote better health and quality of life for them.

PO0648

Bridging the gap from clinic to elementary school: design of ‘kids know…’, a prevention program for paediatric overweight

Beno L1, Steffen C2, Kozak M2, Lappa D2, McBryar N2 and Mittelman B2

1Kaiser Permanente, Atlanta, Georgia, USA; Emory University, Atlanta, GA; 2Kennesaw State University, Kennesaw, Georgia, USA

Paediatric overweight is a significant problem in the USA, especially in the southern states. 42% of 10 year-olds in Georgia have BMI ≥ 85% (1). Few prevention or treatment programs in the USA adequately address the nutritional, physical, and emotional determinants of childhood obesity. Furthermore, integration of clinical programs into the school systems has had limited success (2). We propose a novel solution to circumvent the difficulties for this transition, building on an existing partnership between Kaiser Permanente (KP), an integrated health care medical group practice, and the Department of Elementary and Early Childhood Education at Kennesaw State University (KSU). KP has developed an effective weight management program for overweight and at-risk preteen and adolescents entitled Operation Zero. This program has been found to be ineffective for younger children. With the assistance of clinical and education faculty, and funded by a grant from Kaiser Permanente, undergraduate elementary education majors developed a primary prevention program for children aged 5–7. Preliminary results and focus group data will be presented, along with data concerning the lifestyle and body compositional changes of the undergraduate education students, resulting from participation in the design and implementation process. Learnings about the collaboration process between education and clinical practice, as well as design principles for paediatric overweight prevention programs will be discussed.
References:

PO0649
Prevalence of overweight and obesity among school children in Tehran, 2005
Amini M, Dadkhah M, Abdollahi M, Houshiar-Rad A, Eslam-Amirabadi M and Zowghi T
1National Nutrition & Food Technology Research Institute
Overweight and obesity are among the most prevalent nutritional problems in developed and developing countries. This study aimed to determine prevalence of overweight and obesity in school children of Tehran. A sample of 976 school students (495 girls and 481 boys), aged 5–12 years was randomly selected using a multistage cluster sampling method, from all 19 educational districts in Tehran. Weight, height and data of time spent on watching television and working with computer in minutes were also collected. Overweight and obesity were evaluated using body mass index [BMI] centiles for age and sex. Obesity was defined as BMI ≥ 95th percentile and overweight was ≥85 to <95 h percentile of the sex-specific BMI-for-age growth charts of CDC, 2000. The rates of overweight and obesity in the studied girls were 11.4%, 14.5% and for boys were 13.7 and 14.4%, respectively. Ages of overweight among 6, 7, 8, 9, 10 and 11 years old children were 12%, 9%, 10%, 19%, 16.5, 15% and rates of obesity among mentioned age group were 13%, 14%, 17%, 15.5%, 15.5%, and 13%, respectively. Time spent on TV watching was significantly higher in overweight and obese group (P < 0.04), however this difference for different age groups was not significant. Time spent in front of computer was not different in normal and overweight/obese groups.

PO0650
Healthy school canteens: from guidelines to a mandatory approach. What are the lessons learned?
Vita P1, Matthews R1, Newson R1, Andrews R2 and Stacey N2
1NSW Department Of Health, Sydney, Australia; 2NSW Department of Education and Training, Sydney, Australia

The school canteen has the potential to impact on the food choices at school, at home and in the broader community and sends a strong message about the value and importance of healthy food. In 2004, in response to the rapidly rising rates of overweight and obesity in children the New South Wales (NSW) Government endorsed a move beyond nutrition guidelines to a policy approach that mandated the type (and frequency) of foods and drinks that can be sold in government school canteens. The NSW Fresh Tastes Healthy School Canteen Strategy, was the first of its kind in Australia, limiting the sale of unhealthy foods and drinks based on minimal nutrition standards. Food and drinks are categorized as RED (‘occasional’ limit sale to no more than twice a term). AMBER (select carefully), and GREEN (fill the menu). A process and short-term impact evaluation was conducted by randomly surveying 519 school principals and canteen managers. The reach, utilisation, quality, knowledge, confidence and satisfaction with the three main strategy resources (Canteen menu planning guide and Fresh Tastes Tool Kit and newsletters) was very high. The key finding was that nearly all 98% of the canteen managers reported that they had made all or some of the changes to meet the requirements of the strategy. 82% had limited the sale of RED products to no more than two occasions per term. In addition, more than half (55%) said that they had not encountered any problems doing so. The key lessons learned will be discussed.

PO0651
An innovative evaluation design for systematically examining interactions between process measures and program effects in a school-community based obesity prevention intervention study
Garrard J1, Holland D1, Waters E1, Gibbs L1 and Green J2
1School of Health and Social Development, Deakin University, Melbourne, Australia; 2Murdoch Children’s Research Institute, Royal Children’s Hospital, Parkville and Department of Paediatrics and Melbourne Education Research Institute, Melbourne University

Background: The fun ‘n healthy in Moreland! is a school-community obesity prevention intervention study in the City of Moreland, Australia. Twenty-three primary schools are participating in this five-year cluster randomised controlled trial. Evaluations of community intervention trials often yield highly variable impacts among participating communities. Traditionally process evaluation has been used to help understand this variability; however few evaluations have attempted to quantify key implementation factors and systematically examine their influence on program impacts.

Aim: This paper describes an innovative evaluation design aimed at examining interactions between process measures and program effects in the fun ‘n healthy in Moreland! project.

Method: Process evaluation data collection commenced at baseline (2005) and will continue at regular intervals during the 2-year implementation period. Data collection methods include group discussions with school staff and students, surveys of school staff, monthly feedback from community intervention workers, and document analysis of school newsletters, policies and programs. Demographic data will also be collected. These data will be used to assess key characteristics of school context, population, and program delivery that have been identified in the literature as impacting on the effectiveness of school-community health promotion interventions. Impacts will be measured after a two-year program implementation period. Stratified data analysis or regression techniques will be used to quantify interactions between process measures and program effects.

Conclusion: A more systematic understanding of how process measures impact on program effects in complex health interventions will improve the quality and usefulness of the evidence base for these interventions.

PO0652
Walking to school: promoting a school-based initiative for increasing physical activity
Langenfeld ME
Southeast Missouri State University, Cape Girardeau, Missouri, USA

Background: As levels of childhood physical activity have plummeted to astonishingly low levels and childhood obesity has drastically increased in numerous countries, innovative approaches are needed to address these grave concerns.

Method: When Alma Schrader Elementary School in Cape Girardeau participated in International Walk to School Day on October 5, 2005, it shared commitment to promoting Walk to School with other sites in 37 countries. Worldwide over 3 million children, parents, and community leaders participated. International Walk to School Day and Week are promoted through efforts by the International Walk to School Steering Group (www.iwalktoschool.org). These school-based initiatives advocate that walking is a valuable physical
activity that can replace sedentary time spent as a passenger being driven to school. Walk to School also advocates for built environments that encourage rather than discourage walking to school.

**Results and conclusion:** Our local event involved over one-fourth of the school’s children as well as numerous parents, teachers, and community members. Participation by the City Manager as a walker, along with favourable media attention, set into motion a city project to construct sidewalks along the school grounds. The resulting infrastructure enhancement will increase the safety and appeal of walking to school for years to come. International Walk to School, an alliance involving local and national partners in both governmental and non-governmental roles, proves to be a valuable support and advocacy resource. On a worldwide basis, schools can engage locally while teaming globally with a shared concern to combat the trend of decreased physical activity.

**PO0653**

**Making smart choices – healthy food and drink supply strategy for Queensland schools**

Dick M1, Ward K2, Lee AM1 and Dawson J2

1Queensland Health, Brisbane, Australia; 2Education Queensland, Brisbane, Australia

**Background:** A Queensland cross-government action plan released in 2005 outlined over 100 initiatives to address overweight and obesity in children. Two government departments, Queensland Health and Education Queensland, agreed on a range of actions to be implemented in the school setting, including a strategy for school food and drink supply. Education Queensland delivers high-quality education to more than 70% of all Queensland school students at preschool, primary and secondary levels. The department is responsible for almost 1300 schools attended by more than 490 000 students.

**Method:** Sixteen different government and non-government organisations were engaged in development of the strategy. The draft, based on the NSW Healthy School Canteen Strategy, was presented to the Queensland government for endorsement.

**Results:** In July 2005, the Queensland Government announced that the implementation of a food and drink supply strategy would be mandatory in all government schools. The implementation process was also outlined in the announcement.

The **Smart Choices – Healthy Food and Drink Supply Strategy for Queensland Schools** applies to all areas of the school environment including canteens, vending machines, fundraising, camps, excursions, classroom rewards, curriculum activities and school events such as sports carnivals.

**Conclusions:** The strength of Smart Choices is its application across the whole school environment where all opportunities for food and drink supply support the nutrition messages in the curriculum. A strong partnership approach between Queensland Health and Education Queensland has been vital to development and implementation of the strategy.

**PO0654**

**Building a healthy active Australia – healthy school communities initiative**

Manu N

The **Healthy School Communities initiative** is a part of the Australian Government’s ‘Building a Healthy, Active Australia Package’. This is a $15 million grant program to help schools, families and children to put into practice messages about healthy eating. The program aims to promote healthy eating and help establish positive behavioural change early in life, as we know that good nutrition and healthy eating throughout childhood and adolescence is vital for good learning, development and long-term health. The initiative invites non-government organisations such as the Parents and Citizens/Friends Associations, school auxiliaries, canteen groups, approved outside school hours care providers and other groups linked with school communities to apply for a grant of up to $1500 (GST exclusive) to fund activities that promote healthy eating within the school environment. This presentation will discuss the initiative and some innovative programs undertaken by primary and secondary schools to incorporate healthy eating in schools as well as identifying some of the barriers to early uptake of the grants. It will also outline the **Healthy and Active School Communities Resource Kit**, provided to every school in Australia, which profiles good examples/practice in school policies and programs. This kit outlines what other schools have done, what worked and what helped make the project a success.