

Track 5: Populations and population health

Session 29: Epidemiology

T5:S29:01

The implications of differential trends in weight and waist circumference on population level obesity monitoring

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We aimed to quantify discordance in changes to waist circumference (WC) and weight between 1989 and 2012, and implications for trends in obesity classification for urban Australian adults.

Using three nationally representative surveys from 1989, 2000 and 2012, we selected urban Australian adults aged 25 to 69 years with measured height, weight and WC. Linear regression was used to quantify increases in WC over time adjusted for weight, age and smoking status, and stratified by sex. We additionally quantified age-standardised trends in obesity prevalence classified by WC and/or body mass index (BMI) for each survey, and compared the proportion of individuals captured as obese according to BMI and WC, BMI but not WC, and WC but not BMI.

Between 1989 and 2012, WC increased significantly more than would be expected from increases in weight, by 6.7cm (95% CI 6.2, 7.2) and 2.8cm (1.5, 4.1) for women (W) and men (M), respectively.

While the proportion of women and men identified as obese between 1989 and 2012 according to BMI but not WC did not substantially change (2% to 1% (W) and 3% to 3% (M)), we observed increases in the proportion identified as obese according to BMI and WC (12% to 24% (W) and 9% to 24% (M)), and the proportion identified as obese according to WC but not BMI (4% to 19% (W) and 5% to 11% (M)).

The nature of obesity may be changing for urban Australian adults, and as a result WC may be a more comprehensive indicator of obesity for both Australia and internationally.

T5:S29:02

Daytime napping and the risk of metabolic diseases: Dose-response meta-analysis

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Background: Sleep is an important component of a healthy life. The habit of napping is also widely prevalent around the world.

Aims: We performed a meta-analysis to investigate the association between napping and the risk of metabolic diseases, and to quantify the potential dose-response relation.

Key Methods: We searched electronic databases for articles published up to 2015. The adjusted relative risk and 95% confidence interval were calculated with the random effect model. Dose-response relations were also evaluated.

Results and Conclusions: 307,237 Asian and Western subjects stratified into 21 reports were selected. In each study, analyses were well adjusted for several confounders.

Pooled analysis revealed that a longer nap (≥ 60 min/day) significantly increased the risk of type 2 diabetes compared with no nap of relative risk 1.45 (1.25-1.69, $p=0.03$). In contrast, a shorter nap (< 60 min/day) did not ($p=0.07$).

A dose-response meta-analysis showed a J-shaped relation between nap time and the risk of diabetes or metabolic syndrome, with no effect of napping up to about 40 minutes/day followed by a sharp increase in the risk at longer times. In contrast, nap time was not associated with an increased risk of obesity (1.13 (0.92-1.39, $p=0.25$) for a longer nap; 0.95 (0.88-1.02, $p=0.15$) for a shorter nap).

In summary, longer nap was associated with metabolic diseases. Further studies are needed to confirm the efficacy of short nap.

Conflict of Interest and Funding Disclosure: None

T5:S29:03

Association between meal planning and weight status in a large sample of french adults

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Meal planning has been suggested to improve dietary quality and could be thus a lever to decrease the prevalence of obesity. However to date few studies have evaluated the association between such practice and health status, and in particular weight status. The aim of our cross-sectional study was to investigate the association between meal planning and dietary quality as well as weight status. Meal planning practices were assessed in 51,195 participants of the web-based observational NutriNet-Santé study. Data were weighted according to the national French census. Dietary quality was assessed by using scores estimating food variety and adherence to French nutritional guidelines (mPNNs-GS) respectively. Weight and height were self-reported. Multinomial logistic regression models were used to evaluate the associations between meal planning and quartiles of dietary quality scores as well as with overweight (excluding obesity) and obesity.

A total of 52.5% of the participants declared to plan meals. Meal planning was positively associated with food variety (OR quartile 4 vs. 1=1.27, 95%CI: 1.20-1.34) and adherence to nutritional guidelines (1.14 (1.08-1.21)). In women, meal planning was negatively associated with overweight (OR: 0.94 (0.89-0.99)) and obesity (0.78 (0.72-0.84)). In men, the association was significant for obesity only (0.84 (0.73-0.96)).

Meal planning was associated with a healthier diet and a lower weight status, suggesting the potential benefits of such practices.

T5:S29:04

Breastfeeding duration, maternal BMI and birthweight are associated with differences in BMI growth trajectories in early childhood

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Background: Accelerated postnatal growth is an important predictor for obesity risk. It is unknown how growth trajectories of BMI z-scores (zBMI) differ across obesity risk factors in young children.

Aims: We therefore examined how growth trajectories differed by breastfeeding duration, maternal BMI and birthweight in young children.

Methods: Children (n=5983; 52% male) <7 years of age at baseline (\bar{x} age=15.4 months) in the *TARGET Kids!* cohort study had repeated measures of weight and length/height from birth to 10 years of age. zBMI was calculated using the WHO growth standards. Linear spline multilevel models with knot points at 1, 3, 18, 36, and 72 months of age were used to model changes in zBMI growth rates between each time period.

Results: Children breastfed <6 months (compared to ≥ 6 months) had a higher growth rate between 1-3 and 3-18 months, resulting in a higher zBMI at 18 (0.24 units) and 72 months (0.16 units). Children whose mothers had BMI ≥ 30 (versus <30) had a higher growth rate between 1-3 and 36-72 months resulting in higher zBMI at 3 (0.23 units), 18 (0.15 units), 36 (0.19 units), and 72 months (0.44 units). Children who weighed <2.5kg (versus ≥ 2.5 kg) at birth had higher growth rates between 1-3 and 3-18 months, but had a lower zBMI at all time points.

Conclusions: Differences in zBMI growth rates by breastfeeding duration, maternal BMI and birthweight are seen in early infancy and contribute to clinically relevant differences in zBMI in early childhood.

T5:S29:05

30-year obesity trends; evidence of stability and socioeconomic disparities in Australian children, 1985 to 2015

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The prevalence of children with obesity appears to be plateauing yet obesity is unevenly distributed across Australian communities.

Present 30-year trends in the prevalence of obesity and waist-to-height ratio (WtHr) in Australian children by sex, school-level and socioeconomic background (SES).

Population surveys of Australian children age 5-16 years (1985-1997-2004-2010-2015 n=26,919) with measured anthropometry. Obesity and WtHr ≥ 5 prevalences were calculated. SES was based on residential postcode.

From 1997 to 2015 there was no apparent change in obesity prevalence overall (p=.46). However, obesity prevalence differed significantly within surveys for older boys in low (p <.0001) and middle (p=.008) SES areas and older girls from low SES areas

(p=.034). From 1997 the prevalence of obesity was significantly lower among high SES children. In young and older boys' the difference was significant in 2010 and 2015 and in young and older girls in 2004 and 2015. From 1985 to 2015 WtHr ≥ 5 significantly increased (<.0001) with lower prevalences in high SES children and in older boys from 2004 and older girls in 1997-2010-2015.

Obesity has plateaued in Australian children since 1997 yet significant SES disparities have been apparent in girls, and in boys, SES differences emerge in 2004. WtHr ≥ 5 has significantly increased since 1985. The unequal distribution of child obesity shows current interventions need to address obesogenic factors in socially disadvantaged communities in Australia.

T5:S29:06

Women newly diagnosed with breast cancer Had superior abdominal fat and insulin resistance

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Overweight are widely recognized as a risk factor the development of diabetes type 2 and breast cancer. Furthermore, convincing evidence indicates that diabetes is associated with increased risk for several cancers. The aim of this study was to investigate the differences between body composition and insulin resistance among women newly diagnosed with breast cancer and controls. This case-control study was conducted with 245 women (78 cases and 167 controls) attended in Clinical Hospital of Federal University of Goias. Body composition was assessed by dual energy x-ray absorptiometry. Fasting insulin, glucose, and lipid profile were analyzed after blood collection. Visceral Adiposity Index (VAI), Waist-to-Height Ratio (WHtR) and Conicity Index (CI) were calculated to discriminate excess of visceral fat. Resistance insulin was analyzed by the Homeostasis Model Assessment of insulin resistance (HOMA-IR). The sample was paired according to age and BMI. Mean age and BMI were 53.09 \pm 11.11 and 27.42 \pm 4.75, respectively. Lean body mass, fat mass, and VAI did not differ between groups. Cases showed higher waist circumference (3.5%, p=0.04), android to gynoid fat mass ratio (4%, p=0.02), WHtR (5.4%, p=0.03), CI (2.7%, p<0.01) and HOMA-IR (29%, p<0.001) when compared to controls. Women newly diagnosed with breast cancer were characterized with higher abdominal fat and insulin resistance, which may express a continuous cardiovascular risk and its relation to breast cancer development.

T5:S29:07

The association between resting metabolic rate and weight loss

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It is unclear whether a low resting metabolic rate (RMR) may impair weight loss (WL) success. A sample of 964 adults from Wharton Diabetes and Weight Management Clinics were examined. RMR was measured by indirect calorimetry and predicted using the Mifflin St. Jeor equation. Sex stratified analysis was undertaken. The independent associations between baseline RMR and Δ RMR with WL were examined in models controlling

for the confounding effects of age, BMI, ethnicity, treatment time, hypertension, type 2 diabetes and smoke status. Over 13.6 months (3-64 months), men lost 5.9 ± 9.4 kg and women lost 5.6 ± 8.4 kg ($P < 0.05$). There was a significant difference in predicted and measured Δ RMR for both sexes ($P = 0.01$) that varied greatly, ranging from -1277 kcal to 1418 kcal. There was no association between WL and baseline RMR or Δ RMR in men ($P > 0.05$). Similarly, there was no association between baseline RMR and WL ($P > 0.05$) in women but WL was associated with greater decreases in RMR ($P = 0.03$). This suggests that when participants are given a similar caloric deficit, they will be able to lose similar amounts of weight regardless of their RMR. The large inter-individual variation in baseline and Δ RMR may suggest there are other factors associated with RMR and the Δ RMR that occurs with WL. Further, due to discrepancies between predicted and measured Δ RMR, it may be necessary to measure RMR to aid in determining accurate caloric prescriptions.

T5:S29:08

The prevalence of obesity documentation in primary care, are we acknowledging the problem?

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Background: Although obesity is growing problem, it is often unaddressed by primary care physicians. We evaluated whether the inclusion of body mass index (BMI) in the electronic medical records (EMR) increased the frequency at which obesity was included in the patients' problem lists. Additionally, our study evaluated the impact of obesity on comorbid conditions and overall resource utilization

Method: Medical records for adult patients visiting outpatient clinic between years June 2012 and June 2015 were evaluated.

Result: 3,868 patients were included in the study. 2,003 (52%) patients met CDC standards for obesity. Although the presence of obesity was not related to the diagnoses of depression and COPD, obesity presence was associated with increased prevalence of hypertension, diabetes, and heart disease. Moreover, increased obesity severity was associated with exponential increases in service utilization for hypertension, diabetes and heart disease. Only 115 (3%) patient records included obesity in the patient problem list. Problem list inclusion did not increase the frequency of dietary counseling, as roughly one third of obese patient receive dietary counseling. Inclusion was, however, associated with nearly doubled rates of exercise counseling.

Conclusion: Obesity is generally not recognized as a primary presenting problem. As a result, counselling is provided infrequently, service utilization for obesity related problem increases, and BMI remains relatively unchanged.

T5:S29:09

The impact of maternal metabolic phenotype on maternal and perinatal outcomes

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Maternal obesity associates with pregnancy complications but the impact of maternal metabolic health is unknown. We aimed to determine whether metabolic phenotype, with or without obesity, associates with adverse pregnancy outcomes (gestational diabetes, GDM; small for gestational age, SGA; intrauterine growth restriction, IUGR) in the large multi-centre SCOPE Study ($n = 5488$). Metabolic phenotype was determined according to modified criteria used for metabolic syndrome (≤ 4 abnormalities vs $5-8$ abnormalities including glucose, mean arterial pressure, lipids and CRP at 15 weeks gestation), and additionally categorized for obesity (BMI ≥ 30 kg/m² vs < 30 kg/m²). Multivariable models were used to assess the relationships between pregnancy outcomes and metabolic phenotype. Compared to metabolically healthy and lean, being metabolically unhealthy and obese increased risk for SGA and IUGR by 59% and 87%, respectively. In a separate model, compared to women who were metabolically healthy, being metabolically unhealthy irrespective of BMI, women had an increased risk for GDM (OR 2.67; 95% CI: 1.58, 4.51), while maternal BMI increased risk weakly (OR 1.07; 95% CI: 1.03, 1.11). The combination of poor metabolic health and obesity increased risk for aberrant fetal growth, while poor metabolic health, independent of obesity, significantly increased risk for GDM. We recommend targeted interventions to optimise maternal metabolic health and BMI to promote successful pregnancy outcomes.

T5:S29:10

Changing socioeconomic gradient in obesity in the adult population in mid-Sweden from 2000 to 2012

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Background: Obesity trends within different socioeconomic groups have shown mixed results, both in Sweden and other European countries.

Aims: To investigate trends in the prevalence of obesity by level of education in the general population in Mid-Sweden from year 2000 to 2012.

Key methods: A postal questionnaire was sent to a random population sample aged 25-74 years in years 2000, 2004, 2008 and 2012. The overall response rates were 67%, 65%, 60% and 53%, respectively, and the study included 29017, 27385, 25910 and 24152 respondents, respectively. Obesity (BMI ≥ 30 kg/m²) was based on self-reported weight and height.

Results: The age-standardised prevalence of obesity increased from 13% to 17% in women and from 12% to 17% in men between 2000 and 2012. In 2000, there were distinct differences in obesity prevalence between the three levels of education. However, the socioeconomic gradient in obesity changed during the study period since the absolute increase in obesity was largest

(8 percentages) at the middle educational level. In 2012, the prevalence of obesity was about 20% at both the low and middle educational levels, compared to 11-13% in the high education group.

Conclusion: The results emphasize that obesity is not only a health problem among those with low education, but also a major health concern among those with mid-level education, who represent about half of the total adult population.

T5:S29:11

Addictive-like eating behavior in the German population: A cross-sectional study using the YFAS 2.0 in a representative sample

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Some aspects of excessive eating behavior resemble addiction as classified by Diagnostic and Statistical Manual of Mental Disorders (DSM-5). This led to the hypothesis that there may exist a disease called 'food' or 'eating addiction'. The Yale Food Addiction Scale (YFAS) 2.0 measures addictive-like eating behavior based on the DSM-5 criteria for substance-related and addictive disorders.

In the present study the German version of YFAS 2.0 was used to investigate for the first time the prevalence of 'food addiction' (FA) in a population sample, representative for the age group 18 – 65 years. A total of 1034 Germans filled in a self-administered online questionnaire.

Applying the updated version within our sample 7.9 % received the diagnosis of FA (mild + moderate + severe FA). The number of endorsed symptoms was positively correlated with BMI ($r_s = .11$, $p < .001$) and negatively correlated with age ($r_s = -.22$ $p < .001$). A high prevalence of severe FA (6 or more symptoms and clinical significance) occurred among underweight (15 %) and obese (15 %) compared to normal weight participants (4 %). A significant association was found between BMI and FA ($X^2(3) = 34.61$, $p < .001$). The odds of receiving FA diagnosis was 3 times higher for underweight and 3.5 times higher for obese than normal weight participants.

The recent construct of FA is not able to fully explain the high prevalence rates of obesity. In addition, the association of FA with underweight requires further research.

T5:S29:12

Blood mercury concentration is closely related with central obesity in healthy Korean general populations irrespective of socio-demographic variables, nutritional intake, hematocrit, and cardio-metabolic risk factors

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Animal studies show obesity is associated with higher blood and tissue mercury concentration; however human data are lacking. Even though the explainable mechanism is not certain, obesity may alter the metabolism and distribution of mercury.

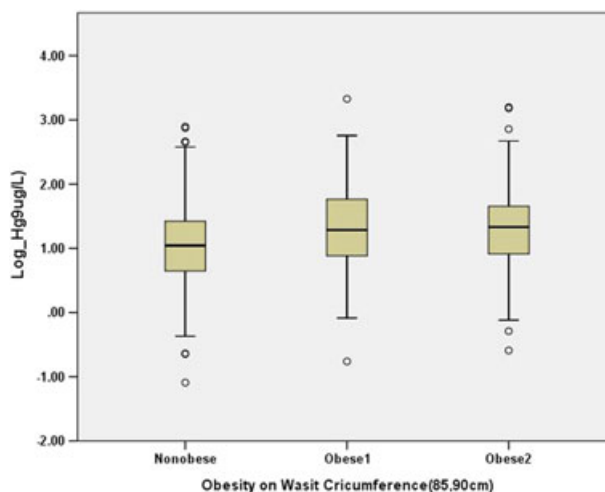
The aim of the study is to determine whether obesity is associated with blood mercury concentration.

Among 8018 Koreans who participated in KHANES (Korean National Health and Nutritional Examination Survey) 2013, 1342 healthy Koreans (39.06 year, women (49.1%), 23.29 kg/m²) without diabetes or hypertension were included. Data of

biochemical measurements including blood mercury levels, nutrients intakes, alcohol consumption, smoking, BP and anthropometric measurements were acquired. Blood pressures were measured three times at 5 minutes interval.

SPSS for window version 18 was performed; Pearson's coefficient analysis was used to assess the relationship between the blood mercury concentration and obesity such as BMI and waist circumference adjusting for age, sex, smoking, alcohol consumption, geographical location, income, cardio-metabolic variables, AST, ALT, hematocrit counts, and nutritional intake.

In conclusion, blood mercury concentrations are significantly related with body mass index and waist circumference irrespective of nutrition intake, socio-demographic, cardio-metabolic variables. Further controlled lager cohort trials should be regarded.



Blood Hg Level (ug/L)	>= 3.71 (N=484)	< 3.71 (N=858)	p
Age (years)	42.97 +/- 12.54	36.86 +/- 12.77	.000
Monthly House Income (X10,000Won)	423.24 +/- 284.09	375.20 +/- 327.95	.007
Systolic Pressure(mmHg)	115.37 +/- 14.39	110.50 +/- 13.06	.000
Diastolic Pressure(mmHg)	76.02 +/- 10.02	72.82 +/- 9.21	.000
Waist Circumference(cm)	81.24 +/- 9.76	77.02 +/- 9.39	.000
BMI(kg/m ²)	23.99 +/- 3.38	22.90 +/- 3.42	.000
Fasting Plasma Glucose (mg/dL)	95.80 +/- 14.39	92.23 +/- 12.61	.000
Hb A1 C(%)	5.69 +/- .46	5.59 +/- .45	.000
Total Cholesterol(mg/dL)	189.95 +/- 33.70	180.95 +/- 32.83	.000
HDL-Cholesterol(mg/dL)	51.96 +/- 11.77	54.17 +/- 11.67	.001
Triglyceride(mg/dL)	141.65 +/-119.67	117.28+/- 95.10	.000
LDL-Cholesterol(mg/dL)	112.95+/- 32.85	119.38+/- 34.53	.193
AST(mg/dL)	22.30 +/- 11.08	19.60 +/- 10.04	.000
ALT(mg/dL)	24.16 +/- 28.15	18.81 +/- 14.27	.000
Hematocrit (g/dL)	43.46 +/- 3.89	41.51 +/- 4.19	.000

Mean +/- Standard Deviation

T5:S29:13

The effect of physical activity on the risk of total joint replacement for severe knee or hip osteoarthritis: A population-based prospective cohort studyAitken, D.*¹; Cicuttini, F.M.² and Jones, G.¹¹*Menzies Institute for Medical Research, University of Tasmania;* ²*Department of Epidemiology and Preventive Medicine, Monash University***Background:** Studies examining physical activity and joint health are conflicting – with some showing a detrimental effect and others showing either no effect or a beneficial effect.**Aim:** To explore the association between physical activity and knee or hip osteoarthritis leading to knee or hip joint replacement surgery.**Key Methods:** 536 community-dwelling adults aged 51-79 years were assessed at baseline, 2, 5 and 10 years. Physical activity was measured by pedometer (steps/day). The incidence of knee or hip replacement surgery was reported at each follow-up. Log-binomial regression was used to examine the association between steps/day with incident knee and hip replacement adjusted for age, sex, BMI, x-ray disease severity, and pain.**Results:** Over 10 years, 36 participants reported having a knee replacement and 27 reported having a hip replacement. For every 1000 steps/day increase at baseline, there was a 0.84 times (95% CI 0.72 to 0.99) lower risk of hip replacement (P=0.036). There was no significant association between steps/day and knee replacement. Baseline BMI significantly predicted knee replacement (RR per SD increase in BMI 1.4 (95% CI 1.03 to 2.0, P=0.032)) but not hip replacement.**Conclusions:** Higher physical activity levels were protective against hip replacement while being overweight or obese increased the risk for knee replacement. This suggests different causal pathways for each site with regard to habitual activity and body composition.

T5:S29:14

Health literacy and obesity in Albanian adultsShkurti Enkelejda, D.r.*¹; Shtiza Diamant, D.r.²; Pistulli Edmond, D.r.¹ and Maksim Basho, D.r.²¹*Univerisity of Medicine;* ²*University Hospital Centre Mother Theresa***Background:** Our objective was to illustrate associations among demographic features, body mass index (BMI), and health literacy between adults in Albania.**Methods:** We interviewed 382 adults in this cross-sectional study. We applied a health literacy device (NVS) that appraised heights and weights; and demographic issues.**Results:** Regarding participants' NVS scores, 40.5% had no less than an opportunity of small health literacy. Lesser NVS scores were related to augmented BMI ($r = -0.03$, $p = .018$ and augmented age ($r = -0.26$, $p < .001$). Elevated NVS scores were correlated with upper earnings ($r = 0.19$, $p = .001$) and higher education ($r = 0.23$, $p < .001$). Females scored considerably better than males ($t = -1.7$, $p = .05$).**Conclusions:** Trails to health literacy are multifaceted; nevertheless, age, earnings, education, and BMI elucidated a humble 19.95% of the joint variance in NVS results. Public health nurses operating to advance health literacy could comprise review of significant information on nourishment facts labels, commonly used computations, and appliance of this information when making food selections.

T5:S29:15

Factors affecting malnutrition and overweight of maternal and child covered by national program for improving nutritional status of children in IranGhodsi, D.*¹; Omidvar, N.¹; Eini-Zinab, H.¹; Raghfar, H.² and Rashidian, A.³¹*Community Nutrition Department, Faculty of Nutrition Sciences and Food Technology, Shahid Behshti University of Medical Sciences;* ²*Department of Economics, Alzahra University, Tehran, Iran;* ³*Department of Health Management and Economics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*

Maternal and child malnutrition in low-income families encompasses both undernutrition and a growing problem with overweight and obesity. Another phenomenon found in transitional countries, is coexistence of child undernutrition and maternal overweight within the same household.

This study aimed to assess the prevalence of malnutrition in under-six-year-old children covered by the national nutritional program and the prevalence of overweight/obesity of their mothers and factors affecting that in two provinces (Semnan and Qazvin) of Iran.

This cross-sectional study was conducted on 362 children aged 6 to 72 month and their mothers. Children were selected through the national nutritional support program. Anthropometric measurements were taken from mother-child pairs. Anthropometric measures of children were used to compute wasting, underweight, stunting and overweight. Data on socio-demographic characteristics of household were collected via questionnaire and food security of household was calculated by HFIAS questionnaire.

The mean prevalence of stunting, wasting, underweight and overweight in children was 16.1%, 21.9%, 21.8% and 0.3% respectively. 54.3% of mothers were overweight/obese (BMI \geq 25). Underweight and wasting were significantly high in girls and stunting prevalence was marginally high in rural compared to urban areas. Pearson's chi-square statistical test showed no association between mother's BMI and children's stunting and wasting status. There was marginal significant relationship between mother's BMI and children's underweight (P<0.06). 51.1% of households were in low SES situation. 43.5% of families were severe food insecure respectively. Most of overweight/obese mothers belong to low SES and severe food insecure households.

These findings suggest the need for further analyses concerning the potential factors which influence nutritional status in this population.

The authors declare no conflict of interest in regard to this abstract.

T5:S29:16

Association of major dietary patterns with anthropometric indices based on gender and ethnicity in Iran

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This study aims to determine the association of major dietary patterns with anthropometric indices in men and women from two Azeri and Kurd ethnicity living in Urmia, West Azerbaijan, Iran. In this cross-sectional study, 723 participants (427 women and 296 men) aged 20–64 years, from two ethnic groups (445 Azeri and 278 Kurd) were selected through a multi-stage cluster systematic sampling. Dietary information was collected by a valid semi-quantitative F.F.Q. Weight, height and waist circumference were measured. Dietary patterns (DPs) were determined using principal component analysis. Data was analyzed by linear regression analysis. Obesity was considerably higher in Azeris (33.7% vs. 25.9%). Three major DPs were extracted including "Traditional High SES (THS)" (high in fruit and vegetables, dairy products, olives, nuts, herbal infusions, traditional Pancake, dolma, thick soup and pickles); "Transitional" (high in fast foods, red and visceral meat, kebab, salty snacks, sauces, sweetened drinks, sweets, poultry, fish, seeds and coffee); and "Traditional Low SES (TLS)" (high in tea, refined grains, potatoes, whole grains, vegetable & hydrogenated oils and animal fat, traditional stew, salt, eggs and legumes). THS was highly consumed in Azeris; in contrast, TLS was highly consumed in Kurds. There were not any significant differences between two groups in consumption of Transitional DP. After adjusting for confounders (age, socioeconomic status, energy intake and physical activity) the associations between DPs and anthropometric factors were not significant. Findings revealed in both ethnicities, the associations are highly affected by social, environmental and lifestyle determinants.

All authors disclose any conflicts of interest and funding sources.

T5:S29:17

Mind-body practice and body weight status in a general population-based sample

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In industrialized countries characterized by a high prevalence of obesity and chronic stress, mind-body practices such as yoga or meditation may facilitate body weight control. However, virtually no data are available to ascertain whether practicing mind-body techniques is associated with weight status. The purpose of this study is to examine the relationship between the practice of mind-body techniques and weight status in a large sample of the general population.

A total of 61,704 individuals aged ≥ 18 y participating in the NutriNet-Santé study were included in this cross-sectional analysis conducted in 2014. Data on mind-body practices were collected as well as self-reported weight and height. The association between

the practice of mind-body techniques and weight status was assessed using multiple linear and multinomial logistic regression models adjusted for socio-demographic and lifestyle factors.

Regular users of mind-body techniques were less likely to be overweight (OR (95%CI): 0.68 (0.63 to 0.74)) or obese (OR (95%CI): 0.55 (0.50 to 0.61)) than never-users. In addition, regular users had a lower body mass index than never users (estimate (95% CI): -3.19% (-3.71 to -2.68)).

These data provide novel information about an inverse relationship between mind-body practice and weight status. If causal links were demonstrated in further prospective studies, such practice could be fostered in obesity prevention and treatment.

T5:S29:18

Association between impulsivity and weight status in a general population

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Impulsivity is a personality trait which has been inconsistently found to be associated with weight status. In addition, this relationship has rarely been explored in a large general population. We aimed to examine the association between impulsivity and weight status in a large sample of the adult general population in France, and the influence of gender on this relationship.

A total of 11,929 men and 39,114 women aged ≥ 18 years participating in the NutriNet-Santé cohort study were selected in this cross-sectional analysis. The Barratt Impulsiveness Scale (BIS-11) has been used to assess impulsivity. Weight and height were self-reported. The association between impulsivity and weight status was estimated using multinomial logistic regression models adjusted for socio-demographic and lifestyle factors.

Individuals with higher impulsivity levels (BIS-11 total score > 71) were more likely to be overweight (OR = 1.41, 95% CI: 1.16-1.71 in men; OR = 1.13, 95% CI: 1.02-1.26 in women) or obese compared to individuals with normal range of impulsivity. The strongest associations between impulsivity and nutritional status were observed in men, where highly impulsive participants were more likely to be obese of class III (OR = 3.50, 95% CI: 1.83-6.71). These observations support the existence of a relationship between impulsivity and weight status, especially in men and suggest the importance to take into account psychological factors when targeting obese individuals.

T5:S29:19

Association between adherence to the French eating model and weight status in a large sample of French adults

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A number of health benefits are often attributed to the French eating model although evidences supporting these assumptions are scarce in the literature. The aims of this cross-sectional study were

to assess the maintenance of the French eating model in 2014 and to evaluate the association between adherence to this model and weight status.

Eating behavior was assessed in 49,784 participants of the NutriNet-Santé study. Different characteristics of the French eating model were evaluated: number of meals per day, meal time, duration, number of dishes, position, presence of guests and pleasure felt. Associations between adherence to the French eating model and overweight (including obesity) were assessed using multivariate logistic regression models.

A majority of people take 3 meals a day, at set times, sitting at table with other guests and consider meals as a moment of pleasure. Overall, individuals with eating behavior closer to the French eating model were less likely to be overweight (OR: 0.90; 95% CI: [0.87-0.92]). In particular, taking 3 meals a day (0.80 [0.72-0.89]), eating at set times (0.83 [0.74-0.92]), taking the time to eat (0.72 [0.67-0.78]), sitting down during meal (0.74 [0.63-0.86]) and considering meal as a moment of pleasure (0.56 [0.51-0.62]) were negatively associated with overweight.

These results show an association between such eating behavior and weight status suggesting a potential benefit of such practices to reduce the prevalence of overweight.

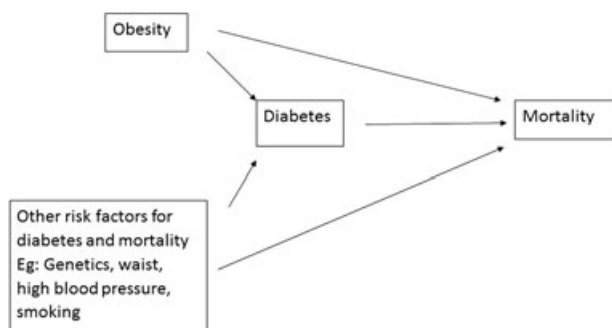
T5:S29:20

Does the obesity paradox exist in those with diabetes? time to move beyond observational evidence

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Many studies describe an obesity paradox in those with diabetes, in which survival is longer in those who are overweight or obese than those with a body mass index in the normal weight range. There are a number of postulated methodological causes of this apparent paradox. Here we systematically analyse those studies describing the existence of the obesity paradox according to each of the potential methodological explanations.

We analysed the eighteen studies identified by Carnethon et al in their systematic review of this topic in 2014. We evaluated each study for the potential effects of (i) smoking status, (ii) reverse causation, and (iii) selection bias. This latter is particularly important as once a study has been conditioned on having diabetes, it is no longer clear what risk factors obesity status is being compared to (see figure; some causes of diabetes may confer greater mortality risk than obesity). We find that it is not possible to exclude the possibility that these methodological issues fully explain the observed relationship between excess body weight and survival in those with diabetes. In contrast, the minimal data from randomised controlled trials of weight loss in those with diabetes shows no evidence of survival disadvantage.



We conclude that there is no benefit to increasing the evidence on the obesity paradox from observational studies as it is not possible to differentiate the findings from potential methodological bias. Instead we encourage mortality follow-up of weight loss trials in those with diabetes.

T5:S29:21

Patterns of body mass index change and its associated lifestyle in evacuees during 3-year after a disaster: Fukushima health management survey

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After the Great East Japan Earthquake in 2011, the obesity prevalence increased in evacuees. We examined their patterns of body mass index (BMI) change after the disaster and its associated lifestyle. Study participants who received health checkups in evacuees in Fukushima, Japan were 21,370 in 2011. We analyzed 4,067 men and 4,704 women aged ≥ 40 years after excluding participants who were BMI ≥ 25.0 kg/m² or < 18.5 kg/m², or did not receive health checkups in 2012-2014. Patterns of BMI change were estimated from group-based trajectory modeling (PROC TRAJ) and classified into four groups: decreasing (men: 7.1%, women: 10.6%); stable (52.8%, 62.5%); stable after slightly increased (36.8%, 24.5%); increasing (3.4%, 2.6%). Associations between these patterns and baseline lifestyle were estimated by multinomial logistic regression analysis. Compared with stable group, odds ratios (95% confidence intervals) in increasing group increased significantly in men (1.94, 1.12-3.35) and women (4.79, 2.88-7.96) who had ≥ 10 kg weight gain from aged 20 years, and women (1.94, 1.09-3.45) who did not walk at a fast pace. Point estimates increased in men (2.33, 0.91-5.97) who skipped breakfast, men (1.61, 0.82-3.35) who did not exercise regularly, and women (1.43, 0.85-2.38) who did not sleep well. In conclusion, BMI has increased significantly (≥ 2.0 kg/m²) after the disaster in the part of the normal weight evacuees and baseline lifestyle associated with the difference of BMI trajectory.

T5:S29:22

Hemoglobin, hematocrit, gamma-glutamyl transferase and aspartate aminotransferase are associated with development of metabolic syndrome in the Japanese general population: A retrospective cohort study

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To investigate predictive values for development of metabolic syndrome (MS) in routine health examinations, we conducted a retrospective cohort study of Japanese who had participated in an annual health checkup from 2008 to 2013. A total of 2790 subjects who had not met the Japanese criteria of MS and pre-MS (PreMS) in 2008 were enrolled in this study. In those population, 1179 subjects were able to follow up until 2013. The baseline characteristics in 2008 according to the development of MS/PreMS (MS and PreMS) in 2013 were compared. In addition, associations between complete blood count, lipids, liver enzymes, renal function and the development of MS/PreMS after 5 years were assessed by logistic regression analysis. Among 1179 subjects, 136 (11.5%) developed MS/PreMS in 2013. In univariate logistic regression analysis, white blood cell count, hemoglobin, hematocrit, liver enzymes and creatinine and uric acid were significantly associated with development of MS/PreMS. However, when the model was adjusted for age, gender, BMI, smoking status, alcohol intake and physical activity, only hemoglobin, hematocrit, gamma-glutamyl transferase (GGT) and aspartate aminotransferase (AST) were associated with development of MS/PreMS. Elevated hemoglobin, hematocrit, GGT and AST were confirmed to be associated with the development of MS/PreMS, suggesting that these parameters should be taken into account when evaluating MS/PreMS among the Japanese population.

T5:S29:23

Prospective associations between liking for fat, sweet or salt and obesity risk in french adults

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Individual sensory liking appears to be an important determinant of dietary intake and may influence weight status. Only two prospective studies conducted in small populations or using an unreliable measure have explored the association between liking and weight status, but the contribution of dietary intake has never been studied.

The aim is to assess the prospective association between sensory liking for fat, sweet or salt and the onset of obesity over 5 years, and the mediating effect of dietary intake.

Data were collected using web-based questionnaires among 24,776 adults participating in the NutriNet-Santé cohort study. Associations between quartiles of liking for fat, sweet or salt and

obesity risk, and the mediating effect of diet were assessed by Cox proportional hazards models stratified by gender, adjusted for sociodemographic and lifestyle factors.

Liking for fat was associated with an increased risk of obesity (HR for quartile 4 vs. quartile 1, men: HR=2.39 (95% CI 1.39,4.11), women: HR=2.02 (1.51,2.71)). Dietary intake explained 32% in men and 52% in women of the overall variation of liking for fat in obesity. Then, liking for sweet was associated with a decreased risk of obesity (M: HR=0.51 (0.31,0.83), W: HR=0.72 (0.54,0.96)) and no association with salt liking was found.

Higher liking for fat appears to be an important risk factor of obesity, explained by dietary intake. Our findings emphasize the need to centrally position sensory liking in obesity prevention.

T5:S29:24

Adjusting established accelerometer thresholds for fitness differences by age, sex, and body weight in comparing objective MVPA with self-report

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Accelerometers are used to objectively measure PA durations. MVPA is determined using universal thresholds that represent absolute and not relative intensity which is more closely related to individual physiological response to PA. Adults who are older or have greater body weight generally have lower fitness levels, thus at an absolute PA intensity they will be working at a higher relative intensity. This may negatively bias accelerometer measured PA for these individuals. Adults (n=829) from 2003-2004 NHANES survey were used. MVPA defined as 40% of maximal VO₂ was converted into counts per minute (CPM) to create new MVPA intensity thresholds by sex, BMI and age groups. PA durations were then assessed using the new intensity thresholds and compared to durations obtained using established thresholds and from self-report PA. New intensity thresholds were significantly different from the established thresholds of 2020 CPM, ranging from 1412-5975 CPM depending on the energy expenditure prediction equation used. Calculated MVPA intensity thresholds were significantly lower for older and higher BMI groups for both sexes. With the use of new MVPA intensity thresholds, over-reporting was still evident among all participants. Further research may be required to determine accelerometer thresholds that are more representative of relative PA intensities to improve the assessment of objective PA.

T5:S29:25

Weight status predicts metabolomic biomarker concentrations among youth, but it depends on age

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Background: In adults, metabolomics has been successfully applied for identification of biomarkers providing early detection of metabolic perturbations related to insulin resistance, diabetes and obesity.

Aim: To investigate the relationship between weight status and metabolomic biomarkers in youth.

Methods: In this cross-sectional analysis, we included 273 children (9-17 years) from seven Cree communities of Eastern James Bay, Canada. Concentrations of metabolomic biomarkers (branched-chain amino acids (BCAAs), aromatic amino acids (AAAs), and

acylcarnitines (AC)) were quantified in plasma and considered as dependant variables. Participants were classified as normal weight, overweight or obese according to the IOTF classification systems. **Results:** Weight status classified 33% participants as lean, 24.9% overweight, and 42.1% obese. Concentrations of BCAA (valine, isoleucine, leucine), AAA (phenylalanine, tyrosine), and AC (carnitine, acetyl-, butyryl-, hexanoyl- and propionyl-carnitine) were statistically significantly higher (all $P < 0.05$) among obese children as compared to lean or overweight. These associations persisted among participants < 15 years, but not among those ≥ 15 years. **Conclusion:** The concentrations of metabolomic biomarkers were higher among obese children. These associations were observed in those < 15 years, but not among 15-17 years, suggesting that changes in metabolism, especially increased anabolism related to growth, might explain this disparity of results.

T5:S29:26

Aminotransferases are major determinants to obesity regardless of cardio-metabolic and socio-demographic factors in non-smoking healthy Korean populations

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Gachon University

Non-alcoholic fatty liver disease (NAFLD) is related with obesity, while obesity is related with cardiovascular morbidities. We would like to know whether liver enzymes relate with obesity in healthy Koreans without DM, hypertension.

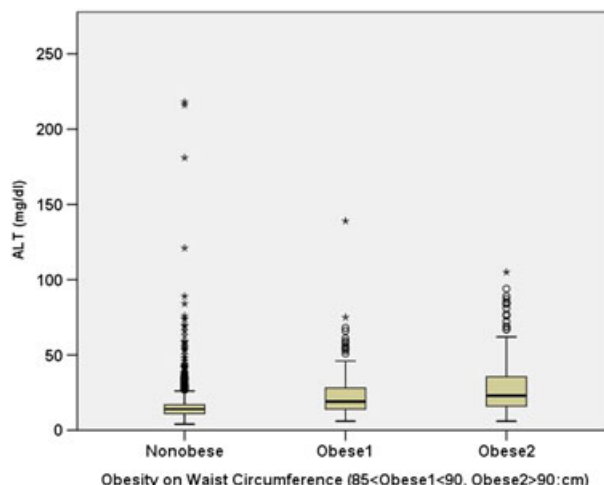
A total of 1764 (83.1% women, 22.95 Kg/m²) healthy population without smoking, known diabetes and hypertension, were included among 8018 subjects of KNANES (Korean National Health and Nutrition Examination Survey) in 2013.

Socio-demographic variables, macro nutrients and micronutrients intake as well as anthropometric variables were evaluated. AST, ALT, cardio-metabolic variables were measured after 8 hours fasting. The blood pressures were expressed the average between second pressures and third ones.

Spearman's coefficient analysis was performed through SPSS window 18, and probabilities less than 0.05 were considered as significant at both sided.

AST, ALT levels were very significantly related with BMI, waist circumference after controlled age, sex, socio-demographic variables, cardio-metabolic factors.

In conclusion, aminotransferases are major determinants to obesity regardless of cardio-metabolic risks and socio-demographic confounders in non-smoking Korean populations without diabetes, hypertension. Further controlled long-term cohort trials would be needed in the future.



	ALT ≥ 40 (N=41)	ALT < 40 (N=1723)	P
Age (years)	41.93 +/- 13.26	41.96 +/- 12.72	0.986
Waist Circumference (cm)	87.45 +/- 13.40	76.03 +/- 8.74	0.000
BMI (kg/m ²)	27.06 +/- 5.27	22.85 +/- 3.19	0.000
Systolic Pressure (mmHg)	118.80 +/- 14.12	111.19 +/- 14.88	0.001
Diastolic Pressure (mmHg)	79.22 +/- 10.68	72.93 +/- 9.88	0.000
Fasting Plasma Glucose (mg/dl)	103.85 +/- 39.97	92.79 +/- 11.61	0.000
Total Cholesterol (mg/dl)	197.51 +/- 36.57	186.59 +/- 33.52	0.040
HDL-Cholesterol (mg/dl)	51.68 +/- 13.46	55.52 +/- 11.74	0.040
Triglyceride (mg/dl)	142.34 +/- 94.77	104.02 +/- 64.65	0.822

T5:S29:27

Change in body mass index (BMI) among Chinese in a general population: The FAMILY cohort

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Background: Studies on the short-term natural changes in BMI are mostly based on Western populations. Hong Kong, the most Westernized and urbanized city of China, may function as an epidemiological sentinel on obesity for other rapidly developing regions in China and Asia.

Aims: To describe the 2-year natural changes in individual BMI among Chinese aged 15 years and above in the FAMILY Cohort, a population-based cohort in Hong Kong.

Key methods: Under Hong Kong FAMILY Project, a Jockey Club Initiative for a Harmonious Society, the weight and height of 11,797 randomly selected participants were measured in Wave 1 (2009-11) and 2 years later in Wave 2 (2011-14) of the FAMILY Cohort. BMI status was defined based on the WHO's cut-off points for Asian populations.

Results: Mean BMI (SD) increased from 23.57 (3.92) to 23.61 (3.88) ($p < 0.001$) over 2 years. The prevalence of overweight/obese (BMI ≥ 23) increased from 52.2% to 52.5%. The prevalence increased in both men (56.2% to 57.9%) and women (48.9% to 49.4%), in which the increase among men was not significantly larger than that in women ($p = 0.31$). 14.8% of participants who were normal/underweight in Wave 1 became overweight/obese in Wave 2, whereas 11.4% of those who were overweight/obese became normal/underweight.

Conclusions: Our findings from a large, population-based cohort describe the short-term natural changes in BMI among Chinese. Future studies examining baseline factors predicting such changes are needed.

T5:S29:28

Child neglect and body mass index (BMI) in adulthood: A sibling study nested in the FAMILY cohort

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Background: Studies for child neglect and BMI are susceptible to unmeasured or unknown confounding by childhood environment and potential genetic disposition. Sibling studies minimize confounding from all shared childhood exposures and can thereby obtain more causally robust estimates.

Aims: To examine the association between child neglect and adult BMI using a sibling fixed effects design.

Key methods: Under Hong Kong FAMILY Project, a Jockey Club Initiative for a Harmonious Society, 471 sibling groups (1,050 participants age ³18 years) from the FAMILY Cohort were administered a child neglect scale including items on health, clothing, food, education and safe living conditions. BMI was analysed as a continuous score and as a binary outcome (overweight/obese: BMI ³ 23). Generalized linear mixed effects models predicting BMI and the odds of overweight/obese were fitted.

Results: 37.2% of adults reported childhood neglect, and 40.8% of sibling groups were discordant in exposure to child neglect. Within-sibling effects for BMI ($b=-0.08$, 95% CI: -0.68 to 0.52) and for overweight/obese (OR=1.45, 95% CI: 0.91 to 2.31) were not significant, adjusting for non-shared factors (age, sex, place of birth and parental occupation at age 10).

Conclusions: The sibling fixed effects model found no association between child neglect and BMI, controlling for shared unmeasured and unknown confounders. Future studies should

T5:S29:29

Sedentary behavior is independently related to body composition among adults in Southwest China

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Introduction: Sedentary behavior (SB) has been suggested to have adverse effects on several health outcomes. We aimed to explore whether the association of SB with body composition was independent of physical activity (PA) or energy intake (EI).

Methods: Data on SB (TV viewing, computer and mobile phone using), moderate-to-vigorous physical activity (MVPA) and dietary intake of 1279 Chinese adults (50.7% women) aged 20-70 years were obtained by questionnaires. Body height, weight and waist circumference as well as skin-fold thickness were measured to calculate body mass index (BMI), weight to height ratio (WHtR), percent body fat (%BF), fat mass index (FMI) and fat-free mass index (FFMI), as measures of body composition. Multiple linear regression models were used.

Results: Among adults in 20-45 age group, women with longer time of TV viewing had 4.7% higher BMI, 4.1% higher WHtR, and 2.0% higher FMI than women with less time of TV viewing after adjusting for the average family monthly income, MVPA energy expenditure and EI (all $p<0.04$). In men aged 20-45 years, time of TV viewing was positively related to BMI, WHtR, %BF and FMI (all $p<0.002$), but not related to FFMI. Time of computer and mobile phone using was not related to body composition both in men and women. Moreover, no association was observed among adults in 46-70 age groups.

Conclusions: Time of TV viewing is positively related to body composition among Chinese adults aged 20-45 years, independent of PA and EI.

T5:S29:30

'Health' dietary pattern has beneficial impact on biological aging only among normal-weight women: Analysis of adults in Southwest China

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Introduction: Diet has been suggested to play a major role in obesity. Evidence is emerging that diet may also influence the biological aging process measured by leukocyte telomere length (LTL). Considering obesity and biological aging are both related to oxidative and inflammatory responses, we aimed to explore whether diet is associated with LTL, and to examine whether and how obesity affect this association.

Methods: Factor analysis was used to identify dietary patterns from a 66-item food frequency questionnaire. Body weight and height were measured to calculate body mass index (BMI). LTL was determined by Southern blots. Data on socio-demographic and lifestyle factors was collected by validated questionnaires. Multivariate linear regressions were performed in 561 Chinese adults (51% women) aged 20-70 years.

Results: There was an interaction of obesity with the relations of dietary pattern to LTL. Among normal-weight women (n=189), 'health' dietary pattern characterized by vegetables, whole grains, potatoes, fruits and nuts was associated with longer LTL, after adjusting for age, family income, education, smoking pack-years, energy intake and moderate-to-vigorous physical activity ($p<0.01$). However, 'health' dietary pattern was not associated with LTL in overweight ($p=0.6$) or obesity ($p=0.8$) women. No association was observed in men between dietary patterns and LTL.

Conclusions: 'Health' dietary pattern was associated with longer LTL only among normal-weight women.

T5:S29:32

Weight cycling prevalence and the association with BMI and mental health in mid age women in the Australian longitudinal study of Women's health

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Introduction: Weight cycling is thought to be harmful for health, although evidence is conflicting. No previous study has examined the prevalence in a representative population and evaluated the association between weight change and mental health outcomes 12 years later. Here we aim to investigate this.

Methods: The Australian Longitudinal Study of Women's Health is a prospective study of factors shaping the health and well-being of Australian women. These analyses include 10,735 women, aged 47-52 years at survey 2. The exposure variable of weight cycling was created by asking how many times women had intentionally lost or regained 5 kg. Weight cyclers were defined as those women who lost or gained 5 kg three times or more. An ANOVA was used to investigate percentage weight change and mental health changes between surveys 2 and 6 (12 years) by weight cycling group. Extensive analysis will be completed by March 2016.

Results: The prevalence of weight cycling was 14.6%. Women who weight cycled had higher prevalence of hypertension and depression

scores and were more likely to be ex smokers. On average, 'weight cyclers' had a higher BMI and started dieting six years prior to the other groups. Weight cyclers gained less percentage weight than any of the other groups (mean difference 1.9–2.9% $p < 0.01$). All groups had improved mental health scores.

Conclusions: Weight cycling was associated with less percentage weight gain with no longitudinal adverse psychological effects.

T5:S29:33

Living at high altitude and metabolic syndrome incidence: Prospective analysis of the SUN cohort

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The role of high altitude in the development of metabolic syndrome (MetS) is not fully understood and the available epidemiological evidence is limited. The aim of the present study was to evaluate the longitudinal association between altitude of residence and incidence of MetS and each of its components in a prospective Spanish cohort, The Seguimiento Universidad de Navarra (SUN) project.

Our study included 6,860 highly educated subjects (university graduates) initially free from any MetS criteria. The altitude of residence was imputed with the postal code of each individual subject residence according to the data of the Spanish National Cartographic Institute and participants were categorized into tertiles. MetS was defined according to the harmonizing definition. Cox proportional hazards models were used to assess the association between the altitude of residence and the risk of MetS during follow-up.

After a median follow-up period of 8 years, 462 incident cases of MetS were identified. When adjusting for potential confounders, subjects in the highest category of altitude (>456 m) exhibited a significantly lower risk of developing MetS compared to those in the lowest tertile (<122 m) of altitude of residence [HR = 0.75 (95% CI: 0.58–0.97); p for trend = 0.029]. Living at higher altitude was associated with a lower risk of developing MetS in the SUN project. Our findings suggest that geographical elevation may be an important factor linked.

No conflict of interest

T5:S29:34

NHANES: Prevalence of prediabetes and diabetes by body mass index in US adults

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Prediabetes prevalence estimates vary depending on diagnostic criteria. We assessed glycemic status across BMI categories and evaluated impact of glycemic status and BMI on comorbidities.

National Health and Nutrition Examination Survey (NHANES) data 2009–10 and 2011–12, using a representative sample of 12,391 US adults (≥ 18 years), were combined. Absolute values and weighted frequencies were used to estimate glycemic status

(defined by A1c, fasting plasma glucose [FPG], or 2-h PG according to ADA, 2010) by BMI class (18.5–24.9, 25.0–29.9, 30.0–34.9, 35.0–39.9, ≥ 40.0 kg/m²). Association between glycemic status and relevant comorbidity by BMI was assessed using Proc Surveylogistic in SAS, with regression analysis adjusted for age/gender.

Across all 3 ADA definitions, prevalence of prediabetes and diabetes generally increased with BMI, and were higher with A1c (range: 17.7–36.3%; 2.7–23.9%), and FPG (25.0–44.0%; 3.6–22.5%) vs 2-h PG (9.5–22.0%; 2.4–13.0%). Across ADA criteria, prevalence of hypertension and dyslipidemia generally increased with BMI and were higher with prediabetes (hypertension: 22.1–54.2%; dyslipidemia 12.1–50.1%) vs diabetes (hypertension: 8.5–32.6%; dyslipidemia 4.1–28.2%).

In conclusion, prevalence of prediabetes and diabetes varied by which ADA definition was used; the trend across all 3 definitions was prevalence increased with BMI. Hypertension and dyslipidemia were more prevalent in those with prediabetes vs those with diabetes, regardless of ADA criteria.

T5:S29:35

Differences in weight change trajectory patterns in a publicly funded adult weight management centre

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Weight loss (WL) is typically described as the mean difference between two time points. However, this pragmatic approach does not consider individual differences in WL patterns, which may have important health effects. Trajectory analysis allows for identification of groups with distinct WL patterns over time, without a priori assumptions about how individuals should be grouped. Groups with differences in the attainment of a 5%WL and percentage WL patterns over time were identified in 7121 weight management patients. Resultant health differences were examined. Patients had 3.2 \pm 6.3%WL with 35% of patients achieving and maintaining a 5%WL. Half of these patients achieved the 5%WL within 6 months, while the other half had a more gradual approach. Another 10% achieved 5%WL, but regained weight after 6 months. There were 7 distinct weight loss patterns identified: LargeWL (Mean WL: 21.2 \pm 8.1%), ModerateWL (15.1 \pm 5.1%WL), SlowWL (6.7 \pm 3.2%WL) and MinimalWL (2.4 \pm 2.2%WL), WL Regain (9.4 \pm 3.5%WL), Weight Stable (1.2 \pm 3.2%WL) and Weight Gain (18.4 \pm 11.2%WG) groups. Improvements in blood pressure, lipids and glucose were generally related to the magnitude of WL achieved more than the pattern or speed of WL. There appears to be large differences in the absolute WL attained and the pattern of WL during a publicly funded clinical weight management program. Health changes appear to be more strongly related with the absolute WL attained as opposed to patterns of weight change.

T5:S29:36

Cultural perception and sensory evaluation of white rice and brown rice among Malaysian adults

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Malaysia is a nutrition transition country. Based on the three major ethnic groups in Malaysia, the highest prevalence of obesity were among Indian (24.6%), followed by Malays (23.2%) and Chinese (8.2%). Malaysian's staple food is rice, however, few studies showed that white rice is associated with Type II diabetes, but

otherwise for brown rice. Despite many studies showed the health benefits of brown rice especially to prevent diabetes, however, there are barriers toward brown rice consumption in managing obesity or diabetes. Color, appearance, taste and texture might influence the consumption of brown rice. The objective of this study is to explore cultural barriers and motivators toward brown rice consumption through qualitative method in focus group discussion. Prior to the focus group discussion, the participants were shown samples of white rice, brown rice and two ratios of white rice and brown rice. The focus groups were transcribed verbatim. Data analysis was conducted and themes emerged from the data itself. For the food sensory evaluation, hedonic scale were transformed to a scale from 1 to 9. Findings showed majority of participants reported they never tasted brown rice. Traditional habit, family support, taste and color were the major themes emerged from the study. This study identified novel approach to motivate Malaysian to change their food choice into healthier ones within their acceptable sensory and cultural.

T5:S29:37

The relationship between body composition and cardiovascular disease risk profile in working population in Southern Taiwan

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Background: Obesity has been identified as a strong risk factor for cardiovascular disease (CVD). Body composition, especially body fat distribution, is supposed to correlate with CVD. However, there are still limited data on the relationship. **Aim:** This study aims to compare various body composition indices and their association with CVD risk profile in working population in southern Taiwan. **Methods:** We conducted a cross-sectional study by analyzing the database from the 2014 annual health examination of a company in southern Taiwan. Anthropometric measurements, sex, age, serum lipid profile, blood pressure, fasting glucose and smoking (or not) were recorded. The Framingham Risk Scoring model was used to predict CVD risk. It was analyzed in association with body composition measurements, including waist circumference, waist-hip ratio, body mass index (BMI), total body fat, and visceral fat levels. The correlation was tested by Pearson's correlation. **Result:** A total of 266 workers were recruited. After adjusting for demographic variables, visceral fat levels have the strongest positive correlation with CVD risk ($r=0.430$, $p<0.001$). Otherwise, waist circumference ($r=0.263$, $p<0.001$) and BMI ($r=0.213$, $p<0.001$) also have positive correlation with CVD risk. However, total body fat does not correlate with CVD risk. **Conclusion:** Visceral fat levels, waist circumference and BMI correlate with CVD risk in our study. Further studies are needed to clarify if they are good prediction in CVD.

T5:S29:38

Association between body mass index, alcohol consumption and metabolic syndrome among Korean Men

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Many epidemiological studies have shown that each obesity and alcohol consumption was related to metabolic syndrome (Mets). The objective of this study was to evaluate the combined effects of body mass index (BMI) and alcohol consumption on Mets among Korean men. Subjects were 5867 men aged 20 years and more,

who visited the health promotion center of one university hospital for general health check-up. They were classified into two groups by BMI (I; $18.5 \leq \text{BMI} < 25.0$, II; $\text{BMI} \geq 25.0 \text{ kg/m}^2$), and then classified into three groups according to alcohol consumption (≤ 7 , 7-14, >14 drinks/week). Mets was defined according to the revised criteria of the National Cholesterol Education Program's Adult Treatment Panel III (NCEP-ATP III criteria). Within each BMI group, the risk of Mets according to alcohol consumption was estimated using logistic regression analysis. The prevalence of Mets was 12.8% in BMI group I and 50.4% in BMI group II. Within both BMI group I and II, alcohol consumption of >14 drinks/week was significantly associated with an increased risk for Mets, compared with alcohol consumption of ≤ 7 drinks/week, after adjustments for age, smoking status and physical activity; the odds ratios (95% confidence intervals) were 1.45 (1.12-1.87) and 1.30 (1.05-1.62), respectively. These findings show that alcohol consumption > 14 drinks/week increases the risk of Mets in both non-obese and obese men.

T5:S29:39

Trends in abdominal obesity among Chinese, findings from 1993 to 2011

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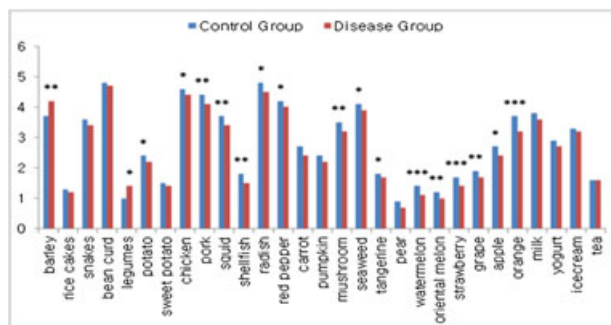
Background Abdominal obesity (AO) is one of the risk factors of several Chronic Non-Communicable Diseases. However, previous studies mostly focused on the mean value changes of waist circumference over time, and rarely on the change of distribution and its socio-demographic factors. **Aims** The aims of this study is to analysis the changes of waist circumference distribution curves and changes of trends of AO among Chinese adults between 18 and 65 in 9 provinces from 1993 to 2011. **Methods** Our samples were from the China Health and Nutrition Survey from 1993 to 2011. The criterion of weight for adults (WS/T 428-2013) was adopted as classification standard of AO. The LMS method was used to reveal the trends of waist circumference distribution curves. **Results** Compared with 1993, the 2006 waist circumference distribution curves flattened and expanded at higher levels in males and females. The 15th, 50th, and 85th percentile waist circumference percentile curves showed increased trend and high percentile increased more obviously. The waist circumference increased from 76.5cm to 84.0cm among males and from 75.3cm to 80.6cm among females. A gradient of increasing prevalence of central obesity was also observed in both genders. In males, the prevalence increased from 8.4% to 30.4% while in females, it increased from 15.2% to 28.1%, and the growth rate per annum were 1.2%、0.7% respectively. **Conclusions** This study indicated that the rapid increase.

T5:S29:41

Associations between supermarket proximity, educational attainment and body weight in Cambridgeshire, UK

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Obesity prevalence varies according to socioeconomic status and exposure to the food environment. Proximity to supermarkets provides access to fresh, healthy, relatively low-cost produce.



Purpose of this study was to analyse the main effect of supermarket proximity on weight status, and to test for the combined effect of supermarket proximity and education level.

In a population-based cohort of 9907 adults aged 29-64 years in Cambridgeshire, UK, we assessed socio-demographics, home location and measured height and weight. Adjusted multinomial logistic regression models were used to estimate odds of being obese ($>30\text{kg/m}^2$) across tertiles of supermarket proximity. Participants were mapped using a GIS, and proximity to their nearest supermarket (m) calculated along the street network. We tested for interaction on an additive scale between supermarket proximity and highest educational attainment.

In adjusted models, participants living farthest away from a supermarket were more likely to be obese (OR=1.26; 95%CI=1.11, 1.44). Odds of obesity was also associated with lower education. Those least educated and living farthest away from their nearest supermarket were 4.33 times more likely to be obese ($P<0.001$), relative to those highest educated and living closest.

This is the first study providing evidence for an association between supermarket accessibility and weight status in the United Kingdom, which was more pronounced in lower educated individuals.

T5:S29:42

Food patterns of Korean adults with lifestyle diseases

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The prevalence of lifestyle diseases (such as obesity, hypertension, diabetes, dyslipidemia) has increased globally, including in Korea. Practicing a healthy lifestyle is important for preventing lifestyle diseases. The aim of this study was to evaluate the habitual dietary intake of Korean adult subjects in Korea with lifestyle disease using the 5th Korea National Health and Nutrition Examination Survey data (2011-2013). Adult subjects were divided into a lifestyle disease group (N=634) and a control group (N=1633). Results found that the intake frequency of 18 (for male subjects) and 15 (for female subjects) food items in both groups was significantly different. Energy, protein, fat, carbohydrate, phosphorus, thiamin, and niacin intake differed significantly between both male groups; no significant differences were observed for the female subjects. This study showed that the male disease group had healthier eating habits than the control group, ingesting fewer total calories and more barley and legumes. Further studies are needed to compare the long-term nutritional and biological markers of subjects with and without lifestyle disease.

T5:S29:43

The relationship between frequency of eating Out and overweight in Japanese Men and women aged 20-64 years: A cross-sectional study

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Background: Although several studies in Western countries suggest a positive correlation between eating out and overweight or obesity, little evidence of such a relationship exists in Japan.

Aim: To examine the relationship between frequency of eating out and overweight in Japanese adults.

Methods: The final subjects of this cross-sectional study were 1,071 men and 1,133 women aged 20-64 years who participated in the Health Diary Study 2, a self-administered questionnaire survey. According to the frequency of eating out (times/week), participants were divided into lower (<1.5), middle (1.5-3.5), and higher (≥ 4.5) categories. We conducted multivariate logistic regression analysis for men and women separately, adjusting for age, socio-economic variables, and dietary habits.

Results: Participants' median (inter quartile range) age, frequency of eating out, and body mass index (BMI) were 44 (34-55) years, 1.5 (0.0-5.0) times/week, and 21.9 (19.7-24.3) kg/m^2 , respectively. Adjusted odds ratios (95% confidence intervals) for overweight (BMI $\geq 25.0\text{ kg/m}^2$) in lower, middle, and higher categories were 1.00 (reference), 0.94 (0.63-1.39), and 1.26 (0.88-1.82) for men and 1.00 (reference), 1.46 (0.96-2.22), and 2.61 (1.53-4.44) for women, respectively.

Conclusion: Although further research is needed, this study suggested that, in Japan, the frequency of eating out is positively correlated with overweight only in women, but not in men.

Conflict of Interest: None disclosed.

Funding: No funding.

T5:S29:44

Widening inequality in obesity prevalence rates by socioeconomic status in Australia over time: A modelling study

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Background: In Australia, two-thirds of adults are now either overweight or obese. An understanding of the epidemiology of obesity progression can be enhanced by modelling studies, which can predict body-mass index (BMI) trajectories and obesity trends over time.

Aims: To develop a model to predict BMI trajectories and obesity trends of Australian adult men aged 20 years and over, from 1995 until 2025.

Key methods: Individual level discrete-time simulation modelling using annual cycles. The relationship for annual BMI gain, based on age, sex and socioeconomic status (SES) was derived using a synthetic cohort technique. We used Australian life tables and a meta-analysis of the excess mortality associated with BMI to predict mortality based on age and weight status. Using an input population of nationally representative data from the National Nutrition Survey of 1995, we simulated obesity (BMI ≥ 30) and class III obesity (BMI ≥ 40) from 1995 until 2025, by SES.

Results:

Year	Low SES Obesity	High SES Obesity	Low SES Class III Obesity	High SES Class III Obesity
1995	17.32%	14.68%	0.39%	0.25%
2010	31.05%	23.46%	2.63%	0.90%
2025	36.43%	26.83%	6.18%	2.14%

Conclusions: Inequalities in obesity are projected to widen by 2025, with males in lower SES at higher risk of developing obesity. The inequalities are widest in the morbidly obese population, which has the greatest disease burden. Prevention efforts should focus on these vulnerable population groups.

Funding: National Health & Medical Research Council capacity project grant 571372

T5:S29:45

Population estimates and characteristics of Australian adults potentially eligible for bariatric surgery

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Background: Australian National Health and Medical Research Council (NHMRC) guidelines for the management of overweight and obesity recommend that bariatric surgery be considered for adults with resistant class-3 obesity, or resistant class-1 or 2 obesity combined with specific obesity-related comorbidity. Most surgery (>90%) is privately funded with approximately 12,000 procedures performed in 2012.

Aims: To determine the potential demand for bariatric surgery in Australia in the public and private health systems.

Methods: Nationally representative data from the 2011-13 Australian Health Survey were used to estimate the numbers and characteristics of Australians meeting specific eligibility criteria. The survey measured height and weight, blood pressure, blood and urine biochemistry, demographics and self-reported health status.

Results: Of the 3,352,037 adult Australians (aged 18-65 years) estimated to be obese in 2011-13, 865,693 (25.8%) were potentially eligible for bariatric surgery (6.1% of the total adult population aged 18-65). Of these 45.8% had class-3 obesity, 54.1% had class-2 obesity, and 467 (0.1%) had class-1 obesity. Similar proportions were female (52.6%) or uninsured (46.4%), and 35% resided outside a major city.

Conclusion: Potential demand for bariatric surgery in Australia, particularly in the public health system and outside major cities, far outstrips current capacity. Better guidance on patient prioritisation is urgently needed.

T5:S29:46

Smoking is associated with fat accumulation in different manners among Men, premenopausal women, and postmenopausal women in Koreans

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The relationship between smoking status and obesity/central obesity is not conclusive. Most of the previous studies used a body mass index (BMI) and a waist circumference (WC) as surrogate markers for obesity and central obesity. The aim of this cross-sectional analysis was to find out the association pattern between smoking status and localized fat accumulation using dual energy x-ray absorptiometry (DXA) indices in representative Korean adults.

This analysis was based on the data obtained from the Fourth and Fifth Korea National Health and Nutrition Examination Survey (KNHANES IV-V). Among this, 18 198 adult data with DXA measurements, were analyzed. Survey analysis method and Wald test were used for the comparison of the localized fat accumulation according to smoking status.

In men, ex-smokers had more whole and trunk body fat than non-smokers and current smokers. In premenopausal women, there was no difference of whole and trunk body fat among the three smoking status groups. In postmenopausal women, current smokers have lower whole and trunk body fat than the other two groups. For the trunk fat/leg fat ratio, in men, non-smokers had lower ratio than the others; in premenopausal women, current smokers had higher ratio than ex-smokers; and in postmenopausal women, there was no difference of the ratio among the three smoking status.

In conclusion, smoking status is associated with fat accumulation in different manners among men, pre- and post-menopausal women in Koreans.

T5:S29:47

Influence of sensory, psychological, socioeconomic and lifestyle factors on dietary intake and 4-year weight changes

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Links between individual factors, dietary intake and weight status form a complex conceptual framework.

The aim of the study was to establish and to validate a conceptual framework by investigating simultaneously the relative roles of sensory, psychological, socioeconomic and lifestyle factors on dietary intake and 4-year weight changes in a large sample of women.

Data were collected during 4 years in 6690 French women participating in NutriNet-Sant , a large web-based cohort study. Structural equation modeling was used to examine the causal relationships and the relative weights of individual factors on dietary intake and 4-year weight changes.

Individual factors implied in significant pathways are presented in order of importance of effect. High fat liking, high uncontrolled and emotional eating, low education and low income were associated with unhealthy dietary intake, whereas high dietary restriction and physical activity were inversely associated. In addition, we observed that unhealthy dietary intake, high dietary restriction, and high uncontrolled and emotional eating were associated with 4-year weight gain.

Sensory fat liking appears as a major predictor of unhealthy dietary intake. Furthermore, unhealthy dietary intake as well as diet to lose weight and psychological factors such as cognitive restraint, uncontrolled eating and emotional eating largely influence weight gain over 4 years in women.

T5:S29:48

Relationships between serum adiponectin levels and muscular fitness in Portuguese adolescents: LabMed physical activity study

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Introduction: Paradoxically, recent investigations have showed that adiponectin levels are inversely associated with muscle strength. However, to date, there is a lack of knowledge on the relationship between muscular fitness (MF) and adiponectin levels in adolescents. We aimed to examine the independent associations of MF and adiponectin levels in adolescents, controlling for several potential confounders. **Methods and Results:** This is a cross-sectional analysis with 529 Portuguese adolescents aged 12-18 years. A MF score was computed as the mean of the handgrip strength and standing long jump standardized values by age and gender. We measured fasting glucose, insulin, HDL-cholesterol, C-reactive protein and adiponectin. Linear regression analysis showed a significant inverse association between adiponectin (Z-score by age and sex) and MF score, after adjustments for age, sex, pubertal stage, socioeconomic status, adherence to the Mediterranean diet, body mass index, HOMA-IR, HDL-cholesterol, C-reactive protein and cardiorespiratory fitness (unstandardized $\beta = -0.176$; $p < 0.005$). Analysis of covariance showed a significant difference between the Low MF/Non-overweight group and the High MF/Non-overweight Group ($p < 0.05$) and between the Low MF/Non-overweight and High MF/Overweight Group ($p < 0.05$) ($F(5, 523) = 2.262$, $p = 0.047$). **Conclusion:** Adiponectin circulating levels are inversely and independently associated with MF

T5:S29:49

Changes in obesity, television viewing, computer use, electronic games and sport participation among elementary school-age children in Portugal from 2002 to 2009

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Sedentary behaviors, such as screen-viewing play a significant role in childhood obesity. The aims of this work are the following: to examine the shifts in obesity, sedentary behaviors and sport participation between 2002 and 2009 in Portuguese school-aged children; to study the association between the socioeconomic status (SES) and obesity, sedentary behaviors and sport participation. A cross-sectional study was carried out in 2002 and 4511 children, aged 7-10 years old, were observed. The same schools were visited

again in 2009 and 5366 children were observed. In both surveys, a questionnaire was filled out by parents concerning family characteristics as well as child's behaviors such as television time (TV), computer use (Pc), electronic games (EG) and sport participation (SP). Weight and height were measured and IOTF cut-off points were used to define obesity. Between 2002 and 2009 the percentage of children that surpass the recommended 2 h/day of TV viewing increased from 12% on weekdays, 15.1% on Saturdays and 16.7% on Sundays. The same pattern occurred for Pc and EG. Only half of the children have some sport participation. A social gradient is observed in both periods, 2002 and 2009: children from low SES show highest rates of obesity, more TV, Pc and EG and lower rates of sport participation. Strategies for reducing the amount of time children spend in sedentary behaviors should target particularly families from low SES. No conflicts o

T5:S29:50

Cardiometabolic risk factors in parents and child body mass index in a general population in Malaysia

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Previous studies have suggested some associations between cardiometabolic (CM) risk factors in parents and children. There is comparatively less evidence from Asia, where the burden of CM diseases is growing. Based on data from the South East Asia Community Observatory, Malaysia (9212 individuals including 4806 children aged 5-19 years), we examined the relation between parental CM risk factors (body mass index [BMI], waist circumference [WC], systolic and diastolic blood pressure, and random blood glucose [RBG]), and age- and sex-adjusted child BMI (World Health Organization reference), using multilevel mixed effects models. Overall, 689 (14.3%) children were obese. Maternal and paternal BMI, WC and RBG were associated with child BMI z-score, with maternal and paternal BMI showing the strongest associations ($\beta = 0.053$; 95% confidence interval [CI]: 0.044, 0.062; $P < 0.001$ and $\beta = 0.034$; 95% CI: 0.020, 0.048; $P < 0.001$ respectively). Children of mothers or fathers who were obese, centrally obese, or with RBG > 11.1 mmol/L were 1.5-2 times as likely to be obese as children of parents without these risk factors. The risk of child obesity increased with the number of parents obese, centrally obese, with systolic hypertension or with RBG > 11.1 mmol/L. Further investigation into these relationships may help inform strategies to address the growing burden of CM diseases in Asia.

T5:S29:51

Concurrent stunting and overweight in 2.0-4.9 year old Indonesian children: Data from four repeated cross-sectional surveys

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The persistence of undernutrition, along with overweight and obesity, constitute the double burden of malnutrition (DBM). This

study aimed to: a) describe the prevalence and trends of concurrent stunting and overweight in Indonesian children, b) identify potentially associated risk factors, and c) determine whether stunted children are at greater risk of being overweight compared to the healthy heights.

A secondary data analysis of children aged 2.0-4.9 years in waves 1 (1993), 2 (1997), 3 (2000), and 4 (2007) of the Indonesian Family Life Survey. Children's height and BMI-z-scores were calculated based upon the WHO Child Growth Standards (2006). We defined "concurrent stunting and overweight" as height-for-age-z-score < -2 and BMI-z-score > +1. Multivariate Generalised Linear Latent and Mixed Models were used to determine associated risk factors. 4,101 children were included in the analysis. There was an increased prevalence of concurrent stunting and overweight from waves one through four. Children were more likely to be stunted and overweight when they were in the youngest age group (2.0-2.9 years), were weaned after the age of 6 months, had short statured mothers, or lived in rural areas. Stunted children were significantly more likely to be overweight than the healthy height children (Odds Ratio: 1.34 to 2.01).

The DBM in individual level occurs in Indonesian children. Current policies and programs need to be tailored for the management of this phenomenon.

T5:S29:52

The severity of non-alcoholic fatty liver disease is independently associated with the increased prevalence of metabolic syndrome

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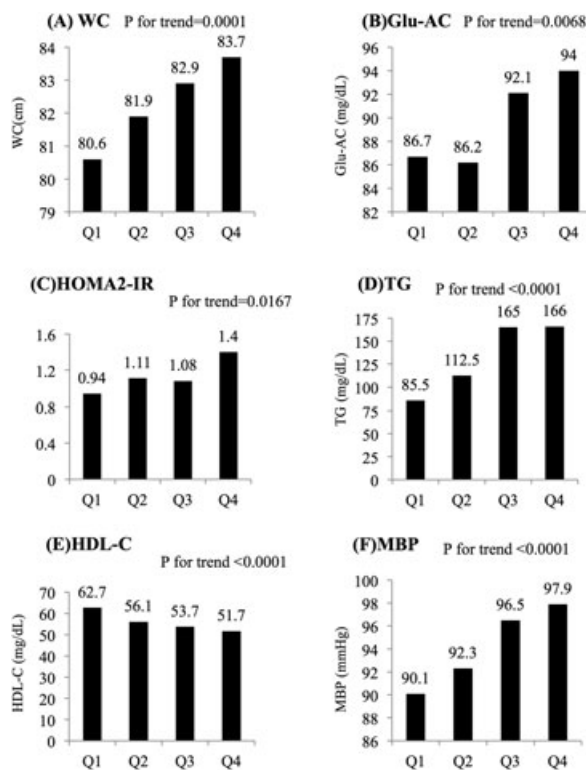
Non-alcoholic fatty liver disease (NAFLD) an emerging chronic liver disease which may lead to liver cirrhosis and hepatocellular carcinoma. However, it was often evaluated by subjective liver ultrasound(US) only.

We aimed to determine the association between the metabolic syndrome (MetS) and NAFLD severity by a semi-quantitative ultrasonography.

Ultrasonographic fatty liver index(US-FLI), a semi-quantitative score was used to assess NAFLD severity(normal 0-1; mild 2-4; moderate and severe 5-8). The ability to distinguish MetS was modeled by a multiple logistic regression model and the areas under the receiver operating characteristic curve(AUCs).

NAFLD was found in 53.7% and MetS was present in 17.3% of 614 participants. A linear relationship existed between the severity of NAFLD and waist circumference, fasting glucose, HOMA-IR, triglycerides, HDL-C and blood pressure. After adjustment for confounders, BMI and HOMA-IR, the odds ratio(OR, 95%CI) of MetS in mild and moderate to severe NAFLD compared with normal liver US, was 3.75(1.5-9.35) and 6.67(2.67-17.07, P=0.0004), respectively. The AUC(95%CI) for MetS in HOMA-IR and US-FLI score were 0.79 (0.75-0.84) and 0.8 (0.76-0.85). US-FLI score=3 had a best ability to diagnose MetS.

NAFLD severity could be measured more objectively by a semi-quantitative liver US. Severity of NAFLD and HOMA-IR both play important roles for MetS in addition to obesity. Whether NAFLD is the component of MetS warrants further research in future.



T5:S29:53

Divergence of patient and clinician perceptions of obesity and weight management

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The ACTION (Awareness, Care & Treatment In Obesity MaNagement) study was designed to identify barriers reported by people with obesity (PWO) and clinicians that may hinder optimal obesity care.

Focus groups with 43 PWO (class I, II and III) and individual interviews with 24 clinicians (12 primary care providers; 12 obesity specialists) were conducted.

75% of PWO felt they were 'healthy', although nearly 75% had obesity-related comorbidities. While PWO and clinicians considered obesity a combination of disease and lifestyle, their emphasis differed; 65% of PWO considered obesity primarily a lifestyle issue while 88% of clinicians considered it a disease. Motivation was identified as a key barrier to weight loss by both PWO and clinicians; limited patient understanding of their condition less so (35 vs 42%). Relative to clinicians, PWO more often cited barriers of food habits (88 vs 38%), social relationships (79 vs 38%) and feeling deprived while dieting (56 vs 8%); limited patient understanding of how to lose weight (9 vs 58%) was cited less often. Importantly, PWO indicated that developing health complications or receiving a 'wake-up call' would motivate them to address their obesity.

Perceptions of obesity vary between PWO and clinicians; this may be a barrier to effective treatment contributing to suboptimal patient-clinician interactions. This qualitative study provides the basis for a quantitative examination of these perceptions and their causes.

T5:S29:54

Prevalence and determinants of metabolically healthy and unhealthy normal weight and obesity in Luxembourg

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Recent studies highlighted that obesity may not be associated with cardiometabolic (CDM) comorbidities, while “normal weight” people could be affected. This issue is a major concern given that some obesity treatments may damage metabolic health, while CDM disorders identification is completely neglected in normal weight people. A better identification of the populations at real CDM risk is therefore required.

Aim: To estimate the current prevalence of Metabolically Healthy and Unhealthy Normal Weight and Obesity (MHNW / MUNW / MHO / MUO) in Luxembourg.

Methods: We analyzed cross-sectional, population-based data on randomly selected adult residents of Luxembourg (N=1449), aged 25 to 64, between 2013 and 2015. Metabolically Healthy/Unhealthy phenotypes were characterized according to Voulgari *et al.*(1) and Ortega *et al.*(2) definitions

Results:

Conclusions: MUNW and MHO prevalence is relevant in Luxembourg. Findings regarding the determinants of these phenotypes will be detailed during ICO 2016

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No conflicts of interest to disclose.

Funding: 1. Directorate and Ministry of Health. 2. Ministry of Culture, Higher Education and Research, Luxembourg.

T5:S29:55

Insulin resistance distribution and cut-off value in Koreans from the 2008-2010 Korean national health and nutrition examination survey

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We sought to identify the distribution and cut-off value of the HOMA-IR according to gender and menopausal status for

metabolic syndrome. Data were from the Korean National Health and Nutrition Examination Survey in 2008-2010. The subjects included adults aged 20 years or older and we excluded participants who had diabetes or fasting serum glucose ≥ 7 mmol/L. Finally, 11,121 subjects (4,911 men, 3,597 premenopausal women, 2,613 postmenopausal women) were enrolled. The mean HOMA-IR was 2.11(2.07-2.15) for men, 2.0(1.97-2.04) for premenopausal women, and 2.14(2.2-2.19) for postmenopausal women. The first cut-off values in men, premenopausal women, and postmenopausal women were 2.23(sensitivity 70.6%, specificity 66.9%), 2.39 (sensitivity 72.3%, specificity 76.4%), and 2.48(sensitivity 51.9%, specificity 80.2%), respectively. Based on the first HOMA-IR cut-off value, the prevalence of metabolic syndrome was 22.9% in men, 13.7% in premenopausal women, and 51.6% in postmenopausal women. The second cut-off value was around 3.2 in all three groups. Based on the second HOMA-IR cut-off value, the prevalence of metabolic syndrome was 50.8% in men, 42.5% in premenopausal women, and 71.6% in postmenopausal women. In conclusion, the distribution of HOMA-IR showed differences according to gender and menopausal status. When we apply HOMA-IR, we should consider gender, menopausal status, and the prevalence of metabolic syndrome.

T5:S29:56

Accuracy of self-reported height and weight in Mexican women from an amateur running race

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Self-reported BMI might be affected by several types of bias causing misclassification. The aim was to evaluate the measurement error in self-reported BMI compared to direct measurements of a sample of Mexican women from a running race. 469 participants had height and weight measurements, from which 46 were excluded because of missing or implausible data. A t-test of paired samples was used to analyze difference between self-reported and direct measurements. Sensitivity and specificity analyses were done to determine the accuracy of self-reported data for classifying subjects on its correct BMI category. Weight was underreported by 1.6 ± 3.6 kg and height was over-reported by 1.6 ± 2.2 cm. Directly measured and self-reported values were statistically different for weight (1.60kg; 95% CI, 1.26 to 1.95; $p < 0.001$), height (-1.60cm; 95% CI, -1.79 to -1.40; $p < 0.001$) and BMI (1.15kg/m²; 95% CI, 1.00 to 1.32; $p < 0.001$). The sensitivity of self-reported BMI was 98.3%, 20%, 62.6% and 56.5% for normal, underweight, overweight and obese women, respectively. Specificity was 99.8% and 99.4% for underweight and obese women, and 72.6% and 87.6% for normal weight and overweight women, respectively. The low sensitivity for the self-reported values in underweight, overweight, and obese suggests that the self-reported BMI is likely to be biased, but the high specificity suggest that it might be useful and cost-effective for identifying more than half of overweight and obese women in this population.

T5:S29:57

Associations between metabolic syndrome and mineral nutrition in subjects with medical check-upMorita, A.^{*1}; Aiba, N.²; Miyachi, M.³ and Watanabe, S.⁴¹*Koshien University*; ²*Kanagawa Institute of Technology*;³*National Institutes of Biomedical Innovation, Health and Nutrition*; ⁴*Life Science Promotion Association*

Background: The prevention of the metabolic syndrome (MetS) is a major challenge in Health Japan 21. Effects of mineral nutrition on the core components of MetS: obesity, insulin resistance, dyslipidemia and hypertension remained unclear.

Aims: To evaluate the role of nutrition in preventing or exacerbating MetS, we examined the associations between MetS and macro minerals in the cohort subjects who had undergone health check-up.

Methods: 4450 Japanese men and women were enrolled at the Saku Central Hospital. They received an anthropometric and clinical examination and were assessed for present illness, lifestyle factors such as physical activity, smoking, drinking, and dietary habits at the enrollment. Dietary assessment was made using a brief self-administered diet history questionnaire. 2602 men and 1844 women aged more than 20 were analyzed.

Results: The mean age in men and women were 59.2 and 58.4 years old and the mean BMI were 23.7 and 22.3 kg/m², respectively. The percentages of MetS were 20.6 % in men and 6.1 % in women. Women with MetS had higher daily intake of sodium than those without MetS. The intake of other macro minerals presented a similar tendency in women but not men. Women with high magnesium intake showed high plasma HDL cholesterol and low triglyceride.

Conclusions: The influence of sodium and magnesium on MetS components was presented in women. Lower prevalence of MetS in the women was probable to show clearer relationship between MetS and minerals.

T5:S29:58

Association between vitamin D status and the inflammatome: Stratification by body mass index — findings from the northern Finland birth cohort 1966Palaniswamy, S.^{*}; Jokelainen, J.; Karhu, T.;

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There is evidence for a link between the vitamin D status and inflammation suggesting that vitamin D can be a safe tool to moderate the metabolic risk in obesity. However, the influence played by BMI in modulating the aforementioned association is unclear. We performed an association study for vitamin D with multiple inflammatory biomarkers in an unselected sample of 3,983 individuals from the Northern Finland Birth cohort 1966 at 31y. We then stratified for BMI to explore interplay with the risk of obesity. Briefly, the molecular markers measured in the fasted state were vitamin D and 17 inflammatory biomarkers: among others interleukin-1 receptor antagonist, interferon gamma-induced protein (IP)-10, monocyte chemoattractant protein (MCP)-1, soluble CD40 ligand (sCD40L) and tumor necrosis factor alpha (TNF)- α . The analysis was adjusted for multiple cofactors. In normal- and overweight subjects, serum concentration of vitamin D was correlated with TNF- α , MCP-1, sCD40L and IP-10 ($P < 0.05$, FDR-corrected). However, the strength of the associations, but not its orientation was lost in obese and morbidly obese subjects. The observation seen in obese could not be simply

explained by a smaller sample size and warrants further investigation. We speculate that normal vitamin D is insufficient to modulate chronic inflammation frequently linked to obesity. It also supports evidence that a tailored vitamin D supplementation, based on BMI, shall be defined to combat inflammation.

T5:S29:59

Perceptions of childhood obesity across three generations in China: A cross-sectional studyLi, X.^{*} and Hesketh, T.*Institute for Global Health, University College London*

The prevalence of childhood obesity has been increasing over time in China. Two-thirds of grandparents share the responsibility of childcare. This study aimed to compare the perspectives on childhood obesity across three generations. We administered self-completion questionnaires to 1253 children aged 8-12 years and 1211 of their parents as well as 684 grandparents randomly sampled from six primary schools in Hangzhou, China. 14.3% of children were overweight with 9.2% being obese. Parents were more aware of obesity than grandparents, both underestimating the psychological consequences. Children, parents and grandparents had acceptable levels of knowledge about healthy diet but inadequate knowledge of exercises. Parents and grandparents had similar attitudes towards childhood obesity. 25% thought obese children would become a healthy weight as they grew, and over 75% didn't think fat meant wealth. While 73% of children thought they ate healthily, one third loved high-energy-dense foods. Under half of parents and grandparents thought it was easy to get children to eat healthily. All thought the burden of homework mainly contributed to physical inactivity, with 56% of children feeling pressures from studies. Our findings provide insights into differences in perceptions of childhood obesity and healthy lifestyle practices across generations. It is essential to improve effective intergenerational communication and family-school communication while planning future interventions.

T5:S29:60

Dietary assessment methods used in Canadian research: Implications for nutrition-related obesity researchRaffoul, A.^{*1}; Vanderlee, L.¹; Csizmadia, I.²; Boucher, B.³; Massarelli, I.⁴; Rondeau, I.⁴; Stapleton, J.¹; Robson, P.² and Kirkpatrick, S.I.¹¹*University of Waterloo*; ²*Alberta Health Services*; ³*Cancer Care Ontario*; ⁴*Health Canada*

Rises in obesity rates have been linked to diet, among other factors. However, the tools used to assess dietary intake vary widely, limiting our ability to understand dietary patterns and assess the effects of interventions. The aim of this scoping review was to characterize self-report measures used to assess diet in Canadian research. The research databases Medline, PubMed, PsycINFO and CINAHL were used to search for Canadian studies from 2009 to 2014. A final pool of 188 articles (reflecting 94 unique studies) reported on self-report dietary intake among healthy, adult, non-Aboriginal populations. A variety of dietary assessment tools were used, including food frequency questionnaires (FFQs; 38%), screeners (20%), food record/diaries (18%), and 24-hour recalls (14%). Three studies (3%) used a single item to assess diet and 7 (7%) did not state the type of tool that was used. There were 14 distinct FFQs used, and FFQs and screeners utilized included tools developed and/or adapted for use in Canada and those developed

elsewhere. Of studies that reported energy intake, 44% used FFQs. Some tools were reported to have been evaluated previously, but few were assessed for use in the specific study population. This review highlights the variety of dietary assessment tools used in research relevant to understanding how diet influences obesity and informing interventions. Efforts to promote rigorous and consistent dietary assessment are needed to allow for a stronger evidence base.

T5:S29:61

Leisure time physical activity levels in immigrants by ethnicity and time since immigration to Canada

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Background: New immigrants to Canada are mostly from Asian/South Asian countries witnessing low Physical Activity (PA) and high rates of over-weight/obesity in recent years. Little is known about the PA patterns of recent immigrants. This study investigates current levels of PA in recent immigrants and how time since immigration influences PA.

Methods: The study sample was extracted from nationally representative Canadian Community Health Survey, Cycle 2011–2012. The study included adults aged 20–64 years (n=10,127). The participants were categorized as physically active, moderately active, and inactive based on their sum of average daily energy expenditures for all activities. The likelihood of being physically active was estimated for recent (0–9 years) and established (≥10 years) immigrants using multinomial logistic regression models. The models were adjusted for age, gender, income, education and children ≤ 5 yrs.

Results: A higher proportion of recent immigrants reported inactivity (61%) compared to established immigrants (53.1%). Inactivity was higher in visible minority immigrants (59.2%) as compared to white immigrants (47.5%). After adjusting for confounding factors, the likelihood of inactivity was still high among recent immigrants (OR=1.46, 95% CI 1.19, 1.78).

Conclusion: The findings show that recent immigrants may need ethnic-specific interventions to ensure they maintain adequate levels of PA during initial years because of potential health implications in later life.

T5:S29:62

Soft drinks and dental health of Australian children Age 5–16 years: The next public health crisis?

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Soft drink consumption is associated with obesity and recommendations to reduce population soft drink intake are strongly supported by evidence. Soft drinks are also associated with dental problems, which may in turn influence diet quality.

To examine prevalence of dental health problems by soft drink consumption in Australian children.

Population survey of Australian children age 5–16 years (in 2015 n=7,555). Dental health and soft drink consumption were assessed by self-report. Covariates were age, sex, BMI, SES.

10% of children drank ≥1 cups of soft drink daily. In the past 12-months, 2.9% often had a toothache, 3.2% often avoided food because of a toothache and 32% brush their teeth ≤1/day. Children who drink ≥1 cups of soft drink/day were more likely to report

toothache (OR 1.79; 95%CI 1.08, 2.95) or avoid foods because of toothache (OR 1.49; 95%CI 0.89, 2.49) in the last 12-months, and more likely to brush teeth ≤1/day (OR 2.00; 95%CI 1.57, 2.53). Girls, not boys, who drink soft drink daily often had a toothache (OR 2.05; 95%CI 1.13, 3.72) or avoided foods (OR 2.42; 95%CI 1.13, 5.19).

Dental health affects what foods are consumed and children who drink soft drink daily have a higher prevalence of poor dental health. Health policies must focus on sociodental approaches to child oral health assessments and include soft drink intake. Further, comprehensive dental health monitoring is required to determine the impact of this potential emerging health crisis on diet quality.

T5:S29:63

Association of asymmetric dimethylarginine (ADMA) with insulin resistance and prediction of severe obesity in adolescents and diabetes in adults

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KNIH

Insulin resistance (IR) occurring with obesity is a major risk factor for T2D. To unravel metabolic determinants of IR predicting obesity and diabetes, we performed a targeted metabolomic analysis in a Korean childhood cohort (KoCAS, n = 430) and quantified 188 metabolites. 67 metabolites such as acylcarnitines, amino acids, biogenic amines, glycerophospholipids, sphingolipids, and hexose, with associations for insulin resistance-related trait were also found to be replicated in an adult cohort (KoGES, n = 2,486). Functional interactions of metabolites with gene/proteins using biological pathway and pathway enrichment analyses with insulin resistance were not identified biological significance and regulatory effects of asymmetric dimethylarginine (ADMA). Functional studies in cellular and mouse models demonstrated that an accumulation of ADMA is associated with the regulation of obesity-induced insulin resistance in skeletal muscle. ADMA treatment inhibited DDAH activity and its related mRNA expression in IR muscle cell model. Moreover, the treatment led to decrease of phosphorylation of insulin receptor, AKT, and GLUT4 but increase of PTP1B. Accordingly, increased ADMA significantly inhibited glucose uptake in myotube cell. Taken together, we suggest that accumulation of ADMA is associated with modulation of obesity-related diabetic risk and ADMA might expand the possibilities of new therapeutic target in the control of energy and metabolic homeostasis in humans.

T5:S29:64

An exploratory dietary intake study of children living in a remote Australian aboriginal community

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Menzies School of Health Research

Aim: This exploratory study aimed to provide some insight on the dietary quality of young children living in a remote Australian Aboriginal community.

Methods: A convenience sample of mothers living in a remote community of the Northern Territory photographed or video recorded all meals and drinks consumed by their child over a 4-day period. The daily energy, macro- and micro- nutrient intake for each child was analysed using Foodworks software.

Results: Food were recorded for five children over four days and three over one day. The four youngest children aged 11 to 31

months were partially breastfed. There was large variation in the reported types and amount of foods consumed as well as in the energy, macro- and micro- nutrient consumption. Energy requirements were not met by the children aged 4-8 years and only 48% of the percentage energy to energy requirements was met by an 11-month child suggesting that half of the energy intake for this child was from breast milk.

Conclusions: The large variation on the amount and type of foods consumed day-to-day warrants further studies with a larger sample of participants to examine dietary intake of young children living in remote communities of Australia.

T5:S29:65

Waist-to-height ratio compared to standard obesity measures as predictor of cardiometabolic risk factors in Asian Indians in north India

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Background: We compared the discriminatory ability of BMI, WC, WHR and waist-to-height ratio (WHtR) in identifying the presence of cardiometabolic risk factors in Asian Indians in north India.

Methods: This cross-sectional study involved 509 subjects (278 males and 231 females) aged 20-60 years from New Delhi, India. ROC curve analyses were performed to compare predictive validity of various adiposity measures against the cardiometabolic risk factors [dyslipidemia, hyperinsulinemia, impaired fasting glucose, hypertension and metabolic syndrome. The odds ratio for the presence of individual cardiometabolic risk factors in the presence of overweight, abdominal obesity and high WHtR were calculated using logistic regression analysis.

Results: WC had highest AUROC for all other cardiometabolic risk factors except hyperinsulinemia in males and for dyslipidemia, metabolic syndrome and presence of at least one cardiometabolic risk factor in females. For metabolic syndrome, WC and WHtR were observed to be the best predictors and WHtR appeared to be the best predictor for hypertension in both genders, particularly in women.

Conclusion: In northern Asian Indian population with high prevalence of cardiometabolic risk factors, WC and WHtR appeared to be having the best clinical utility in identifying individuals with metabolic syndrome. Therefore a combination of WC and WHtR may be better than BMI and WHR in identifying individuals with cardiometabolic risk factors.

T5:S29:67

An accurate Sex specific index of body fat percentage

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The increasing prevalence of obesity has required an inexpensive and accurate assessment of adiposity. The body mass index (BMI), and recent body adiposity index (BAI), are cost effective, but both suffer in accuracy not accounting for sex difference in body fat. The objective was to develop a sex specific equation(s) to more accurately predict body fat percent for men and women.

A total of 3097 volunteers from the CODING study were employed. Height (H), weight (W), hip circumference (HC), and waist circumference (WC) were utilized to construct sex specific body fat indices (BFI) to predict body fat percentage (%BF) measured by dual-energy x-ray absorptiometry. 60% of the subjects was used to develop the equations and the remaining 40% as a validation population. The equation for men is $BFI_m = [(0.25(HC/H^{0.5}) + 0.39(WC/H^{0.5}) + 0.36(W/H^2)) - 33]$, and for women was $BFI_f = [(0.37(HC/H^{0.5}) + 0.07(WC/H^{0.5}) + 0.56(W/H^2)) - 11]$.

Equations had high correlations and concordances with %BF in Pearson's correlation and Lin's concordance analyses. Both BFI_m and BFI_f performed much better than BMI and BAI in predicting body fat percentage. We have developed a new sex specific BFI method that can accurately predict body fat percentage using four simple anthropometric measurements. Having effectively overcome the gender specific limitation, our BFI_m and BFI_f are a valuable contribution towards more accurate clinical adiposity assessment and in large population based study without expensive instrumentation.

T5:S29:68

Prevalence of stunting, underweight and obesity among pregnant women in 52 low- income and middle-income countries: A meta-analysis and meta-regression

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Background: Undernutrition and overnutrition in pregnancy are an important threat to maternal and child health. However, their distribution among pregnant women in low-income and middle-income countries (LMICs) is unclear. We estimated the prevalence of undernutrition (stunting and underweight) and overnutrition (obesity) in pregnant women in LMICs.

Methods: We used data from Demographic and Health Surveys (DHS) done in 52 LMICs between January 2000 and January 2015, comprising 43,615 pregnant women (11,439 within the first trimester), who were grouped by World Health Organization (WHO) region. Pooled estimates by regions and overall were obtained from random-effects meta-analysis.

Results: In LMICs, the pooled prevalence of stunting in pregnant women was 4.9% (95% CI 3.5-6.4); the lowest prevalence was in Europe (1.4%, 0.8-2.2) and the highest was in South East Asia (16.6%, 13.0-20.6). The pooled prevalence of underweight was 7.9% (5.6-10.5); the lowest prevalence was in Europe (2.6%, 0.5-5.9) and the highest was in the South- East Asia (23.4%, 15.9-31.9). The pooled prevalence of obesity was 6.0% (4.4-7.9); the lowest prevalence was in the South- East Asia region (3.0%, 1.1-5.7) and the highest in Eastern Mediterranean region (18.6%, 9.4-30.0).

Conclusions: Both under- and over-nutrition among pregnant women are significant global health issues. Urgent global action is needed to improve pregnant women's nutritional status in LMICs.

T5:S29:69

Ghrelin, amylin, gastric inhibitory peptide and cognition in middle-aged HIV-infected and uninfected women. The Women's interagency HIV study

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Objective: To explore the gut-brain axis via gut hormone levels and cognitive test scores in women with (HIV+) and without HIV (HIV-) infection. **Design/Methods:** 356 participants (248 HIV+, 108 HIV-) in the Brooklyn Women's Interagency HIV Study (WIHS), with measured levels of ghrelin, amylin, and gastric inhibitory peptide (GIP). Cross-sectional analyses using linear regression models estimated the relationship between gut hormones and Trails A, Trails B, Stroop interference time, Stroop word recall, Stroop color naming and reading, and Symbol Digit Modalities Test (SDMT) with consideration for age and other variables. **Results:** Among women at mid-life with chronic (at least 10 years) HIV infection, ghrelin, amylin and GIP were differentially related to cognitive test performance by cognitive domain. Among HIV+ women, there was an inverse association between GIP and Trails A and Stroop Interference, and between ghrelin and Stroop Word. Among at risk HIV- women, inverse associations were observed for ghrelin and performance on Trails A and B, Stroop Color and Stroop Word; and between amylin and Stroop Interference. **Conclusion:** Previous analyses in WIHS participants have suggested that an obesity syndrome characterized by insulin resistance and Type 2 diabetes may be detrimental for cognitive function among women with HIV infection. Digestive hormones may provide mechanistic insights regarding the obesity syndrome-cognition association in middle-aged HIV+ and at risk HIV- women.

T5:S29:70

Leptin, adiponectin and cognition in middle-aged HIV-infected and uninfected women. The Brooklyn Women's interagency HIV study

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Objective: To explore the association of cognition and the adipokines, leptin and adiponectin (total; high molecular weight, HMW), in women with (HIV+) and without HIV (HIV-) infection. **Design:** Cross-sectional analyses of adipokines and cognition using linear regression models of log-transformed adipokines, and Trails A, Trails B, Stroop interference time, Stroop word recall, Stroop color naming and reading, and Symbol Digit Modalities Test (SDMT) with consideration for age, HIV infection status, education, CD4 count, diabetes, body mass index (BMI), and race/ethnicity. **Participants:** 354 participants (247 HIV+, 107 HIV-), in the Brooklyn Women's Interagency HIV Study (WIHS), average age 38.9 years, with measured levels of leptin and adiponectin (total and high molecular weight, HMW). **Results:** Higher levels of leptin were positively associated with worse cognition on the basis of Trails A completion time and SDMT score.

Among at risk HIV- women, leptin was associated with worse performance on Trails B. No associations were observed for total or HMW adiponectin. **Conclusion:** These data suggest that higher levels of leptin, consistent with more adipose tissue, are associated with worse cognitive function in middle age. Monitoring leptin over time and with increasing age in relation to cognition and dementia, may lend insights to the role of adipose tissue in successful body and brain aging among women with HIV infection.

T5:S29:71

Canadian trends in BMI dispersion: Going beyond the mean-centric paradigm

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Background: Most research studying BMI trends in developed countries are pointing to a global BMI increase with various tendencies according to sex, race or socioeconomic status. The trends in the dispersion of BMI received less attention but may conceal important information to understand the creation of interindividual inequalities.

Aim: The objective of this research was to describe the trends in BMI dispersion for various groups of Canadian adults.

Method: Using data from the CCHS (2000-12), we analysed the trends of the BMI mean and median, and the association with the standard deviation (SD) or the 5th and 95th percentiles. All analyses were disaggregated by sex, education level and the province of residence. The sample comprises 429,104 men and women aged 25-64 y.

Result: Increase in mean BMI was accompanied by an increase in SD. The BMI at the 5th percentile increased by 0.2 kg/m² for women and men, while the value at the 95th percentile increased by 1.9 kg/m², and 1.2 kg/m² for women and men respectively. Independently of education level, most provinces showed an increase in BMI dispersion.

Conclusion: The increase in mean BMI is associated with the increase of inequalities in BMI dispersion independently of sex and education level. These observations are suggesting that some individuals may have a genetic predisposition to the interaction with an obesogenic environment. Analysing trends in the dispersion of an outcome may improve the validity of observational studies.

T5:S29:72

Association between sedentary patterns and adiposity in healthy young adults

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T5:S29:73

Effects of parental feeding practices and temperament on BMI and Fat mass from childhood through adolescence

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Background: Few studies have investigated the longitudinal effects of parental feeding practices on children's body mass index (BMI).

Aims: We examined associations between parental feeding control and using food to soothe on multiple indicators of adiposity, and whether effects differed by temperament.

Methods: Participants (n=8864) were from the Avon Longitudinal Study of Parents and Children. Temperament at 6 months was assessed using the Revised Infant Temperament Scale. Feeding control and food to soothe were measured by parent-report at 42-65 months with both categorised into two groups using latent class analyses. BMI measured at 7 and 15 years was converted to sex- and age-adjusted z-scores (BMIz). Fat mass was assessed at 9 years using dual energy X-ray absorptiometry.

Results: Higher feeding control was associated with 0.10-point lower BMIz at age 7, 0.05-point lower BMIz at 15 years, and 0.48 kg lower fat mass at 9 years, than lower feeding control. Lower feeding control increased the risk of overweight by 27% at 7 years and 12% at 15 years but only in temperamentally easy children. There was little evidence of an association between food to soothe and children's adiposity outcomes.

Conclusions: Contrary to some studies, higher parental control was associated with lower adiposity, the effect is prominent among temperamentally easy but not difficult children.

Session 30: Home environment and influences of the wider environment

T5:S30:01

Improving health inequalities through action on people's daily living conditions

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Despite the popular focus on individual risk behaviours as the 'causes' of obesity, the social patterning of obesity points toward something about society that is driving these mass scale dietary and physical activity changes and their unequal social distribution. The conditions within which people are born, grow, live, work and age affect health, partly through their influence on behaviour and weight. Depending on where a person is in the social hierarchy influences their behavioural choices, choices that are governed by their level of material and psychosocial resource provided by the complex system that comprises the daily living environments. Unequal exposure to health protecting or health damaging aspects of these environments adds health disadvantage to those groups who are already disadvantaged in terms of wealth, power and prestige. These underlying inequities are likely responsible for the unequal distribution of obesity.

Missing in most obesity prevention strategies is the recognition that obesity and its unequal distribution is the consequence of a complex system that is shaped by how society organises its affairs. Action is needed that tackles the inequities in this system, aiming to ensure an equitable distribution of ample and nutritious global and national food supplies; built environments that lend themselves to easy

access and uptake of healthier options by all, and living and working conditions that produce more equal ma

T5:S30:02

Parenting and feeding practices affect the development of infants' eating behavior, sleep patterns, and growth

Birch, L.*
University of Georgia

Parenting styles and practices influence many aspects of children's cognitive and socio-emotional development. Less is known about how parents' feeding styles and practices influence the early development of children's eating behaviour, and obesity risk. Infants must rely on others for care and feeding, so feeding practices play a major role in shaping infants' early learning about food and eating. Feeding practices determine *what* and *how* the infant is fed (breast milk or formula), *which* foods are introduced and become familiar during the transition to solids, *whether* feeding is the default response to infant crying, and *how much* and *how often* the infant is fed. In today's food environment, characterized by the ready availability of inexpensive, highly palatable energy dense foods, traditional feeding practices that have evolved over time to promote nutrient intake in contexts of food scarcity, can be maladaptive. Traditional practices include using feeding as the default response to infant distress, and feeding without regard to infant's hunger or fullness cues. While these practices may be an adaptive response to food scarcity, they can promote the development of patterns of preferences and intake that can contribute to unhealthy diets, excessive weight gain, and increased obesity risk in current food environments. Results of randomized trials are presented providing evidence that an alternative to traditional feeding practices, responsive feeding, can reduce risk of rapid weight gain in infancy. Prompt, contingent, and developmentally appropriate, responsive feeding promotes the development of eating behaviours, sleep patterns, and early self regulatory skills that can reduce early obesity risk.

T5:S30:03

Does the built environment influence obesity? A global perspective

Sallis, J.*
University of California

Built environments are believed to influence opportunities for physical activity and access to healthy foods. This presentation focuses on the relation of physical activity environments to obesity risk and physical activity internationally. Single-country studies have yielded mixed results, perhaps due to limited variability in built environments in each country and diverse methods and measures. The IPEN (International Physical activity and Environment Network) Adult Study was designed to examine associations of neighborhood environmental attributes with BMI/weight status and physical activity in 12 environmentally and culturally diverse countries using comparable methods.

Methods: A multi-site cross-sectional study was conducted in 17 cities across 12 countries (Australia, Belgium, Brazil, China, Colombia, Czech Republic, Denmark, Mexico, New Zealand, Spain, UK, USA). Participants (n=14222, 18-66 years) self-reported neighbourhood environmental attributes. Height and weight were self-reported in eight countries and directly measured in four countries. Fourteen cities in 10 countries had objective data on built environments (GIS) and total physical activity (accelerometer)(n=6822).

Results: Three reported environmental attributes were associated with BMI or weight status in pooled data from 12 countries. Safety

from traffic was the most robust correlate, suggesting that creating safe routes for walking/cycling might have a positive impact upon weight status/BMI. Having numerous shops and services within walking distance was associated with lower BMI, suggesting compact neighborhoods with more places to walk facilitates lower BMI. Poor perceived crime safety was related to higher BMI. Four of six objectively-measured environmental attributes were significantly, positively, and linearly related to physical activity: net residential density, intersection density, public transit density, and number of parks. Design of urban environments has the potential to contribute nearly 90 weekly minutes of physical activity.

Conclusions: These findings from IPEN Adult show that both self-reported and objectively-measured built and social environmental variables are related to obesity risk and physical activity. Associations tend to be stronger in these international analyses than in prior single-country studies. Similarity of findings across international cities suggests the promise of engaging urban planning, transportation, parks, and law enforcement sectors in efforts to reduce the global health burdens of obesity and physical inactivity.

T5:S30:04

New methods of assessment of physical activity and sedentary behaviours

Ekelund, U.*

Department of Sport Medicine, Norwegian School of Sport Sciences

Low levels of physical activity is a major risk factor for morbidity and premature mortality. More recently high amounts of sedentary behaviour, usually assessed as daily sitting time or time spent viewing TV, have been associated with increased risks for several chronic conditions and mortality.

Despite the compelling evidence from these studies it is also well known that self-reported physical activity and sedentary time is prone to misclassification due to social desirability and recall bias. Thus, there is a need for more accurate methods for assessing physical activity and sedentary time to; determine the true dose-response associations between lifestyle behaviours and health outcomes; to monitor secular trends in populations; to assess the effect of interventions; to control for habitual physical activity in exercise training studies; and to increase statistical power.

Objective monitoring of physical activity and sedentary time, usually by accelerometry, have been or are about to be implemented in some large-scale surveillance systems and cohort studies. However, there are currently a number of different monitors in use, which may aggravate comparison between studies. This is further complicated by the use of different placements of the monitors. Traditionally, accelerometers were placed close to the centre of the body (i.e. around the waist) while more recently they have been placed on the wrist and thigh.

This presentation will summarise and discuss the pros and cons with the different (new) methods and methodology used to assess physical activity and sedentary time in population-based research.

Session 31: Maternal health and healthy offspring

T5:S31:01

Can we intervene pre-pregnancy?

Gordon, A. and Sim, K.

Charles Perkins Centre, University of Sydney

Obesity is one of the most serious global health crises of the 21st century. The most rapid rise in obesity is in adults of reproductive age, which is a critical window of risk and potential prevention. Women who have higher preconception weight and pregnancy weight gain are at increased risk of diabetes and cardiovascular disease in later life themselves and transmit a 33% increased risk of obesity to their children. This vicious intergenerational cycle drives an increased lifetime risk of obesity, diabetes and cardiovascular disease. Almost half of women enter pregnancy overweight or obese in high income countries and there is an urgent need to identify strategies that will halt or reduce rising obesity rates for women of reproductive age. Trials to limit weight gain during pregnancy have not lived up to the promise of reducing this burden. There is now increasing recognition that targeting obesity prior to pregnancy has greater potential to break the cycle but there are few interventional studies in this period. If weight loss is effective in overweight and obese women planning pregnancy it has the potential to improve significant short term morbidities for mothers and babies as well as obesity and cardiovascular outcomes for the next generation.

T5:S31:02

Tackling gestational weight gain

Bell, R.*

University of Alberta

Maternal body weight is an indicator of the health of a pregnant woman and her developing fetus. Risk of poor maternal and fetal health is increased when women gain too little or too much weight during pregnancy. Excess weight gain in pregnancy is prevalent in Western countries and pregnancy is a major risk factor for obesity and related chronic diseases. A combination of excess weight gain in pregnancy, poor diet quality, and less than recommended postpartum weight loss amplifies these effects. There is a clear need for the development and evaluation of strategies promoting appropriate, effective, safe weight management and healthy diets for pregnant and postpartum women. The ENRICH research program addresses these issues by using a multi-disciplinary, multi-sectoral, integrated knowledge translation approach to 1) advance knowledge; 2) understand perceptions and experiences of diverse groups of women; and 3) identify opportunities in health and community-based care delivery systems where healthy dietary intake and weight management strategies can be promoted. Findings indicate that weight and nutrition are important considerations for pregnant women. Further, all pregnant women need support and their needs extend beyond standard health care, yet few avenues are available to provide non-medical care to healthy women with low-risk pregnancies. Timing of interventions, complexity of life circumstances, and care provider support influence the extent to which women can implement behaviours to optimize nutrition and weight. Integrated and coordinated models of antenatal and postpartum

care are needed to help women and care providers improve maternal and fetal outcomes across diverse settings.

T5:S31:03

Family interventions for obesity prevention in children 0-5 years: Successes and challenges over the past decade and emerging opportunities

Davison, K.*

Harvard TH Chan School of Public Health

Childhood obesity is an entrenched global health problem with broad-reaching health implications for individuals and populations. The epidemic of obesity and its health implications have spared no age group, including young children. The estimated global prevalence of obesity in children 0-5 years was 7.8% in 2015, with rates ranging from 3.9% in South Central Asia to 21.4% in Northern African. In response to these trends and in recognition of the fundamental role that families play in the establishment of lifestyle behaviors (including diet, physical activity, media use and sleep) early in life, family interventions for obesity prevention in young children have proliferated over the past 5 years. Since 2012, at least 16 randomized controlled trials have been completed and an additional 9 trials are still in progress. Three general types of family interventions have been developed and tested including interventions that focus on the promotion of healthy lifestyles behaviors, interventions that couple this approach with the promotion of general parenting skills, and interventions which do not directly target obesity or obesity-related behaviors. In this presentation, family interventions for obesity prevention in children 0-5 years will be reviewed and discussed with a particular focus on variation in trial outcomes by (a) family demographics (e.g., low vs. high income families), (b) implementation setting (e.g., home, primary care), (c) intervention length, and (d) length of follow up. Drawing on these results, successes will be highlighted along with gaps in the evidence base and opportunities for future research.

T5:S31:04

Update on the WHO ending childhood obesity commission

Reddy, S.*

Public Health Foundation of India

Session 32: Obesity in children and adolescents

T5:S32:01

High resolution maps of childhood obesity: Extending the use of child obesity surveillance systems

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Child obesity surveillance systems based on BMI data collected at schools have been used to document declines in obesity in a number of jurisdictions including Alaska, Philadelphia, and New York City (NYC). In addition to monitoring trends, such systems allow for the

evaluation of interventions, estimation by demographic subgroups and geographic areas, and the measurement of disparities.

The NYC child obesity surveillance system was established in 2008 and is based on height and weight measurements recorded for NYC public school students as part of a physical fitness assessment. Records are linked to registry, academic, and attendance data. The estimates currently cover kindergarten through 8th grade and include approximately 600,000 measures per year. Estimates are reported annually for a variety of characteristics.

A key area of interest is the spatial pattern of obesity and its relationship to built environment measures such as walkability, park access, or food environment. Additionally, in the absence of high quality information about poverty, area-based measures have been suggested to quantify disparities.

To meet these needs, we construct high resolution maps of child obesity. The maps are representative, are standardized to ensure comparability across space and time, and are processed to protect student confidentiality. Uncertainty is quantified using resampling and the resulting maps are validated using out-of-sample prediction. Additional uses will be presented.

T5:S32:02

Modifiable risk factors of early childhood overweight and obesity in an Asian population

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Many studies have identified early-life (pre-pregnancy, antenatal and early infancy) modifiable risk factors for childhood overweight/obesity, but few have evaluated whether they may influence risk of overweight/obesity in combination. We examined associations between modifiable risk factors, individually and in combination, with adiposity in young Asian children. Six modifiable risk factors were identified in a birth cohort in Singapore (n=858): mother's pre-pregnancy and father's overweight/obesity (BMI \geq 25 kg/m²), mother's excessive gestational weight gain and high fasting glucose (\geq 4.6 mmol/L), short breastfeeding duration (<4 months) and early weaning (<4 months). The main outcome measures were child BMI, sum of skinfolds (SSF), fat mass index (FMI) and overweight/obesity (BMI-for-age>85th percentile) at 4-years of age. After adjusting for confounders, we noted positive, graded associations between an increasing number of risk factors with BMI, SSF and FMI at 4-years (ptrend<0.001). The estimated probability of overweight/obesity ranged from 5.2 (95%CI: 4.8-5.6)% among children with no risk factors (n=138) to 36.4 (28.1-44.6)% among children with \geq 4 risk factors (n=47). The relative risk of overweight/obesity in children with \geq 4 risk factors was 9.4 (2.8-31.8) compared to children with no risk factors. Our findings suggest that a greater number of early-life modifiable risk factors were associated with a graded increase in risk of early childhood overweight/obesity.

T5:S32:03

Pubertal associations with weight and body fat change over two years: Preliminary analysis of the adolescent rural cohort study of hormones, health, education, environments and relationships (ARCHER)

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Background: Puberty is a risk period for overweight and obesity (O&O). In epidemiological studies, early puberty timing is linked to O&O, but individual longitudinal data are lacking. The association of puberty tempo and O&O is undefined.

Aims: To determine puberty timing/tempo and associations with BMI z-score (BMIz) and body fat over two years in adolescents from the ARCHER study.

Methods: Puberty timing/tempo were estimated using age and Tanner stage (self-report). Linear regression intercepts and slopes (representing timing and tempo) were generated for the overall cohort (sex-specific) and for each individual. Deviations from the overall intercept/slope were stratified into earlier/later timing and faster/slower tempo groups, and used in a multivariate model to predict BMIz and body fat change.

Results: Data were available in 237 teens (44% female). O&O rose from 29% to 32%. Compared to boys, girls showed larger increases in BMIz (0.11 vs. -0.01; $p=0.03$) and body fat (3.8% vs. -2.1% $p<0.001$). Multivariate analysis (adjusted for baseline variables) suggests later timing ($p=0.01$) and faster tempo ($p=0.03$) may be linked to greater BMIz increases in girls, but not in boys.

Conclusions: O&O is prevalent in this cohort, with changes in BMIz and body fat showing sex-specific patterns. Greater weight gain in girls with later timing is contrary to epidemiological data, and results on puberty tempo are novel. More complex modelling of puberty are needed to confirm these findings.

T5:S32:04

Protein density in infancy is associated with early, modifiable infant feeding choices and BMI: Findings from the Melbourne infant feeding activity and nutrition trial (InFANT) program

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Deakin University Centre for Physical Activity and Nutrition Research

High consumption of animal protein has been associated with accelerated growth and increased BMI in infants at 12 months of age. Rapid infant growth rates have been associated with increased risk of obesity in early childhood, adolescence and adulthood. This study describes food sources of protein and correlates of intakes in 424 Victorian children across the first 5 years of life. Protein intakes derived from 3 *24 hour recalls at 9, 18, 42 and 60 months of age; child height and weight collected by trained staff. Associations between demographic and behaviour variables and protein density were examined using mixed models at each time point. Tracking was assessed via correlations between residualised protein scores at the different time points. Mean (SD) protein (gms) intake was 29.7(10.8), 46.3(11.4), 54.3(13.7) and 59.9 (14.7) at 9, 18, 42 & 60 months respectively, vastly exceeding age appropriate recommendations.

Increased protein density was associated at 9 months with earlier introduction of solids ($B=-0.30$ [95%CI: -0.49,-0.12]) & infant formula as principal milk source ($B=0.62$ [95%CI: 0.03,1.20]); at 18 months with consuming > 500g/day of dairy milk ($B=0.40$ [95%CI: 0.01, 0.79]); and with increased zBMI at 18 ($B=0.23$ [95%CI: 0.07,0.40]) & 42 months ($B=0.25$ [95%CI: 0.01,0.50]). Determining correlates of protein intake informs our understanding of how and when we might best intervene to support appropriate intakes and in turn reduce

T5:S32:05

Hyperfibrinogenemia in overweight and obese children and adolescents

De Schepper, J.^{*}; Vanbesien, J.; Anckaert, E. and Gies, I. UZ Brussel

Obesity in childhood and adolescence is associated with several metabolic disturbances, including insulin resistance and low grade inflammation. Hyperfibrinogenemia is associated with an increased risk for coronary artery disease.

To determine the prevalence of increased serum fibrinogen levels and its association with cardiometabolic risk factors and thyroid dysfunction in overweight or obese children and adolescents.

In 306 (182 male) children and adolescents with overweight (BMI z-score > 1.35) BMI and BMI z score, thyroid hormones (TSH, FT4), fasting blood glucose, HOMA-IR, lipids (triglycerides, HDL and LDL cholesterol), fibrinogen (by turbidometric clot detection), homocysteine, blood pressure, and body composition (by BIA) were determined. Birth weight and familial history of diabetes was obtained by maternal recall. Univariate linear regression and T-test were performed.

In total, 68 (22 %) subjects had an elevated (>400 mg/dl) fibrinogen concentration. No gender difference was found. Fibrinogen was linearly related to age, adiposity (BMI z-score, body fat %), fasting glycemia, insulin resistance (HOMA-IR), FT4, homocysteine, LDL cholesterol and HDL cholesterol concentrations. Correlations with FT4 and LDL cholesterol persisted after correction for age and adiposity.

In conclusion, hyperfibrinogenemia is found in one fifth of obese children and adolescents, increases with age and adiposity and is associated with lower FT4 and higher LDL cholesterol values.

T5:S32:06

Associations between neck circumference and adipocytokines among adolescents

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Background: Neck circumference (NC) was recently introduced as a predictor of cardiovascular disease (CVD) risk factor. Adipocytokines may have a key role in the development of CVD.

Aims: The purpose of this study was to examine the associations between NC and adipocytokines, such as adiponectin and leptin in Portuguese adolescents.

Methods: A cross-sectional school-based study was conducted on 529 Portuguese adolescents (267 girls), mean age 14.3±1.7 years. We measured NC, plasma biomarkers (serum adiponectin and plasma leptin), cardiorespiratory fitness (20m shuttle run test), socio-economic status, adherence to the Mediterranean diet and pubertal stage. **Results:** The mean of NC in girls was 31.0±2.2 cm and for boys it was 33.5±2.9 cm. NC was significantly and positively correlated with leptin and negatively correlated with

adiponectin, after controlling for age, sex, pubertal stage, cardiorespiratory fitness, socioeconomic status and diet ($p < 0.001$). Linear regression analyses showed that NC was positively associated to leptin ($\beta = 3.722$, $p < 0.001$), whereas it was significantly and inversely associated with adiponectin ($\beta = -1.326$, $p < 0.001$), after adjusting for several confounders.

Conclusions: The use of NC, as novel predictor of CVD risk factor, should be considered. Since the onset of chronic disease risk factors starts in early childhood, it is important to assess the risk predictors in order that effective preventive strategies targeting those at risk start as early as possible.

T5:S32:08

Nutrition & dietetics services for assessing adolescents' anthropometric status in Saudi Arabia

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Understanding and addressing the components and services of nutritional status of adolescents, particularly anthropometry in clinical settings, are important constituents of clinical care. This study aimed to evaluate dietetic services concerning anthropometry as an assessment method particularly, for weight status in adolescent group. A service evaluation questionnaire based survey conducted in ten general hospitals in Jeddah city, Saudi Arabia. Results showed that seven hospitals have separate independent dietetic departments. Three hospitals have divisions of adolescent medicine and 70% of dietetic departments; provide services to adolescents such as growth and development, weight problems and for diabetic patients. Tools of anthropometry are measured height/weight, circumferences and Body Composition Analysers. Reference data for comparison are international reference standards and not Saudi Reference Data. The Saudi Arabian dietetic services should be guided nationally by the authorized professional organization Saudi Dietetic Association (SDA), which needs to emphasize some specific basics for all nutrition and dietetic services. The study evaluates Jeddah anthropometry services; identify methods' enablers and barriers, particularly for adolescents. We predict that this study will provide bases for the services of anthropometric assessment that could improve services provided for adolescents, particularly when defining the weight status of this group

T5:S32:09

The role of free fatty acids in the inflammatory profile in adolescents with metabolic syndrome engaged in interdisciplinary therapy

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¹Universidade Federal de São Paulo – UNIFESP; ²São Camilo; ³Weight Science; ⁴Universidade Federal de Minas Gerais

Background: Obesity is related to an inflammatory state, which lead to metabolic dysfunction.

Aims: to evaluate if interdisciplinary therapy can influence inflammation and serum fatty free acid profile in obese adolescents.

Methods: 108 obese adolescents, 14-19 years, were submitted to 1-year of interdisciplinary therapy (nutrition, psychology, physical exercise and clinical support). Blood samples were collected to

analyze glucose, lipid, adipokines and fatty free acids concentrations. Body composition and anthropometric profiles were measured. Adolescents were divided according to metabolic syndrome diagnoses: MetS and Non-MetS.

Results: MetS and Non-MetS groups improved inflammatory profile (leptin, adiponectin, leptin/adiponectin ratio, adiponectin/leptin ratio and CRP). Both groups reduced miristic acid (C14:0) and increased docosahexaenoic acid (DHA, C22:6n3), heneicosapentaenoic acid (HPA, C21:5n3) and arachidonic acid (AA, C20:4n6). Leptin and leptin/adiponectin ratio were negatively associated with changes in docosapentaenoic acid (C22:5n3) and stearidonic acid (C18:4n3), independent of metabolic syndrome and the number of metabolic syndrome parameters. Adiponectin/leptin ratio was positively associated with HPA. Changes in adiponectin were positively correlated with changes in HPA.

Conclusion: interdisciplinary therapy can influence serum fatty acids and inflammatory profile in obese adolescents. Moreover, serum fatty acids can modulate inflammatory biomarkers.

T5:S32:10

The impact of adiponectin levels on cardiometabolic risk among Brazilian adolescents with obesity

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Background: Recently, adiponectin has gained attention as a serum biomarker due to its correlation with various cardiometabolic risk factors such as insulin resistance, dyslipidemia, and also cardiovascular disease.

Aims: To explore cardiovascular risk according to different levels of adiponectin in adolescents with obesity, through a cohort study.

Methods: 220 adolescents with obesity, aged from 15 to 19 years, of both genders. Body composition, metabolic profile and adiponectin concentrations were obtained. Adolescents were distributed according to adiponectin tertile. GLM test was performed to analyze difference between groups with p level set at ≤ 0.05 .

Results: Tertile 1 (lower levels of adiponectin ≤ 4.85) presented statistically higher BMI, fat mass (kg), lean mass (kg), subcutaneous fat and waist circumference than tertile 3 (higher levels of adiponectin > 9.63); and higher levels of subcutaneous fat and lean mass when compared with tertile 2 (medium levels of adiponectin > 4.85 e ≤ 9.63). Considering metabolic parameters, tertile 1 presented statistically higher values of insulin, HOMA-IR, HOMA-AD, total cholesterol, triglycerides and LDL-c; and lower values of QUICKI and HDL-c when compared with tertile 3.

Conclusion: We have showed that among adolescents with obesity, the level of adiponectin may modulate cardiometabolic risk. (FAPESP 2013/08522-6; 2015/14309-9)

T5:S32:11

Parental perception of child weight status and weight gain across childhoodRobinson, E.*¹ and Sutin, G.²¹University of Liverpool; ²Florida State University

Importance: Parents of children who are overweight often fail to accurately identify their child's weight status. Although these misperceptions are presumed to be a major public health concern, little research has examined whether parental perceptions of child weight status are protective against weight gain during childhood.

Objective: To examine whether parental perceptions of child weight status are associated with weight gain across childhood.

Method: Data from the Longitudinal Study of Australian Children were used to assess parental perceptions of child weight status and to examine changes in researcher measured child BMI-Z scores across childhood, from 4 to 13 years old.

Participants: 3,556 Australian children and their parents.

Results: Children whose parents perceived their weight as being 'overweight', as opposed to 'about the right weight', gained more weight from baseline to follow up in all analyses. This finding did not depend on the actual weight of the child; the effect that perceiving one's child as being overweight had on future weight gain was similar among children whose parents accurately and inaccurately believed their child was overweight.

Conclusions: Contrary to popular belief, parental identification of child overweight is not protective against further weight gain. Rather, it is associated with more weight gain across childhood. Further research is needed to understand how parental perceptions of child weight may counter-intuitively contribute to obesity.

T5:S32:12

Perspectives of primary care clinicians and parents on a childhood obesity prevention intervention in primary careBourgeois, N.*¹; Brauer, P.²; Randall Simpson, J.²;Kim, S.¹ and Haines, J.²¹Women's College Hospital; ²University of Guelph

Preventing childhood obesity is a public health priority; primary care is an important setting for early intervention. Authors of a Canadian national guideline have identified a need for effective primary care obesity prevention interventions. We explored the perspectives of Canadian primary care clinicians and parents of children 2-5 years on the implementation of an obesity prevention intervention within primary care.

We conducted focus groups with interprofessional primary care clinicians (n=40), and interviews with parents (n=26). Participants were asked about facilitators/barriers to, and recommendations for implementing a prevention program in primary care. Data were recorded and transcribed; directed content analysis was used to identify major themes.

Barriers exist to addressing obesity-related behaviours in this age group, including: a gap in well-child primary care between 18 months and 4-5 years, lack of time, and sensitivity of the topic. The trust and existing relationships with primary care clinicians were noted as facilitators to program implementation. Offering separate parent and children's programs, and addressing both general parenting and obesity-related behaviours were identified as desirable.

Despite barriers to addressing obesity-related behaviours within well-child primary care, both clinicians and parents expressed interest in interventions in primary care settings. Next steps should

include pilot studies to identify feasible strategies for implementation.

T5:S32:14

Predicting future weight status from measurements made in early childhood: A novel longitudinal approach applied to millennium cohort study data

Mead, E.*; Batterham, A.M.; Atkinson, G. and Ells, L.J.

Teesside University

Childhood obesity is a global concern. We aimed to employ a novel analytic approach to predict the weight status of 11-year-old children from measurements at age 5. Data were derived from 12,075 children in the Millennium Cohort Study. We applied ordinal logistic regression to derive the predicted probability (percent chances) of a 5 year-old child becoming underweight, normal weight, overweight, obese or severely obese at age 11, based on their weight status, sex, and index of multiple deprivation fifth. A normal weight child had a 5.7% (95% CI: 5.2% to 6.2%) chance of becoming obese at age 11. The chances of an overweight child becoming normal weight, overweight or obese at age 11 were around a 1/3 for each category. Severely obese children had a 50% (43% to 57%) chance of remaining severely obese. Differences between sexes were not substantial or statistically significant. Non-deprived obese 5-year-old boys had a lower probability of remaining obese than deprived obese boys: -22% (-40% to -3.2%). This association was not observed in obese 5-year-old girls, in whom the non-deprived group had a probability of remaining obese 7% higher (-15% to 29%). The sex difference in this interaction of deprivation and baseline weight status was therefore -29% (-59% to 1.6%). This novel analysis approach informs the prediction of a child's future weight status.

Conflict of interest: Dr Louisa Ells is seconded 2 days a week to Public Health England as a special

T5:S32:S15

Diabetes risk factors in children in medically underserved areasde Andrade Resende, G.*¹; Magalhães, F.O.² and Rowser, M.³¹Universidade de Uberaba/ University of Southern Indiana;²Universidade de Uberaba; ³University of Southern Indiana

Background: Diabetes is a major health issue for the United States; 29.1 million people live with diabetes and around \$245 billion are spent on it yearly. An overweight or obese child is five times more likely of becoming an obese adult than a child of normal weight. Carrying excess weight leads to a majority of diabetes cases.

Aims: The objective of this research is to analyze the main risk for diabetes in medically underserved areas.

Key Methods: BMI rates and family histories of diabetes were assessed and analyzed in 105 children ages 2 to 18. The data was obtained from the USI Community Health Center, which is located in a medically underserved area of Evansville, Indiana.

Results: 42% of all children were in the overweight and obese categories (7% less than the children in the healthy weight). 24% of the children had their BMI percentage at 95% or higher (this classifies them as obese), while 18% had BMI between 85% and 95% (classified as overweight). 35% of children communicated that they have at least one first or second-degree relative diagnosed with diabetes, and 18.5% of the children had both of the risk factors simultaneously.

Conclusions: The United States is already known to have a large obese population, but the results showed that the incidence of both risk factors in this medically underserved area are 7% greater than the national rate of 17%. These results will enable the Health Center to tailor necessary interventions.

T5:S32:17

Weight perception and BMI among adolescents in rural Sri Lanka, a lower-middle income country facing a double burden of under- and over-nutrition

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Rayner, M.R. and Townsend, N.P.T.

University of Oxford

Background: An accurate body weight perception may facilitate healthy diet behaviour, which is critical during the physiological, social and cognitive development of adolescence. Research from developed countries suggests accuracy of weight perception varies according to individual characteristics, but there is a dearth of research from low- and middle-income countries (LMICs), where populations commonly face a double burden of under- and over-nutrition.

Objective: To examine the accuracy of body weight perception among adolescents living in rural Sri Lanka and to assess differences according to individual characteristics.

Methods: We asked adolescents (n=1,299) to report perceived body weight (under-, normal-or over-weight) and compared their perceptions to their actual weight (using BMI SD scores and IOTF standards). We calculated the accuracy of perceptions and used X² analyses to examine how accuracy varied by individual factors.

Results: 43% of pupils were underweight, but only 36% of these pupils reported themselves as such. Five percent of pupils were overweight or obese and most (75%) had an accurate perception. There were no significant differences between boys and girls in weight perception accuracy, but underweight pupils were significantly more likely to have inaccurate perceptions.

Conclusions: With rising obesity rates among adults and high proportions of underweight among young people in Sri Lanka and other LMICs, public health campaigners and researchers must account for the needs of both populations. The methods employed by anti-obesity campaigns in developed countries, where both young people and adults face high rates of overweight and obesity, may need to be adjusted to account for this complexity. Future research will investigate associations between misperceptions and dietary behaviour and how perceptions and behaviors change within the same individuals over time.

T5:S32:19

Analyses of leptin, its soluble receptor, and free leptin index in children treated for obesity

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Background: Leptin concentrations are known to reflect the degree of fat mass and changes herein. Also soluble leptin receptor (SLR)

concentrations and the free leptin index (FLI) are related to the degree of fat mass and changes herein, but less is known in regards to the ability to predict changes in weight.

Aims: To identify markers related to the leptin system that at baseline is able to identify changes in the degree of obesity.

Methods: Weight, height, and blood samples analysed for leptin and SLR concentrations were measured in 249 boys and 318 girls (aged 3- to 22-years) at baseline and after weight changes during childhood obesity treatment. FLI was calculated as leptin/SLR*100.

Results: At baseline the median BMI SDS was 3.09 (1.33-5.54) in boys and 2.76 (1.35-5.65) in girls. Reductions in leptin ($p<0.0001$) and FLI ($p<0.0001$) and increases in SLR ($p=0.002$) concentrations were seen during weight loss. In those gaining weight, concentrations of leptin ($p<0.0001$) increased and SLR ($p=0.01$) and FLI ($p=0.03$) decreased. However, neither leptin ($p=0.43$), SLR ($p=0.52$), nor FLI ($p=0.26$) could predict alterations in BMI SDS adjusted for sex, age, and baseline degree of obesity.

Conclusions: Leptin, SLR, and FLI were related to the degree of obesity at baseline and changes hereafter, but adjusted baseline concentrations were not able to predict subsequent changes in weight, suggesting that the leptin system rather reflect than orchestrate changes in obesity.

Conflicts of interest: None disclosed.

Funding: This study was funded by The Region Zealand Health and Medical Research Foundation, the Novo Nordisk Foundation, and the Danish Innovation Foundation (grant 0603-00484B).

T5:S32:20

Longitudinal effects of family-based behavioral treatment of obesity: Child and family characteristics that influence children's eating attitudes and behaviors

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Children with healthy eating attitudes and behaviors (EABs) tend to maintain a healthy weight status, contrarily, children with unhealthy EABs are at risk for eating disorders or obesity. Family-based behavioral treatment for child obesity (FBBT) often involves limiting consumption of high-calorie foods and monitoring food intake and is considered a gold standard treatment for child obesity. However, some argue these strategies could increase disordered eating behaviors. This randomized controlled trial examines the effects of FBBT and different child and family predictors on children's EABs after one and two year follow-up. 249 obese/overweight children age 8-12 and their parents were randomized to one of two behavioral interventions or an education control. Children completed the Children Eating Attitude & Behavior Test (ChEAT) to assess problematic EABs; higher scores indicate more problematic eating attitudes/behaviors. Results of Hierarchical Growth Multilevel Modeling analyses revealed that compared to baseline, children's ChEAT scores significantly improved overtime across treatment conditions ($p = 0.000$). There was no difference between treatment conditions. Higher ChEAT scores at baseline were related to less improvement at follow-up. Higher baseline social skills and attention problems scores were related to higher ChEAT scores at follow-up. Results of this study provide further evidence that FBBTs for pediatric obesity doesn't lead to increases in problematic EABs.

T5:S32:21

Association between parent monitoring and encouragement and child dietary, physical activity, sedentary behaviors, and weight status among private school children in Delhi, India

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Family is an important socializing institution in India that strongly influences adolescent behavior. Research from high income countries (HICs) shows us that parents play an important role in creating and shaping adolescents' eating and physical activity (PA) environments. With adolescent obesity on the rise in India, it is important to identify factors associated with adolescent obesity to be used as potential action points for interventions. To date, no study has looked at the association of parenting behaviors on child behaviors and weight status in India. This study examined the association between parental monitoring and encouraging of healthy and unhealthy child behaviors with child weight status, healthy and unhealthy eating behaviors, and PA and sedentary behaviors (SB). The study was cross-sectional and used a target population of 551 parent-student dyads of 6th & 8th graders from 6 private schools in Delhi, India. The study found high levels of parent monitoring (37-87%) and encouragement (68-90%) of child health behaviors. High parental encouragement of healthy eating, PA, and limiting unhealthy eating and SB was associated with an increased likelihood of the child being overweight or obese (OR=1.15, p=0.000). Parent encouragement of child PA was significantly and positively associated with higher levels of PA (OR=1.10, p=0.000). More research is needed to understand the relevance of these associations in this population for potential use in intervention programs.

T5:S32:22

Socioeconomic differences in overweight and weight-related behaviors across adolescence and young adulthood: 10-year longitudinal findings from project EAT

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Reducing socioeconomic disparities in weight-related health is a public health priority. This study examined 10-year longitudinal patterns in overweight and weight-related behaviors from adolescence to young adulthood as a function of family-level socioeconomic status (SES) and educational attainment. Project EAT (Eating and Activity in Teens and Young Adults) followed a diverse sample of 2,287 adolescents into young adulthood. Mixed-effects models tested for longitudinal trends in overweight, fast food, breakfast skipping, physical inactivity, and screen use by family-level SES. The influence of subsequent educational attainment was also examined. Results revealed that the prevalence of overweight increased significantly from adolescence to young adulthood with the greatest change seen in those from low SES ($\Delta = 30.7\%$, 95% CI = 25.6%-35.9%) as compared to high SES families ($\Delta = 21.7\%$, 95% CI = 18.2% to 25.1%). Behavioral changes also differed by SES background; the prevalence of fast food intake (≥ 3 times/wk) increased most dramatically in those from low SES ($\Delta = 6\%$, 95% CI = 0.5%-11%) as compared to high

SES families ($\Delta = -1.2\%$, 95% CI = -5.2%-2.9%). Overall trends suggested a protective effect of higher educational attainment. Continued effort is needed to ensure that public health strategies addressing obesity and related behaviors reach adolescents and young adults from low SES backgrounds and do not contribute to widening socioeconomic gaps in weight-related health.

T5:S32:23

Obesity among the under 5's: Does It impact on healthcare expenditure?

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Background: Childhood obesity represents a major health and economic burden. Most studies have found excess healthcare costs associated with childhood obesity in school age children, but internationally there have been no studies exclusively in preschool-aged children, under 5 years.

Aims: To determine whether overweight or obesity among children (aged 2 to ≤ 5 years) are associated with direct healthcare costs after adjusting for child, household and socio-economic characteristics.

Key Methods: Longitudinal cohort analysis of 350 children aged 2 years assessed during the 3-year Healthy Beginnings Phase 2 follow up study. Health-care resource utilization including primary care, medicines, hospitalizations and emergency department use was determined through individual participant data linkage. Using adjusted multivariable regression analyses, we examined the relationship between total 3-year healthcare costs and weight status. Observations took place in Sydney Australia between 2011 and 2014.

Results and Conclusions: After adjustment for significant maternal and socio-demographic characteristics, the additional 3-year costs (AUD) of healthcare for a child with obesity compared with healthy weight were \$825 (95% CI \$135-\$2117) for general patients and \$1331 (95% CI \$174-\$4280) for concession card holders. Prevention of obesity in early childhood is likely to have immediate and substantial benefits in reducing healthcare expenditure.

Funding: NHMRC project grants 1003780 and 571372.

T5:S32:24

Relationship between exposure to food and beverage advertising on Mexican broadcast television and the formation of food intake habits of school aged children

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Background: The National Health and Nutrition Surveys in Mexico show that between 1999 and 2012, the combined prevalence of overweight and obesity in children between 5-11 years of age increased from 26.9% to 34.4%.

Methods: 780 hours of broadcast television (TV) were recorded, between December 2014 and April 2015 of the four most popular channels in Mexican TV. Analysis and coding of recordings were performed to observe the advertising of food and beverages (F&B). During the same period, 115 surveys were applied to children's to identify TV habits and its relationship to their knowledge and consumption of advertised products.

Results: From the total recorded hours, 23.7% were of advertising. An average of 23.5 ads per hour, were of F&B. Most of the F&B ads were broadcasted during soap operas and movies. The top five advertised F&B categories were, dairy products with added sugar (8.6%), alcoholic beverages (8.5%), breakfast cereals (7.8%), pastries and cookies (7.4%), and sweet snacks (6.9%). Children showed a high knowledge of the advertised products' characteristics, such as the matching of character with product (70%), and slogan with product (90%). From the children that reported watching TV, 57.9% stated buying and consuming pastries and cookies.

Conclusion: Children were highly exposed to F&B ads within their preferred TV channels, and the most advertised products were also those mostly consumed by children.

T5:S32:25

Body weight status in Taiwanese students with intellectual disabilities

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Background: Research on the weight status of students with intellectual disabilities (ID) is lacking due to difficulty of obtaining a larger sample size in Taiwan.

Aims: To examine the prevalence of obese, overweight, underweight, and healthy weight statuses across 7 to 18 year old Taiwanese students with ID within different categories of ID.

Key Methods: A secondary data analysis of 1,936 children and adolescents with ID (boy: 1,198, girl: 738) aged 7 to 18 years in public special education schools was utilized. Data was primarily obtained from the school health records (e.g., body mass index [BMI], comorbidities of ID) in 2014. The sample was divided into three age groups (7-12, 13-15, and 16-18years) and six comorbidities of ID (ID only, autism, ID caused by genetic disorders, physical disability, multiple disabilities, and others)

Results: In the 7 to 12 year-old group, 34.4% of the students were underweight; however, in the 16 to 18 year-old 39% of the students were overweight or obese, with girls having a higher percentage than boys. When ID was caused by genetic disorders there was a higher BMI (22.56 ± 5.60) compared to other ID categories ($p < .001$). The mean BMI (17.37 ± 4.62) for those with physical disabilities was significantly lower 20% to 34% than other comorbidity conditions.

Conclusions: The findings demonstrate that the Taiwanese students with ID in different ages experience different weight problems.

T5:S32:26

The presence of bulimia nervosa aggravates the unhealthy hormonal and metabolic profile in overweight and obese adolescents

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Aims: To assess the differences between overweight (OW) and obese (OB) adolescents with (BN+) or without (BN-) Bulimia Nervosa regarding menstrual patterns, Sex Hormone-Binding Globulin (SHBG), Testosterone (T), Free Androgen Index (FAI), Insulin and ovarian ultrasonographic (U/S) characteristics.

Methods: Case-control study of 32 BN+ compared to 67 BN- OW & OB adolescents matched for age, BMI, WHR and Waist

Circumference. Menstrual patterns were recorded, SHBG, T, FAI, glucose and Insulin were measured, while ovarian U/S characteristics were assessed in all girls.

Results: 21/32 BN+ and 26/67 BN- girls reported oligomenorrhea, amenorrhoea or polymenorrhea (65,6% vs 38,8%, $p=0.012$). Mean fasting Insulin levels (27.32 vs 22.74 mIU/L), mean fasting Glucose levels (107.7 vs 96.16 mg/dl) mean serum T levels (1.46 vs 1.12 ng/ml), mean FAI (7.6 vs 4.6) and mean SHBG (66.65 vs 84.34 nmol/l) were significantly different in BN+ compared to BN- OW and OB adolescents (all $p < 0.05$). There was no significant difference in U/S ovarian characteristics between the two Groups.

Conclusions: BN+ OW and OB adolescents, independently of body weight or fat distribution, are in greater risk to present menstrual disorders, fasting glucose and Insulin disorders and hyperandrogenemia compared to controls. A multidisciplinary approach is always indicated for these patients with a seriously unhealthy hormonal and metabolic profile, while further studies, with greater sample are needed to confirm these results.

T5:S32:27

Obesogenic retail food environments around more and less socially deprived schools in New Zealand: A national survey

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This is the first nation-wide spatial analysis of retail food environments around more and less socially deprived schools in New Zealand. Addresses from all fast food, takeaway and convenience outlets (FFTC) were retrieved from all 78 Councils, geocoded and (spatially) validated. Density and proximity of FFTC around/from all schools were stratified by urban/rural area and quintile of school socio-economic deprivation. About 68.5% urban and 14.0% rural schools had a convenience store within 800m, while 62.0% urban and 9.5% rural schools had a fast food or takeaway outlet within 800m. Median road distance to the closest convenience store from urban schools was significantly higher for the least (617m) compared to the most deprived (521m) schools, while the opposite was found for rural schools. Median density of FFTC was 2.4 per km² and maximum density of FFTC was 85 per km² within 800m of urban schools. Median density of convenience stores around the least deprived schools was significantly lower than around the most deprived schools. Access to unhealthy foods through FFTC within walking distance from urban schools is substantial in New Zealand, and is greater for the most compared to the least deprived schools. Health promoters should work with retailers to explore feasible actions to reduce exposure of children to unhealthy foods before and after school, and provisions to allow Councils to limit new FFTC in school neighbourhoods could be included in the local Government Act.

T5:S32:28

Establishing a low cost, sustainable childhood obesity monitoring system in a high income settingCrooks, N.*¹; Strugnell, C.¹; Bell, C.¹; Lowe, J.²; Brennan, M.³; Morgan, S.⁴ and Allender, S.¹¹WHO Collaborating Centre for Obesity Prevention, Deakin University; ²Southern Grampians Primary Care Partnership; ³South-West Primary Care Partnership; ⁴Department of Health and Human Services - Barwon South-West

Childhood obesity poses a significant health risk and subsequent burden on healthcare systems globally. Sporadic sampling has led to underestimated prevalence and uncertainty about trends in childhood obesity in many high income settings. High quality data collected at regular intervals, over extended time periods, with high response rates is essential to support prevention efforts. This paper reports efforts to establish a sustainable childhood obesity monitoring system working with local community members, using census-style sampling of schools and opt-out consent for students. Baseline anthropometric and behavioural data was collected from children aged 7-12 years in 45 primary schools across the Great South Coast region of Australia. We achieved a 70% school response-rate and 93% student response-rate with results reported to communities in <10 weeks post data-collection. We harnessed high levels of community engagement throughout planning, data collection and reporting phases which increased the community skills base, community capacity and data utility. High response rates, high levels of community engagement, community capacity building and timely delivery of results should be the cornerstones of a whole of systems response to monitoring childhood obesity. Our approach achieved this without high dependence on external funding positioning the communities to monitor trends over time at low cost.

Authors affirm no conflicts of interest. Funding: Western Alliance Grants

T5:S32:29

Obesity and underweight trends in Hong Kong primary school childrenHo, S.Y.*¹; Ruan, R.L.¹; Fong, D.Y.T.²; Lee, K.Y.³; Chung, W.H.³ and Lam, T.H.¹¹School of Public Health, University of Hong Kong; ²School of Nursing, University of Hong Kong; ³Student Health Service/Department of Health

The Student Health Service in Hong Kong measures the weight status of primary school students annually. We analysed these cross-sectional datasets on obesity and underweight trends from 1995/96 to 2008/09. An average of 334325 students per school year were analysed. Obesity and underweight were defined using body mass index cutoffs of 25 and 18.5 kg/m², respectively, at age 18. Overall, sex, age and parental education specific prevalence estimates were calculated after weighting by sex and/or age. Obesity increased from 1995/96 to 2008/09 (16.1%-23.3%, 44.7% increase) overall, and greater increases were observed in boys (19.0% to 28.2%, 48.4% increase) than girls (13.0% to 18.0%, 38.5% increase), in younger age groups (<8 years 55.4%; 8-9 years 43.5%; ≥10 years 41.5%), and those with less educated parents (primary education or below 59.1%; secondary 53.1%; tertiary 30.4%). Underweight decreased from 17.6% to 11.4% (35.2% decrease) overall, and greater decreases were observed in boys (15.3% to 9.6%, 37.3% decrease) than girls (20.1% to 13.4%, 33.3% decrease), in the youngest age group (<8 years 36.8%; 8-9 years 33.9%; ≥10 years 35.5%),

and those with less educated parents (primary education or below 37.1%; secondary 33.9%; tertiary 26.9%). In sum, the prevalence of obesity increased and underweight decreased in Hong Kong primary school children from 1995/96 to 2008/09. Greater increases in obesity were observed in boys, younger age groups and those with less educated parents.

T5:S32:30

Socio-demographic risk factors of overweight and obesity among children and adolescents in South China

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Introduction: The increasing prevalence of childhood obesity constitutes one of the most important threats to public health in China. We aimed to examine the socio-demographic factors of obesity among Chinese children.

Methods: Data on 2269 Chinese children (48.5% girls) aged 7-15 years was analyzed. Body weight and height were measured to calculate body mass index (BMI). Childhood overweight/obesity were defined based on Working Group on Obesity in China (WGO) criteria. Parental height and weight as well as socio-demographic data were questioned. Multiple logistic regression models were used.

Results: Paternal overweight was significantly associated with overweight both in boys and girls ($p < 0.01$). Maternal overweight was a risk factor for girls' overweight (OR=2.2, 95%CI: 1.2-3.9), but not for boys'. The odds ratio of girls being overweight was 1.8 (95%CI: 1.1-3.3) folds higher with parental smoking than those without parental smoking. Moreover, obesity in children was significantly related to paternal and maternal overweight after adjusting for age and other socio-demographic factors ($p < 0.046$). High income of family was identified as a risk factor for girls' obesity (OR=2.8, 95%CI: 1.1-7.3), but not for boys'. However, parental education level and profession were not related to childhood overweight/obesity.

Conclusions: Paternal overweight, high family income and parental smoking were identified as risk factors and had important practical value for obesity intervention.

T5:S32:31

Worlds apart: Active (opt-in) consent underestimates the prevalence of obesity in a school-based survey. Evidence from the healthy together Victoria and childhood obesity (HTVCO) studyOrellana, L.*¹; Strugnell, C.¹; Hayward, J.¹; Millar, L.¹; Swinburn, B.² and Allender, S.¹¹Deakin University; ²University of Auckland

Background: Active (opt-in) consent results in selection bias in school-based research. Estimating magnitude of this bias is difficult because it requires outcome data for the non-enrolled. The HTVCO study, a school-based survey on childhood obesity and eating and physical activity behaviours, provided a unique opportunity to compare childhood outcomes under opt-in versus opt-out consent. **Aim:** To quantify selection bias associated with opt-in consent for estimating overweight and obesity (ow/ob) prevalence.

Methods: Repeat cross-sectional study of 3 randomly selected primary schools from 26 municipalities, Victoria, Australia. Opt-

in consent was used in 2013 to recruit Grade 4 and Grade 6 students within consenting schools (38 schools, 856 children). Opt-out consent was used in 2014 (45 schools, 2561 children). Resampling was used to estimate selection bias due to opt-in consent: 10,000 samples (N=856) were drawn from the 2014 study sample to obtain the empirical distribution of mean BMI-z and prevalence of ow/ob under opt-out consent.

Results: $\forall P < 0.0001$ (i.e., all 10,000 bootstrap samples produced an estimate $>$ opt-in estimate)

The bias is greater in girls and in children enrolled in lower grades.

Conclusions: This study demonstrates and quantifies the underestimation of population ow/ob prevalence associated with the standard practice of opt-in consent. Monitoring programs utilising passive (opt-out) consent are required to provide any real sense of current prevalence.

T5:S32:32

A New understanding of quality of life in adolescents with obesity: Contribution of the self-determination theory

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Literature reports that obesity in adolescents affects their quality of life (QOL). Preservation of QOL is now a major determinant of obesity management, but little is known about variables predicting QOL. Identifying these predicting variables of QOL would provide further understanding of the QOL concept and help drawing clinical implication. The Self-Determination Theory (SDT, Ryan & Deci, 2000) is a promising understanding perspective of the QOL. The SDT postulates that well-being and motivation are determined by satisfaction of three needs: autonomy, competence and relatedness. Many researches have confirmed the relationships between these SDT's needs and well-being, but little is done about relationships between those SDT's needs and QOL, particularly in adolescents with obesity. We assessed 70 adolescents with obesity (mean age: 13.9 ± 1.6 years) by self-report questionnaires on 1) satisfaction of the three SDT's needs, 2) QOL, 3) psychological distress and 4) stigmatization. We found that high satisfaction of the SDT's needs predicts high QOL and low psychological distress. Adolescents' needs support by parents and teachers could reduce the QOL impairment associated with stigmatization of obesity. These results could contribute to drawing new clinical applications: in adolescents with obesity, interventions promoting high satisfaction of the SDT's needs could improve their QOL and help them break the vicious circles of overweight.

T5:S32:33

Psychological group therapy for adolescents with severe obesity

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In the Children's Obesity Clinic, Holbaek University Hospital, the outpatient children and youth are aged 3-24 years. Teenagers with severe obesity in treatment are at risk of impaired mood, quality of life, and body image in the transition period from child to adult. Treatment of this specific age group with severe obesity needs to address these risk factors: Impaired self-esteem, dissatisfaction of body image, motivational problems, and psychosocial burden.

The objective of this study is to examine, whether an additional psychological group treatment alongside the established treatment protocol for overweight adolescents is effective in order to reduce the adolescents' psychosocial challenges and support a healthier lifestyle.

Two groups of 15-19-year-old adolescents were included in this study: A study group (n=56) who participated in a psychological group treatment (10 group sessions; 1½ hours biweekly with a specific customized agenda) in addition to the Children's Obesity Clinic's Treatment Protocol (TCOCT) and a control group (n = 60) who just followed the standard TCOCT protocol. Assessments at baseline and after six months of treatment included BMI SDS and Visual Analog Scale (VAS) scores addressing mood, quality of life, appetite, bullying, motivation, and body image.

Statistical analysis will be performed and the treatment effects, recruitment process and the attending rate will be analysed, described and discussed at the conference.

T5:S32:34

FTO Rs9939609 SNP impacts on success in pre-pubertal, but not pubertal, obese youth enrolled in weight management programs

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Polymorphisms in the Fat-mass and obesity-associated (FTO) gene are associated with weight regain after lifestyle intervention in children after 12 months of intervention. We aimed to examine the association between FTO genotype with longitudinal changes in BMI and percentage fat mass (%FM) up to 2 years in obese youth.

Auxological data were collected (with ethics approval) from patients (age < 18 yrs) attending our weight management clinic for ≥ 3 visits between Apr 09 - Jun 14. Genotype (FTO rs9939609 SNP; risk allele A) were performed using Sequenom MassARRAY MALDI-TOF MS. Data were analysed using chi-squared, one-way ANOVA and logistic regression.

141 patients (mean [SD] 11.7 [3.3] years; BMI-Z 2.5 [0.46]) attended at least 3 visits (mean follow-up 7.6 \pm 4.4 months) and 39

attended up to 7 visits (mean follow-up 26.3 [7.9] months). Decreases in BMI-Z and %FM were significantly less in the AA group compared to AT and TT groups ($p < 0.01$ and $p < 0.05$) in pre-pubertal, but not pubertal, children.

The FTO rs9939609 risk allele is associated with less success in attempts at weight change in pre-pubertal, but not pubertal, overweight/obese children. Further studies are now required to assess whether the addition of FTO allele data to environmental and other genetic data can help to identify those young children who may, or may not, benefit from expensive multidisciplinary obesity services

T5:S32:35

Misclassification from the use of rounded percentiles instead of Z-scores in the measurement of growth in early childhood

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The WHO Growth Standards are recommended for growth monitoring of Canadian children. BMI-for-age Z-score cut-points of < -2.0 , > 1.0 , and > 2.0 are recommended by the WHO to define wasted, overweight and obese. However, rounded percentiles of the 3rd, 85th, and 97th (corresponding to Z-scores of -1.88, 1.04, and 1.89) are commonly used and recommended in Canada. This study aimed to evaluate the misclassification resulting from the use of cut-points defined by rounded percentiles instead of Z-scores for growth monitoring in early childhood. A cross-sectional study was conducted among 5836 children < 6 years of age from the TARGeT Kids! primary care practice network (www.targetkids.ca). Weight and height/length were measured by trained research assistants. Using rounded percentiles, the proportion of children who were wasted, overweight and obese was 4.2%, 12.5%, and 5.1%. In comparison, using Z-scores the distribution was: 3.6%, 13.8%, and 4.4%. Overall, 117 (2%) children were misclassified when using percentiles instead of z-scores. Within the extreme categories, 13.5% of children who were wasted and 13.1% of children who were obese were misclassified by the use of rounded percentiles instead of Z-scores. Misclassification of child growth results from the use of cut-points defined by rounded percentiles instead of Z-scores and may have clinical implications. Future guidelines should clearly recommend the use of either Z-scores or rounded percentiles for consistency in child gro

T5:S32:36

Changing systems the new way forward in obesity prevention: Successes and lessons of the Australian capital territory 'It's your move' project

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The Australian Capital Territory 'It's Your Move!' was a 3-year (2012-2014) intervention to reduce unhealthy weight gain and facilitate healthier lifestyles among adolescents (12-17 years) through comprehensive school systems changes. Each intervention school aimed to develop, implement and evaluate a food@school policy plus a specific aim; increase active transport or increase physical activity or improve mental well-being.

Data were collected from intervention ($n=3$; RR 71%) and comparison ($n=3$; RR 38%) schools (634 students). Anthropometry

was measured and behaviours self-reported. Interaction regression analyses tested overall intervention effectiveness. McNemar's test evaluated weight status change within intervention schools. Adjusted regression models examined outcomes of the 3 school specific objectives compared to other intervention schools.

Overall there was no interventions effect; however, within schools, 2 of 3 the intervention schools showed decreases in overweight/obesity ($p=0.04$). One school reported a decrease in depressive symptomatology (26% to 17%) compared to an increase in other intervention schools (16.3% to 20.2%; $p < 0.05$).

Obesity prevention can be achieved within schools using systems approaches. Combining obesity prevention with promotion of mental well-being may be more acceptable to the target group and community and can result in increased benefits for the same outlay. The complexities of systems approaches need novel evaluation designs.

T5:S32:37

Eating breakfast daily is associated with a lower prevalence of overweight and obesity and poorer dietary habits in Australian children

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Skipping breakfast is a common dietary practice in children and adolescents and has been associated with obesity and overweight. To assess the association between skipping breakfast and overweight and obesity in a representative sample of Australian children.

The Schools Physical Activity and Nutrition Survey (SPANS) 2015, is a representative sample of Australian children age 5-16 years ($n=7,555$) with measured anthropometry. Prevalence of overweight and obesity were calculated using IOTF values. Dietary habits and eating behaviors were measured using short questions.

Children who did not consume breakfast daily were more likely to be overweight and obese OR (95%CI) = 1.32 (1.16-1.50), adjusted for age, gender and socio-economic status. Not eating daily breakfast was also associated with other harmful dietary behaviors such as eating fast food regularly (2.75 95%CI: 1.91, 3.97), eating dinner in front of the television (1.28 95%CI: 1.11, 1.48) and consuming more than one cup of soft drink per day (1.45 95%CI: 1.17, 1.79).

Skipping breakfast was the most important dietary behavior associated with overweight and obesity in this representative survey of Australian children. Skipping breakfast may have public health consequences for adolescents and appears to be an indicator of other harmful dietary behaviours during adolescence.

T5:S32:38

Effectiveness of lifestyle intervention to prevent obesity among primary school students in Nanjing, China

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Background Childhood obesity has been increasing rapidly worldwide. The objective of this study was to assess the

effectiveness of a school-based lifestyle childhood obesity intervention prevention program. **Methods** A cluster randomized controlled trial was developed among grade 4 students from 8 urban primary schools. Each school was randomly assigned to either the intervention or control group. A one-year multi-component intervention program was provided to the intervention group from May 2010 to April 2011, while students in the control group followed their usual health and physical education curriculum with no additional interventions. The intervention program consisted of four components: classroom curriculum, school environment support, family involvement, and fun programs/events. **Results** Overall, 1108 (93.7%) of the 1182 enrolled students completed the intervention study. The prevalence of overweight/obesity was 26.5%, 27.4% in control group and intervention group before the program, respectively. While the prevalence of overweight/obesity was 20.9%, 21.1% in control group and intervention group after the program, respectively. Compared to control group, the awareness rates of health behaviors and obesity-related knowledge were significantly higher in the intervention group, ($P < 0.05$). **Conclusions** The school-based lifestyle intervention program was practical and effective in improving health behaviors and obesity-related knowledge for children in Nanjing.

T5:S32:39

Go4Fun: An effective Australian community based obesity treatment program for children

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Childhood obesity prevalence remains high in Australia with around 25% of children overweight or obese. Clinical services have limited capacity to provide treatment and may not be accessible by many families with children above a healthy weight.

This presentation describes outcomes of the Go4Fun program, a free weight management program for children aged 7-13 years and their families, delivered at scale across NSW since 2011. The program is delivered once per week and has demonstrated effectiveness from a recent pragmatic cluster randomised controlled trial.

Child health outcomes are measured pre and post, and the program is routinely monitored by indicators of social disadvantage.

To date, over 6500 families have participated. Families from rural or regional communities comprise 28% of participants and 54% of mothers indicate relative social disadvantage.

On average, children achieve clinically and statistically significant changes in health outcomes. BMI decreases by 0.6kg/m², recovery heart rate by 4.9 beats/minute, physical activity increases by 37 hours/week and time spent in sedentary activities decreases 3.2 hours/week, while self-esteem improves significantly. All changes are statistically significant ($p < 0.0001$). BMI z-scores remained statistically lower ($p < 0.01$) at six-month follow up.

Go4Fun offers an effective scalable community based solution to the treatment of overweight and obesity in children, particularly for families living at social disadvantage.

T5:S32:40

Three month outcome of a family based intervention program for adolescent obesity: The LITE randomised controlled trial

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This study was designed to address the gap in service provision of a family based weight management program for overweight and obese adolescents. The LITE (Lifestyle Intervention for obese teenagers) group program is a 6-month, family-based behavioural lifestyle intervention, specifically designed to treat obesity in adolescents 10-16 years referred to the Weight Management Clinic. The program involves 4 weekly sessions, followed by 3 monthly sessions, for adolescents and parents.

The study design is a two-arm randomized controlled trial that recruited 60 overweight and obese adolescents 10-16 year olds that attended Kandang Kerbau Women and Children's Hospital (KKH) weight management clinic. Participants are randomized to LITE program with usual care or usual care. Outcome measurement are assessed at 3 and 6 months post baseline and include anthropometric measurements, physical activity, dietary intake, metabolic profile, improvement in positive parenting behaviour and measurement of family support. This study aims to evaluate the short term (three month) changes in body mass index (BMI) z-score.

Of the 60 adolescents who enrolled, 22 (37%) completed the three month follow up with 14 from LITE program. Participants in LITE program with usual care had a mean reduction in BMI z-score of 0.049 (95% CI -0.10 to 0.003) compared to 0.024 (95% CI -0.69 to 0.02) in those in usual care although the difference was not statistically significant ($p = 0.49$).

T5:S32:41

The relationship between exclusive breastfeeding and childhood obesity among under-five children in Oyo State Nigeria

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Background: The increasing prevalence of childhood obesity is of serious public health concern in the world. Several Studies reported a significant relationship between exclusive breastfeeding and childhood obesity.

The aim of this study is to investigate the relationship between exclusive breastfeeding and obesity among under-five children in Oyo State Nigeria.

Methods: Cross-sectional survey using four stage random sampling technique to select 450 (214 males and 236 females) under-five children from Oyo State, Nigeria. Pre-tested, interviewer-administered semi-structured questionnaire was used to collect information on demographic and breast feeding practices of respondents. Anthropometric indices were taken and categorized according to WHO standards. Exclusive breastfeeding (EBF) was defined as having being fed with maternal milk for 6 months without addition of any fluids or semi liquid.

Result: Mean age of the children was 29.8±17.0 months with 52.6% being female. The prevalence of overweight, obesity and EBF among the children were 14.4%, 20.2% and 17.3% respectively. Children who were exclusively breastfeed were 6.7 (OR=6.7; 95% CI=1.21-36.46) times less likely to become obese than those who were not exclusively breastfeed.

Conclusion: Exclusive breastfeeding is a protective factor for obesity among under-five children in this study, indicating that concerted efforts in increasing the practice of EBF among mothers is important in preventing childhood obesity

Key word: Obesity EBF.

T5:S32:42

Association between impaired fasting glycaemia in pediatric obesity and type 2 diabetes in young adulthood

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Impaired fasting glycemia (IFG) in adults is linked to increased risk of type 2 diabetes (T2D). If IFG in obese children adds to the risk of high BMI for the development of T2DM in adulthood is unclear.

The aim was to investigate if IFG in a cohort of obese children and adolescents predicts T2D medication, as a proxy for T2D, in adulthood.

The obese cohort consisted of subjects included in the Swedish register for childhood obesity – BORIS and were ≥ 18 years at follow-up, $n = 1620$. A comparison group was matched on gender, age, and living area, $n = 8046$. IFG was defined according to WHO (fasting glucose ≥ 6.1 mmol/l) and to the additional range set by ADA, (5.6-6.0 mmol/l). Main outcome was T2D medication.

The obese pediatric cohort was at increased risk of being treated for T2D in early adulthood compared with the comparison group (HR=24.0 [12.5-46.0]). In addition, IFG according to WHO in obese children and adolescents predicts future T2D medication (HR=3.8[1.9-7.7]), whereas the additional glucose range by ADA did not predict higher T2D incidence (HR=1.7 [0.8-3.4]). Female gender (HR=2.0[1.1-3.9]) and more severe degree of obesity (HR=2.6[1.4-5.0]) were risk factors for the incidence of adult T2D medication.

Fasting glucose ≥ 6.1 mmol/l in Swedish obese children increases the risk for T2D almost 4-fold compared with fasting glucose levels < 5.6 mmol/l. Fasting glucose between 5.6-6.0 mmol/l does not contribute to the risk of T2D in young adults more than pediatric obesity itself.

T5:S32:43

How should we talk with children and families about obesity and weight-related topics: A scoping review to establish best practices

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Healthcare Professionals (HCPs) play a key role in preventing childhood obesity, but guidance for discussing weight-related topics with children and families is sparse. We conducted a comprehensive scoping review (2005-2015) on this topic using established methodology. A total of 28 peer-reviewed studies met the inclusion criteria, including qualitative studies ($n=11$), expert opinion ($n=8$), randomised controlled trials ($n=3$), non-randomised studies ($n=2$), surveys ($n=2$), and observational studies ($n=2$). The mean quality rating of empirical studies was 44.2%. Most studies were conducted in primary care settings and from the HCP perspective.

Evidence-based best practices were largely absent from the literature, although some guiding principles were identified: 1) HCPs, children, and families should all participate in weight-related conversations; 2) HCPs should raise the topic of weight and health behaviours early and regularly; 3) Strengths-based and blame-free language focusing on health rather than weight should be used; 4) Family-led goal-setting should be used to engage children and parents; and 5) Diagrams and charts can aid communication. However, specific guidance on implementing these principles was absent and contextual factors, such as age, disability or culture were largely unaddressed. Overall, a robust evidence base is lacking in weight-related communication best practices. Current research provides some insight into approaches that should be evaluated empirically.

T5:S32:44

Stunting in early childhood and the risk of overweight/obesity in adolescence: A 14-year prospective study in Indonesia

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Stunting is prevalent in Indonesia. In cross-sectional studies stunted children are more likely to be overweight than those of healthy height. This study aimed to determine, prospectively, whether stunting in early childhood increases the risk of overweight/obesity in adolescence.

We analysed data from children aged 2.0-4.9 years in wave 1 (1993) of the Indonesian Family Life Survey (IFLS) and followed them in waves 2 (1997), 3 (2000), and 4 (2007). IFLS is a longitudinal, nationally representative survey of a stratified random sample of households, with a high re-contact rate. Height and body mass index (BMI) were expressed as z-scores with reference to the WHO Standard (2006; < 5 years) or WHO Reference (2007; 5-19 years). Height-for-age-z-scores $< -2SD$ were categorised as stunted and BMI-z-scores $> +1SD$ as overweight or obese.

765 children had complete anthropometry and were traced from waves 1 to 4. The prevalence of stunted children in wave 1 who were overweight in waves 2, 3, and 4 was 2.9%, 2.6%, and 8.6%, respectively. The Relative Risks of stunted children being overweight in each wave were 0.41 ($P < 0.01$), 0.30 ($P < 0.001$), and 1.3 ($P > 0.05$), respectively.

Stunting in early childhood did not increase the risk of overweight/obesity in adolescence.

T5:S32:45

The national cancer Institute's family life, activity, sun, health and eating (FLASHE) study

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Background: Few studies evaluate both parenting styles and practices as they relate to their child's cancer preventive

behaviors within the context of a dyadic approach. To address research gaps, NCI's FLASHE study collected data in adolescents and their parents in multiple domains of environment and behavior, with a specific focus on family relationships. It will examine the correlates of obesogenic and cancer preventive behaviors among adolescents and their parents across intra- and interpersonal domains, including the community and home environment.

Methods: The cross-sectional, web-based surveys of adolescents (12-17 years old) and their parents were administered between April – October 2014. Data on multiple domains, including neighborhood, community and home environment, parenting relationships, psychosocial factors and behaviors were collected from N=1582 parent-adolescent dyads. Accelerometers collected motion data from a subset of adolescents. A conceptual model was developed, with constructs identified through a comprehensive literature review.

Results: The design and development of the FLASHE study is reviewed. Data on parent and adolescent reported intra- and interpersonal domains (including psychosocial variables, parent and the community and home environments) offers multiple opportunities to study research questions among individuals and dyads and related cancer prevention behaviors.

Conclusion: FLASHE data will be made publically available in 2016.

T5:S32:46

Testing a new visual intervention to improve parental recognition of childhood overweight: The 4 & UPP study

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Parental ability to recognise when their child is overweight (OW) is low, partly because they tend to use extreme cases as a reference. This 3 arm cluster randomised trial tested the impact of an intervention including newly developed body image scales (BIS) on parental recognition of childhood OW in 4-5 and 10-11 year-olds. Schools were randomised to a paper- or web-based intervention or no intervention (control). Parent perception of their child's weight status was assessed by the question 'How would you describe your child's weight at the moment? (underweight, healthy weight, OW, very OW) in controls as the baseline measure and at 1 month for the intervention groups. Parental perceptions were compared with measured child weight status. Of the families recruited, 2768 (94%) had objectively measured child weight status, 15% of these were OW/obese. The proportion of parents correctly identifying their child's OW status for the control and intervention groups was 23% vs 23% at 4-5 years and 52% vs 59% at 10-11 years. No significant differences were found between control and interventions grouped together or separately, at either age. Exploration of the BIS responses suggests the explanation for these results may lie in an unwillingness of parents to label their child as OW, rather than an inability to recognise OW. This is the first study to examine if parental recognition of childhood OW can be improved using a visual tool. Funded by the National Prevention Research Initiative.

T5:S32:47

Healthier side dish options in restaurants: An updated analysis of children's views and parents' awareness of these views

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In the United States, children frequently consume food from restaurants which may be more energy-dense than food prepared at home. Previously (2010 data), children reported willingness to accept fruit/vegetable (FV) side dishes with their meals at restaurants. The aims of the current study were to examine changes in children's willingness over time and parents' awareness of child willingness. Participants were 711 8- to 12-year-old children and one of their parents, each of whom completed an online survey in 2014. Data were weighted to be nationally representative. Children were asked how happy/unhappy they would be if their restaurant meal came with a FV but not fries: 1 (very unhappy) - 5 (very happy); parents were asked how happy/unhappy they thought their child would be with the substitution. Compared to 2010 (M = 3.01, SD = 1.22), children in 2014 reported being happier with the substitution (M = 3.17, SD = 1.23; $t = -2.12$, $p < 0.05$). Most parent assessments of child willingness were accurate (child willing = 63.1%; child not willing = 21.9%). However, in some cases parents were not aware of their child's willingness (5.3%) or lack thereof (9.7%). Children report even greater willingness to accept healthier sides at restaurants than in the past. These high levels of acceptance support efforts to increase the availability and accessibility of healthy children's menu offerings, and parents' awareness of children's views suggest that many parents will support such efforts.

T5:S32:49

Metabolically unhealthy obesity and visceral adiposity in children

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Obesity in children is a public health issue owing to related cardiometabolic disturbances, in particular in case of visceral adipose tissue (VAT) storage. Nevertheless, since the definition of metabolically healthy (MHO) and unhealthy (MUO) obesity, the question of the role of VAT in both phenotypes occurrence should be raised in children. Adult studies were rather controversial.

Aims: To investigate the relationship between VAT and MUO in youth.

Methods: VAT was assessed by magnetic resonance imaging in 181 obese Luxembourg youth (7-17 year-old) (1). MHO and MUO were defined according to Prince *et al.* definitions (2): Presence/absence of 1. Insulin resistance; 2. At least 1 risk factor from high values of blood pressure, triglycerides, HDL-C and/or glucose. Multivariable regressions were performed to investigate VAT in MHO and MUO.

Results: According to the insulin resistance definition, for a one unit increase in VAT, the odds of being MUO (versus being MHO) increase by a factor of 1.057 (P-Value < 0.0001).

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No conflicts of interest to disclose.

Funding: Ministry of Culture, Higher Education and Research, Luxembourg. National Research Fund, Luxembourg.

T5:S32:51

Parenting and management of child weight-related behaviour in parents of overweight children in Singapore

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Previous studies have highlighted the critical role that families play in weight management, with parents of overweight children showing a high rate of ineffective parenting strategies in managing their child's lifestyle behaviours. However, there has been paucity of research into assessing the role of parenting styles in non-western populations.

The current study aimed to explore the role of parenting styles in weight management in families in Singapore. Self-report questionnaires, assessing perceived difficulties in managing lifestyle behaviours and parental self-efficacy, parenting style, and parental support around diet and exercise were administered to 57 families attending an obesity clinic.

The results reflected the findings of western-samples, with a high percentage of parent responses falling within the clinical range for lifestyle related problem behaviour (76.2%) and dysfunctional parenting styles (laxness 50%, over-reactivity 57.9%). There was a relationship between a higher severity of lifestyle specific problem behaviour and higher levels of parental activity, although this fell just below significance ($r = 0.305$, $p = 0.53$).

Parental BMI was also shown to impact parental management, with higher parental BMI associated with lower reported involvement/support in children's physical activity. Furthermore, the relationship between parental self-efficacy and parental BMI was also approaching significance ($r = -3.22$, $p = 0.068$).

T5:32:S52

Vitamin D status and adiponectin and their association with insulin resistance in male adolescents with obesity

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The age of onset of obesity has become younger by years. Understanding the mechanism by which this occurs could help with early prevention and treatment. Obesity have been associated with decreased in adiponectin (an adipocytokine) and circulating 25-hydroxyvitamin D3 (25OHD), which is a fat soluble vitamin. Low 25OHD and adiponectin concentrations are associated with obesity and its associated risk of cardiometabolic outcomes such as diabetes mellitus. Previous studies have elucidated the potential role of vitamin D and adiponectin in glucose-insulin homeostasis. Therefore, the objective of this study is to determine the association between vitamin D and adiponectin with insulin resistance in male adolescents with obesity. This study is an observational analytical with cross-sectional design. Seventy one (n=71) male adolescents were involved in the study. Anthropometric and blood pressure measurements were taken. Plasma 25OHD and adiponectin were quantified using ELISA. Fasting plasma glucose and insulin were measured to obtain HOMA-IR. The results showed that there were significant associations between HOMA-IR and vitamin D ($p = 0.0062$), as well as HOMA-IR and adiponectin ($p = 0.0309$). There were no significant association between vitamin D and adiponectin. The study revealed the negative association between both vitamin D and adiponectin with HOMA-IR suggesting the role of them in maintaining glucose-insulin homeostasis in adolescents with obesity.

T5:S32:53

Percent of energy consumed by preschool children vary by type of food offered

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Lunch is in the Bag, a multilevel behavioral-based intervention, successfully increased servings of vegetables and whole grains parents packed in their preschool child's lunch. The purpose of this study was to evaluate the difference at baseline in the percent of energy consumed by preschool children by food types.

Food observation records from participating children (n = 607) were used to analyze food group servings and nutrient content of lunches. Three-level regression models with random intercepts at the Early Care and Education Center level were employed to model outcomes that were adjusted for gender, age and body mass index (BMI).

Lunches contained a mean of 602.5 kcals but only 66% kcals were consumed. There was a significant difference ($p < 0.001$) in the percent consumed by major food groups (Vegetables, Grains, Fruit, Dairy, Meat and Beans) with a range of 54-69%. Separation of the major food groups into sub categories revealed a significant difference ($p < 0.001$) in the percent of energy consumed. For example, preschool children consumed less raw vegetables (49.9

+2.4% kcals) than they did cooked (59.5+3.1% kcals). Children consumed less proportion of whole grain bars (50.3+6.6% kcals) than they did whole grain tortillas (73.7+12.1% kcals). Individual meals impact the overall health of preschoolers. Focusing on one meal can provide sufficient information to establish dietary patterns to significantly improve children's diets.

T5:S32:54

Irisin and its relation to metabolic syndrome among Korean adolescents

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Irisin is a recently identified adipomyokine that has been reported to be associated with energy and metabolic homeostasis in mice and human. Whether irisin levels are associated with metabolic syndrome (MetS) in adolescents has not been studied. This study is purposed to assess the relation between circulating irisin levels and MetS in adolescents.

This cross-sectional study evaluated serum irisin levels and cardiometabolic risk factors of 1,719 subjects; 11-16 years of age, taking part in Korean Children and Adolescent Study (KoCAS) between 2010 and 2013. MetS was defined as the presence of three or more than the components of MetS by IDF. Cross-sectional associations between circulating irisin levels and status of MetS were assessed.

Serum irisin levels were significantly lower in subjects with MetS compared to subjects without MetS. Girls had significantly higher irisin levels than boys ($P < 0.001$) and irisin levels were not significantly different according to obese status. After adjustment for potential confounders including age, physical activity, and vegetable intakes, irisin levels were inversely associated with MetS (OR of highest tertile of irisin levels 0.52, 95% CI 0.30-0.89, Boys; OR 0.45, 95% CI 0.24-0.81, Girls)

In conclusion, serum irisin levels are related to MetS status in adolescents.

T5:S32:55

The impact of obesity on post-acute rehabilitation length of stay and hospital costs in children with physical disabilities and mental health disorders

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Little is known about the prevalence of obesity in pediatric rehabilitation (rehab) populations and the impact of excess weight on length of stay (LOS) and hospital costs (HC). This study determined the prevalence of obesity, hospital LOS and HC in a pediatric rehab population. Although 420 patients ages 4-18 years were admitted to hospital in Alberta between 2004-2014, height and weight measurements were missing for 95 (23%) patients. Clinical and administrative data were analyzed for a sample of 325 patients (55% male; mean age 11 years). Thirty-seven percent of patients had a BMI-for-age classified as overweight or obese. Mean LOS was 34 days (range 30-37). No significant difference in hospital LOS was found between groups based on BMI-for-age ($p=0.51$). Mean HC was \$34,868.00 (CD) (range: \$31,509-\$38,228) with no statistical difference between BMI-for-age groups. The proportion of children with excess weight exceeded national prevalence estimates, but the missing and non-standardized

anthropometric measurements limited this study. Strategies are needed to standardize the collection of height and weight measures for children with disabilities. The high proportions of overweight and obesity warrant greater consideration with respect to rehabilitation program service delivery.

Funding source: The program of research is supported by a PRIHS award from Alberta Innovates – Health Solutions.

T5:S32:56

All aboard the meal train! Can child friendly menu labelling encourage parents and children to make healthier food choices while in hospital?

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Rising childhood obesity rates are due in part to increased access to energy-dense nutrient-poor foods and larger portion sizes. Menu labelling is a promising public health education strategy. Inpatients at SickKids use an ordering system called Meal Train where food is selected by the patient and their family. This study evaluated patient food orders before and after the introduction of a revised menu design, with no change in food options. The intervention menu included child-friendly labelling (attractive characters, fun food names and traffic light system) to encourage healthier choices. A 2 week crossover RCT was performed. Children on specialized diets/TPN, <2 years old were excluded. 163 patients (81 boys) were included: age 9.98 ± 5.05 years, and weight Z-score -0.27 ± 1.42 . On weeks receiving the intervention menu, children ordered more healthy choices that were higher in fiber, lower in saturated fat and added sugar (4.88 ± 2.51 vs. 3.35 ± 2.02 servings/child/day, $P < 0.0001$). Orders in the "foods-to-limit" category showed significant decrease (4.17 ± 2.65 vs. 3.49 ± 2.34 servings/child/day, $P=0.04$) and there was a trend towards increased orders of vegetables and fruits (2.84 ± 1.66 vs. 2.32 ± 1.66 servings/child/day, $P=0.06$) between intervention and control groups, respectively. Menu labelling in the hospital setting was an effective tool to decrease the selection of energy-dense nutrient-poor foods and can be a strategy for nutrition education to children and their parents.

T5:S32:57

Diet affects metabolic side effects in children treated with second-generation antipsychotics

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Approximately 1.2 million Canadian children have a mental health condition and many are treated with second-generation antipsychotics (SGAs). In some children SGA treatment is associated with weight gain, insulin resistance, and dyslipidemia. The objective of this study is to determine if diet affects metabolic side effects in SGA-treated children. Anthropometrics, 3-day food records, fasting plasma lipids, glucose, insulin, and homeostatic model assessment of insulin resistance (HOMA-IR) were obtained from SGA-treated ($n=35$) and SGA-naïve ($n=29$) children (6-18 yrs). SGA-treated children had higher BMI z-scores ($p < 0.001$), waist circumference z-scores ($p=0.009$), waist-to-height ratio ($p=0.029$), and HOMA-IR ($p=0.002$), compared to SGA-naïve children. There was no effect of SGA treatment on energy (SGA-treated: mean \pm SD; 1970.6 ± 639.8 kcal vs. SGA-naïve:

1733.5±485.8 kcal, $p = 0.243$), fat, protein, carbohydrate, sugar, and sodium intakes. Interactions between SGA treatment and energy ($p=0.02$) and sodium ($p=0.015$) intakes on HOMA-IR; and SGA treatment and saturated fat intake on low-density lipoprotein cholesterol (LDL) were observed. Positive relationships between energy intake and HOMA-IR ($p=0.029$), and saturated fat intake and LDL ($p=0.002$) were observed in SGA-treated children after adjusting for sex, height, pubertal status, overweight/obese, and psychostimulants. These data suggest that diet may influence metabolic side effects associated with SGA treatment in children.

T5:S32:58

The prevalence of severe obesity and cardiovascular risk in children 0 to 6 years of age

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Background: The prevalence and impact of severe obesity has not been assessed in Canadian children. Children with severe obesity may be at increased risk for cardiovascular risk factors.

Aims: To determine the prevalence of severe obesity in a cohort of young children in Ontario and to examine the association with cardiovascular risk factors.

Key Methods: A cross sectional study was conducted among children 0 to 6 years of age from TARGet Kids!, a practice-based research network. Anthropometric measurements and a non-fasting blood sample were obtained by trained research assistants. BMI percentiles were age and sex standardized based on the WHO Growth Standards. Severe obesity was defined as 120% of the 95th percentile.

Results: Among 3925 children, the prevalence of overweight, obesity and severe obesity was 10.1%, 6.6% and 0.6%, respectively. Among children who were overweight, obese and severely obese, 25%, 26% and 41% had high non-HDL cholesterol, 12%, 11% and 21% had high LDL, and 23%, 26%, and 38% had high total cholesterol. Low HDL was observed in 37% of overweight, 38% of obese and 45% of severely obese children. However, these differences were not statistically significant.

Conclusion: Preliminary results suggest that young children with severe obesity may have worse lipid profiles than overweight and obese children. Further research is needed to inform secondary screening in young children with severe obesity.

T5:S32:59

Persistent insulin resistance is associated with gender, puberty stage and fat mass in overweight and obese adolescents - a PREVIEW study

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During puberty a transient physiological insulin resistance occurs. Overweight and obese children are at risk for persistent insulin resistance and diabetes later in life. Prevention of diabetes through lifestyle intervention in Europe and around the World (PREVIEW, EU-FP7-n. 312057) and Centre for Overweight Adolescent and Children's Healthcare (COACH) assess the effects of lifestyle interventions in overweight children.

The aim was to evaluate associations between anthropometrics and puberty on insulin resistance in overweight adolescents. Anthropometric characteristics and Tanner stages were determined and tested for associations with homeostatic model assessment of insulin resistance (HOMA-IR) at baseline.

127 adolescents (53m/74f, age 13.9±2.3y, BMI z-score 3.1±0.7, HOMA-IR 3.5±1.4) were eligible for this study. HOMA-IR was higher in girls (M 3.3±2.7, F 3.7±2.1, $p=0.021$), and persistently high postpubertally (3.8±2.4). In both genders HOMA-IR was positively associated with BMI z-score (M $r=0.48$, $p=0.003$; F $r=0.47$, $p<0.001$), puberty (M $r=0.56$, $p=0.001$; F $r=0.29$, $p=0.047$), waist circumference (M $r=0.513$; $p<0.001$; F $r=0.33$, $p=0.005$) and fat mass (M $r=0.51$; $p=0.001$; F $r=0.42$, $p=0.001$). After correction for age and BMI z-score, fat mass was the main contributor to HOMA-IR in girls but not in boys.

In conclusion, gender, puberty stage, BMI z-score and fat mass are the main determinants of persistent rather than transient insulin resistance in overweight and obese adolescents.

T5:S32:60

Are parent food rules associated with child dietary intake and weight among children in low- income, ethnically diverse families in Texas?

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The influence of parents on child dietary behavior and weight, through the use of specific, predetermined food rules, is not well understood. The objective of this study is to examine the use of parent food rules in relation to child dietary intake and weight. This cross-sectional study is part of the Texas Childhood Obesity Research Demonstration, a multilevel, quasi-experimental intervention. Parent-child dyads ($n=1561$) were created for Pre-K, 2nd, and 5th grade students, matched with self-reported parent

surveys at baseline. Valid and reliable survey items included sociodemographics, food rules, and child intake on the previous day. Linear regression was conducted to examine associations between the total number of food rules and: 1) intake of food items, 2) healthy and unhealthy dietary intake, and 3) child BMI z-scores. The total number of food rules was positively associated ($p < .001$) with intake of fruit, vegetables, and water, and negatively associated ($p < .001$) with intake of French fries/chips, soda, and sports drinks/punch. Parents who reported a higher number of food rules had children with significantly higher healthy food scores ($p < .001$), lower unhealthy food scores ($p < .001$), and lower BMI z-scores ($p = 0.019$). Parent food rules are positively related to healthy child dietary intake and weight. These findings can be used to inform guidelines for healthy family behaviors, and in designing interventions for families in similar low-income, minority populations.

T5:S32:61

What does healthy mean? is physical literacy associated with health/weight perceptions among 8-12 year olds?

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The Canadian Assessment of Physical Literacy (CAPL), as developed by researchers at the Children's Hospital of Eastern Ontario (CHEO), is the first comprehensive protocol that assesses physical literacy in children 8-12 years of age. Physical literacy is the result of an interaction between four domains (Motivation and Confidence, Knowledge and Understanding, Physical Competence, and Daily Behaviour).

A questionnaire was administered to 434 children in southwestern Ontario, Canada. Children were asked to draw a line to as many items they thought *Healthy means*, options included: *Eating Well, Feeling Good, Not Being Sick, Being Skinny*, and *Looking Good*, with the latter two being incorrect. Separate multiple linear regression analyses (controlling for age, sex, and BMI) were used to see if the four domain scores were predictors of selecting *Being Skinny* and *Looking Good*, indicating a child's understanding of health.

The Knowledge and Understanding score ($\beta = -.163$, $p = 0.002$) was a significant predictor of selecting *skinny is healthy* for children ($R^2 = .031$). Also, the Knowledge and Understanding score ($\beta = -.189$, $p = 0.000$) was a significant predictor of selecting *looking good is healthy* ($R^2 = .035$) for children.

Results suggest that with greater Knowledge and Understanding, one is less likely to think *skinny* and/or *good looking* is healthy. Future interventions should be aimed at increasing knowledge and understanding of physical literacy to improve understanding of what *healthy means*.

T5:S32:62

Grandparents as the potential key to tackling childhood obesity in china: A cross-sectional study of their knowledge, attitudes and practices towards childhood obesity

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There are 36.8% three-generation households in China, and 66.5% grandparents help look after their grandchildren. Despite of the dramatic increase in the prevalence of childhood obesity, little is known about grandparents' perceptions of childhood obesity. This

study aimed to assess the knowledge, attitudes and practices of grandparents towards childhood obesity. A cross-sectional survey using self-administered questionnaires was conducted among children aged 8-12 years and their grandparents (the main carers) randomly sampled from primary schools in Hangzhou, China. Full data were available for 684 child-grandparent pairs. 13.1% of children were overweight with additional 9.5% being obese. 39% of grandparents were unaware of the positive energy balance leading to obesity, and 38% didn't think people could have lives cut short by being overweight even rarely recognising the psychological consequences. The results additionally presented grandparents' false beliefs. 33% reported they used food as reward for grandchildren, and 73% would buy food upon grandchildren's requests. But 83% believed parents should be responsible for childhood obesity. The relationship between grandparents' perspectives and grandchildren's weight status was further examined. Grandparents are potential agents of change for treating childhood obesity within Chinese context. Future childhood obesity interventions would benefit from involving grandparents in the components of education and behaviour change.

T5:S32:63

The role of grandparents in promoting healthy weight behaviours in their grandchildren

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Six million UK grandparents provide childcare to their grandchildren every week. Although there are advantages to children being cared for by grandparents, there is also concern that grandparents do not promote healthy-weight behaviours in grandchildren. The aim of the study was to examine existing literature, and to investigate parents' and grandparents' views on promoting healthy-weight behaviours. A systematic review of the literature (databases: Web of Knowledge, Medline, Embase, PsycINFO) using search terms around diet and physical activity (PA) was carried out. In-depth interviews were conducted with parents and grandparents ($n = 30$). Participants were recruited from community groups in areas of high deprivation. Data was analysed thematically using Atlas.ti. Nineteen articles were identified, with 11 studies containing qualitative results and 10 containing quantitative. Results suggested that grandparents were more likely to have a negative influence on their grandchildren's healthy-weight behaviours (diet and PA). This finding held across cultures. Within the interviews, few tensions were reported between parents and grandparents. Grandparents gave 'treats', but believed on the whole they provided healthy food, encouraged children in active play and limited screen time. Future work will look to develop appropriate interventions with grandparents around children's healthy-weight behaviours.

Funded via a Cancer Research UK/BUPA Foundation Fund Innovation Grant C53245/A19672

T5:S32:64

Descriptive analysis of advertising on food packaging with an impact on children's nutrition

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The population is exposed to different marketing strategies in the purchase of products high in fat, sugar and sodium. To characterize the marketing strategies utilized by products consumed by children, as well as the nutritional content of these products. In order to know the type of advertising used in packaging of food and beverages that have an influence on children's nutrition, photographs of food products in 20 supermarkets in Mexico City were taken during two different observations. In every supermarket visited, pictures of food and beverages that presented advertising and/or promotions on the packaging were taken. Foods that were considered for the study were those directed to children's consumption, and those high in energy, sugar, sodium and saturated fat, which were not advertised directly to children, but have an impact on their nutrition. During both observations a total of 900 products were collected. It was identified that during both stages, most of the products were positioned at an accessible distance for children, with 76.2% during the first observation and 77.6% in the second. The audience to which most of the promotions were aimed at, was children during the two observations (66.4% in the first, and 90.9% in the second). Of those promotions aimed at children, the most used in the two observations were "presents". The type of "present" mostly used, was "toy" on the first observation, while the second was "pogs".

T5:S32:65

Strategies utilized in marketing and promotions around and within supermarkets in Mexico City

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Research continues to demonstrate that increases in the prevalence of overweight and obesity in children are related to social and environmental influences. To describe the marketing of food and non-alcoholic beverages (FNAB) to school-children around and within supermarkets in Mexico City. Advertising around and within 20 supermarkets was registered. The collection of information was carried out in two repetitions between March and July 2015. FNAB advertisements were grouped in the following food categories: 1) breakfast cereals, 2) savory snacks, 3) sweet snacks, 4) sweet beverages, 5) fast food, 6) dairy products, and 7) other. For the observation around supermarkets, a total of 386 adverts from both observations were recorded. During the first observation, sweet beverages were the category with the largest number of ads (17.1%), followed by dairy (13%) and sweet snacks (8.9%). On the second observation, the distribution was modified with dairy being the category with the largest number of ads (18.8%). Within the supermarket during the first observation, dairy products had the highest number of promotions (25.2%), followed by sweet beverages and sweet snacks, while in the second observation it was sweet beverages (22.9%), followed by dairy products, and sweet snacks. In both stages, discounts were the most frequent type of promotion. These results suggest the importance of policies that regulate the obesogenic environment.

T5:S32:66

Marketing techniques used within food advertisements on Mexican broadcast TVRincón-Gallardo, P, S.*¹; Tolentino-Mayo, L.¹; Monterrubio Flores, E.¹; Vandevijvere, S.² and Barquera, S.¹
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The evidence has shown that food marketing influences children's food purchasing requests and consumption. The use of persuasive marketing techniques in food advertisements(ads) on television (TV) has been associated with greater attention from child viewers. We aimed to investigate the extent and nature of promotional techniques used within food TV ads on Mexican TV.

We recorded food ads during 10 randomly selected days of the 4 broadcast channels with the highest national audience ratings; 5 weekends and 5 week days(6:25am-10:10pm) during school period in 2014. Promotional techniques(characters and premium offers) within food ads using the internationally standardized INFORMAS taxonomy were analyzed. We used the WHO Europe 2015 categories to classify the advertised foods. Frequencies and χ^2 analyses were conducted; $p < 0.05$.

A total of 13,130 ads were broadcast, of which 16%(3,223) were related to food. The majority of these(93.2%) featured a promotional character, frequently within ads for sweetened beverages(96.8%), yogurts(96.7%) and chocolate(96.1%). Premium offers were less popular 26.9% and were found most often within ads for ready-made food(60.7%), chocolate(38.8%) and savory snacks(33.4%).

The majority of these ads used a promotional technique in products high in saturated fat, sugar, or sodium. Identifying strategies used to promote food to children on TV is critical for the monitoring, development and improvement of the existing regulations in this area, within and between countries.

T5:S32:67

Effects of a school-based intervention program on metabolic syndrome parameters in school-aged youth

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Metabolic Syndrome (MetS) represents a group of factors that increase risk of non-transmissible diseases. Physical Activity (PA) is considered a main agent for improving MetS conditions and consequently life expectancy. The aim of this study was to assess the impact of a school intervention program on the parameters of MetS in Mexican secondary school students.

A sample of 41 adolescents was randomly divided in experimental and control group. During six months, EG students carried out school PA based on tactical ball games (four 60-min sessions/week), and attended meetings of nutritional counseling with their families (1 hour/week). CG participants had regular school Physical Education. Pre-post test showed that values of HDL cholesterol ($p = .039$) and triglycerides ($p < .001$) worsened at post-test in CG. In EG, triglycerides significantly decreased ($p = .008$) whereas HDL cholesterol increased ($p < .001$). No differences were found in waist circumference, blood pressure, and glycaemia values. At post-test, EG had significantly better values than CG in cholesterol ($p = .006$), triglycerides ($p = .004$), and glycaemia ($p = .018$).

School-based health programs focused on PA appear to be effective for reducing the risk of MetS. However, no effects were obtained for waist circumference or blood pressure. In the future, it is

recommended to increase the duration of the intervention, as well as to monitor participants' daily diet in order to assess changes in their nutritional habits.

T5:S32:68

Parental lifestyles and their influence on children with obesity and disability

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Background: Childhood obesity is a global public health concern. Parents are the earliest influencers in determinants of obesity of their children through parenting attitudes, beliefs, and lifestyle habits. The relationship between parental influences and children with obesity has been well documented in the literature. This same scholarly level of evidence is not well represented for children with obesity and disability.

Aim: To critically analyze the current literature for methodological rigor and quality of the evidence and identify gaps in research on the relationships between parental lifestyles and their influence on children with obesity and disability.

Methods: A critical literature review was conducted to analyze the methodological quality and strength of the current literature. A comprehensive search was conducted for peer-reviewed literature on the following electronic databases: Medline, EMBASE, CINHAL, PsychINFO, Pubmed, Scopus, OTSeeker, and other systematic reviews and rehabilitation literature databases. **Findings:** Eight quantitative studies met the inclusion criteria and were reviewed. There was a paucity of literature, lacking in quality and rigor due to many biases and limitations in study design and methods, resulting in conflicting evidence. **Implications:** The results were mixed and must be considered with caution. More methodologically sound research is indicated for this emerging field, particularly in occupational therapy.

T5:S32:69

Adiposity and insulin resistance syndrome among young Malaysian adolescents

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Body adiposity determines the risk of insulin resistance (IR), which is one of the factors contributing to metabolic syndrome (MS). This study aimed to explore the association between insulin resistance and obesity indices with cardio-metabolic risk factors of children. A cross-sectional study was conducted among 408 participants (207 boys, 201 girls) aged 9-14 years. Weight, height, waist circumference (WC), skinfolds at five sites and blood pressure (BP) were measured. Fat mass was assessed through bioelectrical impedance analysis. Fasting blood glucose (FBG), triglycerides (TG), high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, total cholesterol and insulin were determined from an overnight fasting blood sample. IDF (2007) criteria for children were used to diagnose MS while homeostasis model assessment

(HOMA-IR) method was used to calculate insulin sensitivity. Girls have significantly higher total cholesterol ($p<0.05$) and body fat percentage ($p<0.001$) compared to boys. MS was found in 2.4% of the adolescents and IR in 17.1%. Regression model revealed that biceps skinfold ($\beta=0.309$, $p<0.001$), FBG ($\beta=0.319$, $p<0.001$) and TG ($\beta=0.203$, $p<0.001$) were independently associated with HOMA-IR among boys; while FBG ($\beta=0.755$, $p<0.001$), WC ($\beta=0.145$, $p<0.05$), TG ($\beta=0.130$, $p<0.001$), subscapular skinfold ($\beta=0.196$, $p<0.01$) and diastolic BP ($\beta=0.083$, $p<0.05$) were associated with HOMA-IR in girls. We conclude that significant association exists between body adiposity and insulin resistance with cardio-metabolic risk factors among young Malay adolescents.

T5:S32:70

Early obesity in fully breastfed infants

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Breastfeeding is recommended as the best source of nutrition in early life and observational studies have associated exclusive breastfeeding with slower weight gain and a protective effect against obesity in childhood. Between 2003-2015 we followed 73 patients who were exclusively breastfed in the first 6 months and showed excessive weight gain in the first year of life. To describe the clinical features of this cohort to determine factors that may lead to this unusual weight gain.

Descriptive and cohort study.

Of 73 patients, 63% were girls. All but one were born full term. Overall, mean birth weight was 3.67 kg (2.65–4.62) and mean birth length was 50cm (45.5–52.5). At 3 months of life, 64% had a weight/height of +2,59SD (-1,19/+4,56). At 6 months, overall weight/height was +4,43SD (+2/+7,26). At 12 months, weight/height was +5.5 SD (+2,13/+9,47). Mean age at semisolid-food introduction was 7 months, and the transition was well accepted by 73.2% (41 patients). Mean age at weaning was 15.8 months (9–26 months). 100% of mother-child pairs routinely bedshared. Although breastfeeding typically reduces excessive weight gain, in our cohort of exclusively breast-fed children weight gain was excessive, fast, and of early onset. Feeding behavior, mother-child relationship, and milk intake with feeding-on-demand may have contributed to this unusual growth pattern. Genetic and epigenetic factors and adipokine content in the human milk should be further studied to confirm this hypothesis.

T5:S32:71

Outdoor play, physical fitness and quality of life: Associations with BMI in 8-9 year Old children: Trial protocol of a pilot study

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Background: Children's physical activity and fitness levels are increasingly insufficient for good health, however in green, outdoor space children's physical activity is greater than indoors. Outdoor play may increase physical activity and fitness, thus reducing the risk of obesity and disease, and may contribute to positive mental wellbeing.

Aim: To assess children's access to outdoor play space, and associations with physical activity, fitness, body mass index (BMI) and quality of life.

Methods: Children aged 8-9 years will be recruited from one primary school in Northeast England. Opportunity for outdoor play away from school, and quality of life will be measured by

questionnaire. Weight, height and maturity status will be measured using calibrated scales and stadiometry. Physical activity will be measured by accelerometry; and fitness via 20 m multi-stage shuttle run test performance. Flexibility, lower- and upper-body strength will be measured by the sit-and-reach, standing broad jump and handgrip tests, respectively. Regression analyses will assess the strength of associations between variables.

Results: Data will be collected on ≈ 80 children in December 2015, and associations between opportunity for outdoor play and fitness, quality of life and BMI presented at the conference. The proportion of overweight and obese children will also be determined.

Conclusions: Recommendations for children's access to outdoor play space or requirements around fitness will be made.

T5:S32:72

Cut-off value of percent body Fat of obesity and abdominal obesity measured by dual energy X-ray absorptiometry in Korean adolescents: Korean national health and nutrition examination survey (KNHANES) 2008~2011

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Background: Childhood obesity leads to higher prevalence of adulthood obesity which increases the risk of metabolic syndrome. Recently, the prevalence of obesity and metabolic syndrome is rapidly increasing among children and adolescents in South Korea. The aim of this study was to estimate the accurate cutoff value for percent body fat and trunk fat measured by dual energy X-ray absorptiometry (DEXA) in adolescents.

Methods: Among 3,895 participants, aged 10~18 years, 2648 participants were selected from the Korea National Health and Nutrition Examination Survey (KNHANES) from 2008 to 2011 and evaluated by DEXA. The cutoff value for body fat percentage was set to maximize the sum of sensitivity and specificity for detecting obesity using the Receiver Operating Characteristics (ROC) curve. The relationship between percent body fat and trunk fat with metabolic risk factors was assessed after controlling for sex and age.

Results: The cutoff value for the percent body fat used to define obesity was 32.1% in boys, 37.0% in girls aged 10~12 years, 28.7% in boys, 35.8% in girls aged 13~15 years, and 22.8% in boys, 36.2% in girls aged 16~18 years. The cutoff value of percentage trunk fat for abdominal obesity was 31.5% in boys, 35.4% in girls aged 10~12 years, 24.2% in boys, 34.8% in girls aged 13~15 years, 23.1% in boys, 33.3% in girls aged 16~18 years.

Conclusion: The cutoff values of percent body fat and trunk fat were lower than those suggested in previous studies.

T5:S32:73

Guilt and shame associated emotions to BMI in adolescents

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Moral emotions are important in the individual and interpersonal relationships, positive and negative situations are learned and affect the overall health of the individual. The person learns self-care

culture and with it their body condition. Emotions enhance the ability to reflect and become aware. The relationship of emotions with BMI and eating disorder (Dunn & Undercyn, 1981; Fairburn & Cooper, 1984), bulimia nervosa and binge eating (DSM V, 2013), the proclivity of the emotion of guilt (Tangney, Wagner & Gramzow, 1992); emotions of guilt, shame and BMI (Guillen-Riebeling et al 2012). Guillen-Riebeling in 2015 developed valid and reliable instruments of guilt in four age groups. The aim of the study was to correlate the BMI perceived guilt and shame in children and adolescents, women and men, Mexico City, from 13 to 17 years old. Guilt scale (Cronbach's alpha = 0.795). Results. The BMI of the population with higher body weight was found in under age (24 and 30 percent); significant correlations were obtained in women and men of BMI ($p < 0.001$) factor 1: Stealing, lying, hurting ($p < 0.035$), Cronbach's alpha = 0.935). The emotion of shame ($p < 0.05$; 0.306) with BMI in adolescents perceived. Results matching Sjöberg, Nilsson & Leppert (2005), obesity with shame experiences in adolescents 15 to 17 years. Children and are concerned about your body, more boys than girls: normal weight, overweight and followed last underweight.

T5:S32:74

Feeding toddlers and pre-schoolers: A description of the prevalence and frequency of feeding practices employed by parents

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Parent feeding practices are associated with children's eating behaviours and weight, yet few studies report prevalence of weight promoting feeding practices and this limits understanding of behaviours to target to promote healthy growth. This study combined data from 4 Australasian trials, each using the Comprehensive Feeding Practices Questionnaire (CFPQ). Means and standard deviations for each CFPQ dimension were calculated for toddlers (1.3-2 years; $n=1344$) and pre-schoolers (4-5 years; $n=795$). Scores were categorised by frequency and percentages in each category calculated. Mixed effects regression analysis determined associations between socio-demographic characteristics and feeding practices. In both age groups parents reported extensive use of some CFPQ dimensions including modelling, encouraging balance/variety and healthy food environment. Greater variation was seen for child control and pressure to eat. Food as reward was used more in the preschool group, and was inversely associated with the mothers' age. Parents' use of restriction for health and pressure to eat were associated with child weight status. Feeding practices such as modelling and providing a healthy food environment are important, but we're unlikely to detect effects in intervention studies as most parents report adoption of best practice. In contrast, use of food as a reward and pressure to eat may be more likely to provide evidence of effect in behaviour change interventions.

T5:S32:75

Prevalence and determinants of obesity and metabolic syndrome among school children and adolescents in Ras Al Khaimah, United Arab Emirates: Study design and methodology

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The United Arab Emirates (UAE) is a high-income developing country that has experienced significant economic and social development since its formation in 1971. The UAE population has experienced a lifestyle shift to an urbanised and technology-driven lifestyle characterised by reduced physical activity, coupled with the overconsumption of energy-dense foods. Rates of childhood obesity have continued to increase in the emirates of Abu Dhabi and Dubai; however, there are no estimates for the emirate of Ras Al Khaimah (RAK). This study aims to assess the prevalence and determinants of obesity and metabolic syndrome among School children and adolescents in RAK. Using a cross-sectional study design with weighted stratified random sampling, 1200 children and adolescents aged 6-18 years from public and private schools will be recruited during the 2015-2016 academic year. Anthropometric measurements (i.e. body mass, height, waist circumference, blood pressure) will be taken using standardized procedures. Participants will complete a diet and lifestyle questionnaire and one parent will complete the demographic and family health questionnaire. Fasted blood samples will be assessed for blood glucose, high-density lipoprotein, triglycerides, and total cholesterol. The International Diabetes Federation diagnostic criteria will be used to diagnose metabolic syndrome. Study findings will be used to develop school- and home-based health interventions for children and adolescents in RAK.

T5:S32:76

Associations between high junk food consumption and socio-economic status in a population sample of Australian children

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Processed or “junk” foods are common components of the diet in children and adolescents and high consumption of these foods is associated with lower diet quality, obesity and overweight. An index summarising junk food consumption provides a means to easily communicate the frequency of junk foods in the diet.

To assess the association between high junk food consumption and socio-economic status (SES) in a representative sample of Australian children age 5 to 16 years.

Analysis of data from the Schools Physical Activity and Nutrition Survey 2015 (n=7555). A junk food index (i.e., french fries, chips, biscuits, cakes, confectionary ice cream) was determined from a validated food frequency questionnaire. Children eating ≥ 3 of these foods, three or more times/week were classified as ‘regular junk food eaters’. SES tertiles were based on residential postcode.

Overall 23.7% ate junk food regularly however there was a significant inverse SES gradient with a lower prevalence in children from high SES (21.7%), than middle SES (23.2%) and low SES areas (28.0%). When adjusted for age, sex and BMI category,

children from low SES areas were significantly more likely to be regular eaters of junk food (OR=1.41 (95%CI 1.22-1.62) when compared with high SES children.

Almost one quarter of all children eat junk food regularly. Measures to eliminate children’s exposure to junk food are a priority, especially in low SES communities. Strategies may consider advertising bans and taxes on junk food.

T5:S32:77

Rapid weight gain and obesity at Age 7 in urban Australian aboriginal children: The GUDaga cohort

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Improving the health of Aboriginal and Torres Strait Islanders has been a key focus of successive Australian governments. The Gudaga cohort (N=155) is a birth cohort of urban dwelling children with at least one parent who identifies as either Aboriginal or Torres Strait Islander. Children have been followed every six months and are now in their 8th year. This paper aims to determine the current weight status of children, (now aged 7 years) with particular emphasis on those who experienced rapid weight gain (defined as an increase of greater than 0.67 BMI Z score between birth and 12 months). At two years of age, over one third of children were overweight, with 60% over the overweight children having experienced rapid weight gain. At age 7, the proportion of children who were overweight or obese was 43% and rapid weight gain remains the strongest predictor of overweight and obesity. Infant feeding method, age of parents, current and early diet are not significantly associated with overweight in this cohort. This study suggests a concerning and persistent association between rapid weight gain and excess weight through early childhood in a cohort with higher rates of overweight and obesity than the general population.

T5:S32:78

Challenges and barriers experienced by Prince George parents in providing opportunities for children to engage in healthy eating and active living

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University of Northern British Columbia (UNBC)

Background/Aims: The purpose of this study is to investigate the challenges and successes experienced by parents in providing their children with opportunities for healthy living.

Key Methods: Focus group interviews were conducted with parents of children 0-6 years old to discuss challenges and successes in healthy eating, active living and being screen smart. The focus group interviews were digitally recorded and transcribed. The transcripts were analyzed for themes. **Results and Conclusions:** Three main themes emerged which include Barriers to Healthy Living; Parent Involvement; and Child Involvement. It is recommended that the Healthy Families Prince George Committee review these results to plan and design community initiatives to support families in the Prince George area in order to achieve optimal healthy living. Upstream social and public health policies are warranted to provide support for low socio-economic status (SES) parents and their families to achieve healthy lifestyle, including healthy eating and active living.

T5:S32:79

Consumption of juice and carbonated drinks in relation to body mass index among Kuwaiti children aged 2-5 yearsAl-Hilal, M.*¹; Al-Hamad, N.¹; Alsumaie, M.¹ and Al-Taiar, A.²¹*Food and Nutrition Administration, Ministry of Health;*²*Associate Professor of Epidemiology, Faculty of Medicine, Kuwait University*

Consumption of sugar-sweetened beverages is a key contributor to the childhood obesity. We investigated the association between the consumption of juice or carbonated drinks and current Body Mass Index (BMI) among children (2-5 y) who participated in the Kuwait National Surveillance System 2013 (KNSS 2013). Data were collected through KNSS 2013, which selected children (n= 1074) from nurseries and vaccination clinics in health centres in all governorates of Kuwait. Data on consumption of sugar-sweetened beverages were collected through interview with mothers as a proxy source of information. Anthropometric measurements were made using standardized protocol. Approximately 42% consumed 100% fruit juice daily while 62% and 37% consumed juice as a nectar (20-30% fruit juice) or consumed drinks (without fruit juice, e.g. Sunkist and Vimto), respectively, while 21% consumed carbonated drinks on daily basis. There was no significant difference in BMI between those who consumed 100% fruit juice and those who did not, mean (SD) was 16.11(2.04) and 16.03 (2.13), $p=0.593$. Similarly, no difference in BMI was found between carbonated drinks consumers and those who did not, 16.14 (2.35) and 16.09 (2.02), $p=0.797$. The findings remained unchanged even after stratification by age. Consumption of carbonated drinks, juice and drinks among 2-5 years old was not associated with increase in BMI, which may be due to inaccurate data collection tools. A local assessment technique for children is needed

T5:S32:80

Physical activity in children attending an obesity service in IrelandDoyle, S.B.*¹; Cahill, D.² and Murphy, S.²¹*Faculty Of Paediatrics, University College Dublin;*²*University College Dublin*

The causes of obesity are broad and complex. Healthy lifestyle education forms the basis of many treatment programmes and public health promotion strategies.

We performed a retrospective review of 111 randomly selected children attending our service over a 16 month period. Their initial assessment sheet was reviewed and the data analysed. The aim was to analyse lifestyle choices made by the children attending the service and parental awareness of recommended physical activity time.

60 minutes of physical activity per day is recommended for health in children over 5 and 3 hours for children under 5. This review highlighted a lack of awareness of the amount of physical activity required for health with only 23% of parents aware of the recommendations. 41% of the children never got the recommended amount of activity, 39% got the recommended amount daily, and the remaining 20% got the recommended amount rarely or once per week. 49% of children used motorised transport to get to school, 37% used active travel and 14% of charts weren't completed. Time spent on sedentary activities (watching TV, on the computer + smart phone) was recorded on weekdays and weekends. An average of 6 hours was spent during the week and 8 hours at the weekends.

This data highlights poor awareness of healthy lifestyle choices and a high level of sedentary activity among this high risk group. It is likely that the combination of poor activity levels and sedentariness are major contributor

T5:S32:81

Mental health in children attending an obesity service in IrelandDoyle, S.*¹; Cahill, D.² and Murphy, S.²¹*Faculty Of Paediatrics, University College Dublin;*²*University College Dublin*

Obesity is a major public health concern internationally. In Ireland, 7% of Irish children are obese and 19% are overweight. Obesity is linked with multiple comorbidities and tracks into adult life.

We performed a retrospective review of 111 randomly selected children attending our service over a 16 month period. Their initial assessment sheet was reviewed and the data analysed. The aim was to analyse the services needed to care for these children.

All children had a BMI > 98th centile and a median age of 10.75 years (range 2-16 years). 49 of the patients were male and 62 female. 33% of the children disclosed emotional difficulties and only 46% were linked to mental health services. 26% of the children have behavioural problems and 52% attend mental health services. 63% admitted to being teased about their weight and 12% had a history of school absenteeism as a result.

Psychology assessment is an important part of the treatment of obesity in our service and estimates from our psychologists are higher than those above. Further analysis of this data is needed.

Emotional and behavioural difficulties are linked to childhood obesity. These children require access to mental health services. Of the children reviewed attending our service many have not received this treatment. This is an important issue which requires consideration when caring for any obese child.

T5:S32:82

Association between whole-school environmental mapping and body mass index of school children in Terengganu

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There is evidence to suggest that the school environment do have prominent contributions to the rising of childhood obesity. The objective of this study was to examine the association between whole-school environmental mapping (physical, economic, political and sociocultural) and body mass index (BMI) of school children in Terengganu. Sixteen schools were randomly selected (8 urban and 8 rural) in Terengganu, Malaysia and 32 teachers were interviewed face-to-face using a set of validated "Whole-school Environmental Mapping" questionnaire. A total of 400 school children aged 10 and 11 years old were randomly selected from the selected schools. Multiple linear regression analysis was conducted to examine the association between the school environment practice and children's BMI. The prevalence of underweight, normal, overweight and obese was 4.0%, 46.3%, 23.3% and 26.5%, respectively. The highest median score was for political environmental mapping (63.9%; IQR=43.1) whilst the lowest score was for socio-cultural environment mapping (33.8%; IQR=27.2). The results showed that calorie intake ($\beta= 0.00$; $p<0.001$), socio-cultural environmental mapping ($\beta= -0.15$; $p<0.001$), whole-school environmental mapping ($\beta=0.10$; $p=0.011$) and physical activity level ($\beta= -1.05$; $p= 0.043$) were adjusted significantly associated with BMI of

schoolchildren. An appropriate intervention would be beneficial to improve the school environment in combating childhood obesity.

T5:S32:83

Weight management, weight perception, and health-related behaviours among adolescent females: A cross-sectional analysis of data from a school-based study

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There is increased attention on promoting weight management to curb rising rates of obesity among youth, although the unintended consequences of these initiatives are not fully understood. This study aimed to explore associations between weight management, weight perception, and a cluster of health-compromising behaviours among adolescent girls. Cross-sectional data for adolescent females from COMPASS, a prospective cohort study of students in Ontario and Alberta, were utilized (N=22,149). Multinomial regression analyses investigated whether each of smoking, binge drinking, and breakfast-skipping were associated with weight management and perception. Most girls reported engaging in some form of weight management (58% trying to lose, 4.5% trying to gain, and 18% trying to maintain), and 33% perceived themselves as overweight. Girls who were smokers were more likely to try to gain weight (OR=1.50) and more often perceived themselves as underweight or overweight. Girls who engaged in binge drinking were at a significantly elevated risk of using any type of weight management. Girls who skipped breakfast were at a higher risk of trying to lose or gain weight, and were also significantly more likely to perceive themselves as overweight. Although further research is needed to untangle relationships among weight management efforts and other behaviours among girls, our results suggest that obesity reduction efforts should consider the potential impact on other realms of health.

T5:S32:84

Evaluating the effects of metformin use on height in children and adolescents: A meta-analysis of randomized controlled trials

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University of Alberta

Background: Metformin use is increasing in children and adolescents (≤ 19 years of age). Previous meta-analyses have identified a highly variable effect of metformin use on body mass index (BMI), but have not considered height as a confounder.

Aim: To conduct a systematic review and meta-analysis of the effects of metformin use on height in children and adolescents.

Key Methods: Databases were searched (September 9, 2014) for interventions examining the effects of metformin on height of participants ≤ 19 years of age. Weighted mean differences (WMD) for height, body weight, and BMI changes were compared between metformin and control groups, with random-effects models.

Results: Ten studies were included (n=562 participants), with mean ages ranging from 7.9 to 16.1 years, and interventions lasting from 3 to 48 months. Height changes were not significantly different between the metformin and control groups. However, stratified analyses according to cumulative metformin dose [(metformin/day) \times intervention length] showed a greater increase in height with metformin in the 5 studies with the highest doses (WMD= 1.0; 95%

CI: 0.0 to 2.0 cm), but not the 5 studies with the lowest doses (WMD= -0.1; 95% CI: -0.7 to 1.0 cm).

Conclusions: Preliminary evidence suggests a dose-response relationship between metformin use and increases in height in children and adolescents. To help confirm or reject this relationship, future studies should report changes in height.

T5:S32:85

The relationship between movement behaviours and adiposity in early years children: A scoping review

Kuzik, N.* and Carson, V.L.
University of Alberta

Background: Understanding modifiable risk factors of overweight and obesity in the early years (0-5 years), such as movement behaviours (i.e., sleep, sedentary behaviour, and physical activity) is important for primary prevention. No review has explored the associations between movement behaviours and adiposity in the early years.

Aim: To conduct a scoping review examining the relationships between physical activity, sedentary behaviour, sleep, and adiposity in early years children.

Key Methods: A database search was conducted (June 15, 2015) for studies with apparently healthy children ≤ 5 years. Results were synthesized separately for infants (< 18 months), toddlers (19-35 months), and preschoolers (36-60 months). Consistent positive or negative associations were determined when $\geq 60\%$ of studies reported positive or negative results.

Results: Sixty-seven studies representing 81,635 participants from 17 countries met the inclusion criteria, including 36 physical activity studies, 25 sedentary behaviour studies, 20 sleep studies, and 1 study with all three behaviours. Consistent negative associations were found between sleep and adiposity in toddlers (80% of studies) and preschoolers (80% of studies). All other relationships were either inconsistent or could not be assessed due to limited studies. Few studies included infants and toddlers.

Conclusions: Future studies should measure all movement behaviours across the early years, and use an integrated analysis (e.g., compositional analysis).

T5:S32:86

Free sugars guidelines aiming to reduce childhood obesity also have benefits for academic achievement

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The WHO recently released guidelines that intake of free sugars should constitute less than 10% of total energy intake to alleviate the public health burden of obesity. Various studies have suggested a link between diet quality and academic achievement (AA) but the importance of sugar intake and adherence to the new WHO guidelines for children's AA has not been studied.

Intake of free sugars and adherence to the WHO guidelines was assessed using a validated food frequency questionnaire administered among 1595 grade five students in Canada. AA was comprised of standardized provincial exam results (average of Language Arts and Mathematics) written in grade six. We applied multivariable mixed-effects linear regression to quantify the association of adherence with AA while adjusting for relevant confounders.

Relative to those with high sugar intakes, students who adhered to the new guidelines performed on average 3.7% better on exams (β : 3.70 [95%CI: 1.83, 5.29]). Within the subgroup of adhering students, we observed a gradient of increasing AA with decreasing sugar intake: 0.54% increase in AA per 1% decrease in consumption of free sugars [0.66, 1.02].

Adherence to the new guidelines has benefits not only for alleviating the public health burden of obesity but also for improving AA. This evidence justifies that more class time be used for the promotion of healthy eating as this will improve academic outcomes in the short term and prevent chronic diseases in the long term.

T5:S32:87

Early-life body mass index (BMI) trajectories associated with resolution of youth obesity

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Background: Obese youth who become non-obese adults have the same risk of diabetes and heart disease as someone who has never had obesity. However, the early-life BMI trajectories of those who resolve youth obesity by adulthood have not been described.

Aim: To determine the BMI trajectories from youth to adulthood for those who resolve youth obesity.

Methods: From 1980 to 2011 up to 8 measures of weight and height were collected from participants in the Cardiovascular Risk in Young Finns Study. Youth (those aged 3-18 years) obesity was defined using Cole's BMI cutpoints and adult (21-49 years) obesity was defined as BMI ≥ 30 kg/m². Multilevel mixed models compared BMI trajectories of those who resolved youth obesity with those persistently obese from youth to adulthood.

Results: Of 229 individuals with youth obesity, 94 (41%) were not obese as adults. Those who resolved youth obesity had similar BMI at age 3, 6, and 9 years as those with persistent obesity but had significantly lower BMI (-1.8kg/m², $p < 0.001$) by age 12 years. The persistent obese continued a linear trend of increasing BMI compared with a plateauing in the resolution group (Figure). The maximum BMI difference occurred at age 49 years (-14.5kg/m², $p < 0.001$).

Conclusions: Efforts to amend BMI trajectories that lead to adult obesity should begin early in life. The natural resolution of youth obesity begins to occur around age 12 years, suggesting a sensitive window for secondary prevention before the adolescent years.

T5:S32:88

BMI better predicts renal tubular dysfunction, whilst BMI Z-score better predicts glomerular filtration abnormalities, in clinically obese children and adolescents

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Obesity is an established risk factor for renal disease in adults. In children the contribution of obesity to renal dysfunction is less well understood. We investigated the prevalence of renal dysfunction in an obese paediatric cohort with the aim of understanding which

anthropometric characteristics would be better indicators of risk in a clinical setting.

Patients were enrolled into the Childhood Overweight Biorepository of Australia (COBRA) study, from the multidisciplinary weight management service at the Royal Children's Hospital in Melbourne (n=297, M 47%, mean BMI z-score 2.47, mean BMI 35.74 \pm 6.38, mean age 11 years). Renal function: eGFR, urinary albumin to creatinine ratio (ACR), urinary cystatin C, osteopontin, β 2 microglobulin and NGAL. Statistical modelling was used to assess each measurement against anthropometric data; BMI z-score, BMI and total body fat percentage (BFP).

BMI, but not BMI z-score correlated with urinary Cystatin C/creatinine ratio ($r=0.249$, $p=0.039$), urinary osteopontin ($r=0.362$, $p=0.005$) systolic ($r=0.489$, $p < 0.001$) and diastolic blood pressure ($r=0.271$, $p=0.36$). Calculations for glomerular filtration correlated with BMI z-score (eGFR, $r=-0.409$, $p=0.017$, ACR $r=0.294$, $p=0.017$). In multiple regression modelling age and BMI z-score accounted for 27% of the variation in eGFR ratio ($R=0.572$, $p < 0.01$).

Paediatric obesity is a risk factor for the development of renal disease. Total BMI rather than BMI z-scores may better predict early renal disease.

T5:S32:89

Parental perceptions and concerns of weight status in children with autism spectrum disorders in Kuwait

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Autism spectrum disorders are developmental disabilities associated with deficits in communication skills. The distinct behavioral and physical characteristics of ASD can make these individuals more vulnerable to obesity. This study evaluated the prevalence of obesity in a group of ASD children and investigated their dietary habits, and mealtime behavior. Parental perception and awareness associated with overweight and obesity was evaluated. Data was collected from 65 student-respondent dyads in a cross-sectional survey of students enrolled at the Kuwait Center for Autism. Fifty-nine percent respondents reported regular measurement of their children's height and weight. Both healthy (daily breakfast, daily milk intake, frequent consumption of fish and seafood, and consuming fruits and vegetables) and unhealthy (consuming fast foods) dietary habits were reported by majority of respondents. Most respondents (78%) felt that their children ate a varied diet. Mood swings and hyperactivity were commonly reported mealtime behaviors in students. The findings suggest that obesity is common in children and youth with ASD in Kuwait. Monitoring and modification of dietary habits and mealtime behavior should be implemented towards tackling the problem of overweight and obesity in this population.

Session 33: Prevention of obesity

T5:S33:01

Prevention of obesity and cardiocascular risk factors- the EDDY project

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Austrian Academic Institute for Clinical Nutrition

The prevalence of overweight and obesity in children and adolescents in European countries ranges from 5% to 25% and correlates strongly with diseases of the cardiovascular system in adulthood. Furthermore overweight in children and adolescents is associated with an increased risk of adult obesity. Therefore it is necessary to find concepts to combat obesity and prevent its origin in early age.

The EDDY project is an interventional cohort study with duration of two years. The intervention group received a comprehensive, age-appropriate nutrition and sports intervention and a physiological training. Subjects were physically measured (BIA, height) and blood samples were taken to determine the metabolic status. In addition, knowledge of nutritional issues as well as eating habits and psychological parameters were measured with adequate questionnaires.

Nutritional knowledge improved significantly in the interventions group after intervention compared to the beginning. In addition the consumption of junk food, sweets and salty snacks was reduced significantly after intervention. The body fat percentage of the subjects in the intervention group was reduced in a nonsignificant extend after intervention, as well as the number of children with elevated LDL and total cholesterol values.

The data indicate that an intervention based on nutrition knowledge and stimulating daily physical activities is able to improve the nutrition habits and possibly the health status.

T5:S33:02

Preventing weight gain in women across multiple settings and lifestages: HeLP-her cluster randomised controlled trials

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Even modest weight gain increases the risk for chronic illness, yet evidence-based interventions to prevent weight gain are rare. The HeLP-her program is a simple low-intensity community lifestyle intervention to prevent weight gain in women. The program focus is on small changes to behaviour, self-management, self-weighing, group and phone delivery with SMS text reminders. We have conducted 2 large, 1-year pragmatic cluster RCTs to prevent weight gain in over 900 women, and an RCT to prevent excess gestational weight gain in 200 women. In the most recent RCT, 42 rural towns (clusters) were randomised to intervention or control. Women 18 to 50 years, received a 1-year self-management lifestyle intervention (HeLP-her) consisting of 1 group session, monthly SMS text, 1 phone coaching session and a manual, or to a control group. 649 women were recruited, mean age 39.6 years (\pm SD 6.7) and BMI of 28.8kg/m² (\pm SD 6.9), the primary outcome was weight change between groups at 1 year. The mean change in the control was +0.44kg (95%CI -0.10 to 0.97) and the intervention group -0.48kg (95%CI -0.10 to 0.03) an unadjusted between group difference of -0.92kg (95% CI -1.67 to -0.16) or -0.87kg (95% CI -1.62 to -0.13) adjusted for baseline values and clustering.

Secondary outcomes included improved diet quality and self-management. Here we present the successful findings from each HeLP-her RCT and discuss current translation to international settings.

T5:S33:04

Implementation of mini SALTEN a virtual intervention targeted to parents and 6 yr old children of Buenos Aires, Argentina aimed to prevent childhood obesity: Study protocol

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¹ILSI Argentina; ²Deakin University

Background: Parents model healthy habits for their children. Childhood obesity prevention requires reliable and effective interventions to improve their motivation and efficacy.

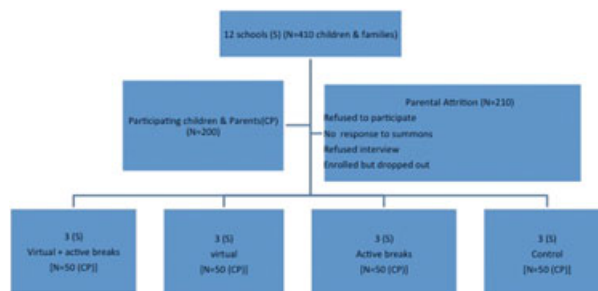
Aims: Implement a technology-based intervention designed to improve eating habits, physical activity (PA), and knowledge about healthy habits in 6 yr old children and their families, and to assess its feasibility and effectiveness.

Methods: Types of intervention: virtual; virtual + active breaks; active breaks; and control. A virtual interactive educational platform (www.nearpod.com) was adapted to bi-weekly deliver multi media presentations-comprising information about nutrition and PA for parents, and active games for children. Active breaks (20 min) are promoted. Children are evaluated at baseline and 12-mo post intervention. PA is assessed with accelerometers (ActiGraph wGT3X-BT) used during 7 days; children's intake and habits with two 24h recalls using the Multiple Pass Method completed by their mothers.

Results: Accelerometers' data is analyzed with ActiLife 6.11.8; 24h dietary recalls data is analyzed with NDS-R. Intervention runs from July 2015 to July 2016.

Conclusions: Mini SALTEN is an educational program designed to prevent obesity; it is technology-based and promotes health habits and PA in young children. If proven effective, Mini SALTEN could be adapted and implemented in other countries.

Mini SALTEN protocol participants
Flow chart study sample



T5:S33:05

Not just Fun and games: Toy advertising on television targeting children promotes sedentary play

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University of Ottawa

Background: In Canada, rates of overweight and obese children have doubled since the 1970's. Poor levels of physical activity have been identified among Canadian youth. Food marketing has been associated with childhood obesity yet little research has examined toy advertising targeting children.

Aims: To examine the volume of television toy advertising targeting Canadian children and to determine if this advertising promotes active or sedentary play and targets males or females more frequently.

Key methods: Data for toy and game advertising on 27 television stations in Toronto for May 2006 and 2013 was purchased from Nielsen Media Research. A content analysis was performed on all ads to determine what age group and gender was targeted and whether physical or sedentary activity was being promoted.

Results: Although there was a decrease in the volume of toy ads between May 2006 and 2013, there was an increase in the number of ads promoting sedentary play (80% in 2006 and 91% in 2013; $X^2 = 266.2$ (1); $p < 0.001$). Overall, toy advertising targeted males more often and the majority of ads promoted sedentary play. There was no change in volume of male-targeted ads promoting sedentary play over time.

Conclusion: The volume of ads that promote sedentary play to Canadian children may have an impact on children's activity levels and obesity rates. Future research should explore whether such advertising influences children's levels of physical activity.

T5:S33:06

Improvement of obesity and a study of metabolic treatment by low-frequency rotating electrical muscle stimulation deviceFujimoto, T.F.*¹; Tabata, A.T.² and Kinugasa, Y.K.²¹*Clinic F*; ²*Ito Co., Ltd.*

Objectives We evaluated the effect of the low-frequency rotating electrical muscle stimulation device: AC-BODY with the basal metabolic rate and inspected whether it can decrease visceral fat and subcutaneous fat. **Method** Subjects underwent low-frequency rotating stimulation EMS for 30minutes for 20 treatments in 10weeks. Body weight, body mass index (BMI), body fat, trunk fat, total muscle mass, trunk muscle mass, basal metabolism and circumference of lower abdomen at the height of the navel and waist were evaluated before and after. Measurements were carried out with a body composition analyzer and a normobaric indirect calorimeter. CT images of the visceral fat and subcutaneous fat was also examined before and after. No dietary or exercise therapy was imposed during the treatment period. **Result** Body weight, BMI, body fat, lower abdomen circumference were decreased. Basal metabolic rate increased compared with before treatment. All results showed significant change after treatment. CT image showed decrease of visceral fat of 43.2% and 31.1%. Subcutaneous fat decreased 39.0% in female subjects in their 40s. **Conclusion** The results of this study showed significant decrease of visceral fat and subcutaneous fat in the abdominal area and the difference of basal metabolic rate by applying low-frequency rotating stimulation treatment with no change in muscle mass. Low-frequency rotating stimulation treatment may be an option to have effects not only in improving obesity.

T5:S33:07

Determinants of dietary behavior and physical activity among Canadian Inuit: A systematic review

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Background: Increased dependence on Western diets and low physical activity have largely contributed to weight gain and associated chronic diseases in the Canadian Inuit population. The purpose of this study was to systematically review factors influencing dietary and physical activity behaviors to guide health promotion interventions and provide recommendations for future studies.

Method: We conducted a systematic literature review to identify relevant articles. Searches were conducted between May 2014 and July 2014 using four databases: PubMed, PsycINFO, SocINDEX, and Psychology and Behavioral Sciences Collection. Eligible studies focused on diet and/or physical activity or determinants of diet and/or physical activity, and were published in English. **Results:** A total of 45 articles were included in the analysis. A detailed appraisal of the articles suggested that many Inuit have disconnected from the traditional ways of life, including harvesting and processing of traditional food species and the associated physical activity. In the last two decades there has been a significant shift from consumption of healthy traditional foods to energy-dense store-bought foods particularly among younger Inuit (<50 years of age).

Conclusion: Prospective studies are needed to advance the knowledge of the cognitive and environmental determinants of Inuit energy balance-related behaviours. These studies can inform the development of health promotion interventions in the population.

T5:S33:08

The effectiveness of maternal dietary interventions during pregnancy on obesity in offspring: A systematic review and meta-analysis

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Background: Childhood obesity is a potential risk factor for many medical conditions later in life.

Aims: We conducted a systematic review of randomised controlled trials (RCTs) assessing the effectiveness of dietary interventions during pregnancy on adiposity status in offspring. Included RCTs had a min. of 1-month follow-up post gestation. We searched CENTRAL, MEDLINE, SCOPUS, WHO's Int. Clin. Trials Reg., E-theses and Web of Science. Study quality was evaluated using the Cochrane's risk of bias tool.

Results: A total of 12 RCTs were identified and grouped by intervention: fatty acid supplements, Probiotics supplements, life style change and low glycemic index (GI) diet. Only one study was identified for both life style and low GI diet, so these are not reported. Six studies supplemented fatty acids (n=1512 children) and four probiotics (n=1610 children); all were heterogeneous in type and duration of supplementation and follow-up. A random-effect model showed no effect of maternal fatty acid intake on BMI in offspring (SMD:0.013, 95% CI:-0.16-0.18, I²:0%, n=520) and fatty acid supplementation did not also significantly affect other adiposity-related measures. Probiotic use in pregnancy did not protect children against obesity (RR:0.36, 95% CI:0.03-3.9, I²:54.8, n=485) or being overweight (RR=0.73, 95% CI:0.40-1.36, I²:0%, n=485).

Conclusion: There is no evidence that maternal supplementation of fatty acids or probiotics has a beneficial effect on adiposity in children.

T5:S33:09

Effect of energy restricted diet on weight and FBS of patients with type 2 diabetes

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Obesity is of major pathogenetic importance to type 2 diabetes; it contributes to poor glycemic control and increases the risk of chronic complication of this disease. Healthful eating pattern, regular physical activity, and often pharmacotherapy are key components of diabetes management.

This study aimed to investigate the effects of an energy restricted and healthy diet on weight and glycemic control of diabetic patients.

This cross-sectional study carried out on 119 diabetic patients, aged 26-77 years from both genders who referred to one of private diet therapy clinic in Tehran from December 2012 to April 2014. Information on medications, socio-economic status, diet and physical activity level was obtained from questionnaires. Weight, height, and waist and hip circumferences were measured in the standard method in the first visit. They have been referred to one of laboratory for measuring FBS. They received an appropriate energy restricted diet based on their adjusted ideal body weight for four month. All of them advised to walk 20 minutes/day. Anthropometric measures and FBS were measured again after one and four month. They were requested to don't change their physical activity during this period.

Patient's weight significantly decreased after intervention $p < 0.001$ (77.91 ± 13.4 for baseline, and 76.7 ± 12.9 , 76.3 ± 12.7 for the first and the second measurement after intervention, respectively), also all pairwise comparison were significant after adjusting for multiple comparisons. FBS level reduced significantly from baseline $p < 0.001$ (181.2 ± 65.9 , 146.48 ± 47.9 , and 142.56 ± 43.6) and significant reduction was observed in waist circumferences ($p < 0.001$).

The marked improvement in weight and FBS of T2DM was primarily due to the healthy and energy restricted diet and they are effective on weight and glycemic control in T2DM without any complication.

The authors declare no conflict of interest in regard to this abstract.

T5:S33:10

Eating behavior associated with weight regain after dietary intervention in obese female

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Eating behavior is referred to as one of the components of weight management. The three-Factor Eating Questionnaire (TFEQ) measures uncontrolled eating, emotional eating, and cognitive restraint eating behavior. The aim of this study was to test the association of eating behavior with weight loss and weight regain after dietary intervention in obese females. A total of 29 obese females (mean age: 50.1 ± 8.8 years, mean BMI: 28.3 ± 3.3 kg/m²) were included in this study. Eating behavior using the TFEQR, which measures uncontrolled eating, emotional eating, and cognitive restraint eating, was tested for its association with weight loss (baseline to 3 months) and weight regain (3 to 15 months). All subjects received a low-calorie diet for weight loss, replacing one daily meal with a soy-based drink (180 kcal of calories; total fat: 1.5 g, carbohydrate: 16 g, and protein: 25 g) for 2 months (weight loss phase). After 1-month supplementation, subjects were followed for 12 months (weight maintenance phase). The mean weight loss in the weight-loss phase was -4.6 ± 2.3 kg and the mean weight gain in the weight maintenance phase was 1.6 ± 3.6 kg. Uncontrolled and emotional eating scores at the baseline were associated with weight regain, although the cognitive restraint eating score was associated with weight loss. Information on eating behavior may help identify people who require additional support to maintain a reduced bodyweight after dietary intervention in obese females.

T5:S33:11

Tools of the trade: Feasibility of employing a novel pathway for the identification, assessment and management of childhood obesity in the clinical care setting

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The "Pathway for the Identification, Assessment and Management of Overweight and Obese Children & Youth" was developed to support health care providers in identifying and treating childhood obesity in British Columbia. The study aimed to determine the feasibility and effectiveness of using the Pathway in clinical settings.

Methods: 13 health care providers (7 family physicians, 2 pediatricians, 2 registered dietitians, and 2 nurse practitioners) assessed the Pathway and participated in semi-structured interviews. A direct constant comparative analysis guided the coding of the interviews in the NVivo 9 qualitative software.

Results: Constraints to implementation included: capability of providers (lack of knowledge, skills, and self-efficacy to assess readiness to change and requiring experiential training to use motivational interview techniques); providers feared their involvement may be “harmful” or not helpful; and environmental barriers within: a) their Organization (lacking information system e.g., computing percentile body mass index; and lacking infrastructure delivery system e.g. staff and resources), b) their Community (lacking access to sanctioned referral programs & specialists), and c) the Province (policies for visits and billing).

Conclusion: Health care providers should be involved in screening and managing childhood obesity. Addressing the challenges found in this study will enable health care providers to take a more active role in treating childhood obesity.

T5:S33:12

A study on the usefulness of iPhone/iPad applications to monitor the health in Japan

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Background/Purpose: iPhone/iPad application (app) might offer a novel way to self-monitor the health of the public, however, little is known about its usefulness. We created the app for monitoring the food balances, daily activity, and weight by of a person using a published food and dish database freely in Nov. 2012. Until Nov. 2014, over 6,000 people registered as users. The purposes of this study were to clarify the characteristics of the users, and to examine the usefulness of this app.

Methods: User's characteristics were assessed by information of app registration. Usefulness of the app was assessed by a questionnaire (n=30).

Results: The registered users were 5,096 females, and 945 males, and 20's were 39% and 10's were 20% of the total users. While 74% of users used this app in less than 10 days, 111 users used more than 100 days continuously. Obese males (BMI>25) were 34%, underweight females (BMI<18.5) were 17%. 18% of users used a weight recording function during the past two months.

According to the web questionnaire, 37% of users perceived themselves as being overweight, and 10% experienced the dieting restriction repeatedly. The main motivation for use of this app was health management (47%) and dietary restriction (20%). About 93% of the users thought this app were useful to monitor their health.

Conclusion: This app has a potential to monitor the health of the public conveniently. Future efforts should focus on effectiveness for continuous health education.

T5:S33:13

Prevention of insulin resistance by micronutrient-enriched canola oil during a high fat challenge

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Insulin resistance (IR) favors the progression of metabolic syndrome (MetS) and increases the risk of type 2 diabetes. IR results from metabolic dysfunctions, oxidative stress and inflammation

caused by ectopic fat depots. We studied the effect of canola oil enriched with micronutrients naturally present in canola seed on IR and MetS during a high fat (HF)-challenge. Rats were fed with a HF diet containing 30% of lipids, mainly derived from palm oil (diet P), or from a mixture of palm and canola oils (60:40, diet C). In 2 groups of animals, diet C was further supplemented with alpha tocopherol, CoQ with or without Canolol, (diets CMC & CM respectively). Insulin sensitivity and glucose tolerance were assessed after 10 weeks. HF animals were compared to control animals receiving a standard diet. All groups receiving a HF diet gained significantly more weight compared to control. Similar results were obtained for fat depots. Glucose tolerance was altered in P and C groups and improved in CM and CMC. Insulin sensitivity was not different between control and P groups, but was higher in CMC group compared to controls. A reduced activation of PDK4 and Srebp1c expression was observed in skeletal muscle in CM group. In conclusion, the proportion of AGPI could not prevent metabolic disturbance induced by a HF meal. Enrichment with natural micronutrients could prevent insulin resistance and glucose intolerance which could be mediated by a better glucose oxidation in skeletal muscle.

T5:S33:14

Frequency of nutritional consultation in obesity: Impact on weight, waist circumference and body fat

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Background: Obesity, being a long-term condition, requires consistent monitoring and adjusting of diet therapy. Regular face-to-face contact between nutritionist and patient can have a positive impact on the management of this disease.

Aims: to assess the impact of consultation frequency on weight loss and changes in body fat and waist circumference of obese patients.

Key Methods: a total of 200 obese patients (46 males and 154 females) aged 18 years and over were followed up for a 12 month-period at the Yaounde Military Hospital. Weight, body fat and waist circumference were assessed at each visit.

Results: Inverse and significant correlations were found between the consultation frequency and reduction of body mass index ($r=-0.30$, $p<0.0001$), body fat ($r=-0.22$, $p<0.001$) and waist circumference ($r=-0.19$, $p<0.001$). Patients who attended 3 to 5, 6 to 8 and 9 and more clinic visits reduced the weight by 5,4±7.4 kg, 7,1±7.4 kg and 11.1±7.6 kg, respectively. The reduction of body fat was 2.0±4.0%, 2.2±4.0% and 4.3±4.3%, respectively. As well, waist circumference decreased by 5.4±7.5 cm, 7.4±7.1 cm and 8.1±15.4 cm, respectively.

Conclusion: These findings suggest that higher nutritional consultation frequency can be a useful measure to improve the management of obesity.

T5:S33:15

A brief digital health intervention for parents to prevent childhood obesity in primary care: Preliminary findings from a randomized controlled trial (RCT)

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Objective: To determine if a novel screening, brief intervention and referral to treatment (SBIRT) digital health intervention offered in primary care influenced parents' (i) concern about children's weight status, and (ii) readiness to change children's lifestyle behaviors.

Methods: Parents of children in a primary care clinic waiting room were block randomized to complete (via tablet) one of four brief (~10 minutes) interventions (n=2 on nutrition; n=2 on physical activity) or to a control group. Children's measured height and weight were used to calculate body mass index and weight status. Parents reported their concern about children's weight status and readiness to change children's lifestyle behaviors.

Results: Parents (n=226) of children (9.9±3.4y; 67.3% healthy weight) were primarily biological mothers (85.8%) and Caucasian (70.4%). Parents' concern about children's weight status varied across groups (F=2.6; p=0.04), but *post hoc* analyses for pairwise comparisons only trended towards significance for one nutrition group. Parents' readiness to change children's lifestyle behaviors did not differ across groups.

Conclusion: Parents in one nutrition group tended to report greater concern about children's weight status, but readiness to change did not differ by groups. Data at one-month follow-up are being collected to examine if parental concern and readiness explain whether parents access resources, which were offered through our SBIRT, to prevent childhood obesity.

T5:S33:16

Incorporating asset-building into a school-based obesity and eating disorder prevention program: Complementary or complicated?

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Background: Researchers are increasingly recognizing the benefits of developing prevention programs for adolescents that target obesity and eating disorders while enhancing resilience. The developmental assets framework is composed of assets that have been consistently associated with high resilience and positive health behaviours.

Aim: This study examined the effectiveness of a universal prevention program that aimed to strengthen assets and reduce five shared risk factors of obesity and eating disorders through teacher-led classroom activities called *Body Image Kits*.

Method: Participants (n=447) in grades 7-9 completed surveys on measures of self-esteem, body satisfaction, teasing, disordered eating, internalization of media ideals, and assets at baseline, post, and follow up. One school participated in the program while the other two schools served as a combined control group. Teachers

and parents were offered workshops on how to prevent weight-related issues in students. Generalized Estimating Equations were used to examine between-group differences in risk factors and assets over time.

Results: The intervention group experienced less disordered eating at post and greater positive identity overall compared to the control group. No significant effects were found on the remaining risk factors or asset areas.

Conclusions: Implications and recommendations for engaging teachers and parents and facilitating sustainable change at home and school are provided.

T5:S33:17

Acute effects of monounsaturated (oleic acid) and saturated (palmitic acid) dietary fats on 24hour energy metabolism

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Compared with monounsaturated acid, saturated fatty acid decreases fat oxidation and diet induced thermogenesis, resulting in fat accumulation, although there are some inconsistencies among the literature. Potential limitation of the previous studies is a short duration of the calorimetry. Aim of the present study was to examine acute effects of monounsaturated (oleic acid: OA) and saturated (palmitic acid: PA) dietary fats on 24hour energy metabolism.

Eight males participated two sessions of indirect calorimetry in a whole-room calorimeter. In each session, subjects consumed high-oleic acid diet (HOAD: 42% of energy as fat, 57.6% as OA, 7.8% as PA) or high-palmitic acid diet (HPAD: 42% of energy as fat, 37.6% as PA, 41.6% as OA) in three meals. Core body temperature was monitored using an ingestible telemetry pill systems.

Significantly RQ was decreased and fat oxidation was increased after breakfast and lunch in HOAD condition compared with those of HPAD. Fat oxidation over 24hour was also enhanced (P=0.08) in HOAD, suggesting a decreased fat accumulated from dietary fat. The present results suggest that a diet rich in saturated fatty acid stimulates body fat accumulation compared with that rich in monounsaturated fatty acid. It has been shown that a diet rich in saturated fatty acid delays biological clock. Although diurnal rhythm of core body temperature of some subjects was delayed by HPAD condition, the difference did not reached a statistica

T5:S33:18

Physical education classes

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Physical education classes are nonexistent in Saudi girls' curriculum at all educational levels and physical activities are not permitted at public schools. The study aimed to assess physical activities for female students in intermediate and high schools. A questionnaire was completed by 1519 participants from 18 schools in Jeddah City. Activities at school and after school were reported. About 63% of the girls preferred to have physical education classes at school. Girls thought that they were performing (43.2%) enough physical activities and (74%) rated themselves as performing an average level of physical activity in comparison with their peers. Only 32% linked the importance of physical activities to their health.

Cars are the main transportation methods to and from school (87%) and 8% walked to school. Some physical activities (59.2%) are performed at school [walking during break times (42%) or running (5.2%)]. Only 40% were involved in light activities after school while 54% participated in washing up or cleaning the house. Other activities outside school, e.g. walking, shopping, bowling, horse riding and table tennis was reported by 48% of the participants. Moderate activities such as swimming, cycling, dancing, or competitive running was reported by 70% of the respondents. Only 13% joining fitness centers. Results emphasized the central role and obligation of decision makers in protecting young consumers through providing a healthy environment in schools

T5:S33:19

Paying people to lose weight: A systematic review of the effectiveness of financial incentives for weight loss provided by health insurers

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The increasing rates of overweight and obesity is of concern to governments and private health insurers who bear the associated health care cost. This research aims to determine the effectiveness of personal incentive programs related to obesity prevention offered by health insurers.

A systematic review was conducted to identify evidence of the effectiveness of financial incentives provided by health insurers to promote change in diet, physical activity and weight.

Seventeen studies were included in the literature review. Effectiveness of financial incentives to achieve weight loss were mixed. The strongest evidence indicated that incentivising weight loss as compared to physical activity or dietary behaviours are more effective in inducing weight loss. Programs that incentivised weight loss resulted in increased weight loss compared to standard weight loss programs (1.2-6.35kg over 3-13 months); however weight loss was not maintained after incentives ceased.

Incentive design also varied across studies. The findings suggest that the size of the incentive has a positive impact on effectiveness but the relationship is not linear and is affected by other variables such as incentive design and the effectiveness of the supportive behaviour change strategies implemented with the incentive.

Incentive programs have the potential to be effective. This review will inform the modelling of the cost-effectiveness of incentives provided by private health insurers.

T5:S33:20

Predictors of adequate lifestyle counselling by health professionals in a region of Quebec in Canada

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Evidences show that lifestyle counselling by health workers can prevent chronic diseases and obesity in the population. The aim of this study was to identify predictors of adequate lifestyle counselling by health professionals. A phone or web survey

covering counselling received in the last 12 months was completed by a representative sample of 8737 adults of the Eastern Townships, Quebec, Canada. Active smokers reported the highest rate of counselling (n=1175, 43% received advice about tobacco cessation). The groups with the lowest rate of counselling were individuals who eat less than 5 portions of fruits and vegetables daily (n= 4907, 15% received guidance about diet) and those with excessive alcohol drinking (n=915, 17% received advice about alcohol intake). In the BMI>30 subgroup (n=1568), only 33% received counselling on weight loss, 24% on diet, 29% on exercise and 11% on stress management. The strongest predictor to receive at least one type of advice was to meet a dietician in the last 12 months (OR 7,30). Having access to a family physician was also an important predictor of all types of counselling when analysed separately. Results show that lifestyles counselling rates remain low in the general population. Also highlighted is the fact that more actions are needed to help health professionals in their counselling practice. An interdisciplinary approach may be a good avenue to tackle behavioural risk factors for chronic diseases that are closely linked with obesity.

T5:S33:21

Improved eating behaviours mediate weight gain prevention of young adults: Moderation and mediation results of a randomised controlled trial of TXT2BFIT, MHealth program

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Explanatory evaluation of interventions for prevention of weight gain is required beyond changes in weight, to determine in whom the intervention works and underlying mechanisms of change. Participant characteristics may moderate intervention effects on weight and improved eating and physical activity behaviours may mediate the relationship between intervention and weight change. In our RCT, young adults at risk of weight gain (n=250) were assigned either to an intervention group that received a 3-month mHealth (TXT2BFIT) program with 6-month maintenance or to a control group. Data were collected via online self-report surveys. Moderators and mediators of the intervention effect on weight were independently assessed in PROCESS models for 3 and 9-month weight change. Gender, age group, and income moderated intervention effects on weight at 3-months (Ps<0.04) with larger effects for males, those aged in mid-20s or with higher income. Gender was the only significant moderator at 9-months (P=0.02). Intervention to weight change path at 3 (-1.12kg) and 9-months (-1.38kg) were significant within mediator models (Ps<0.01). Indirect paths explained 39% (0.72/1.85kg) and 40% (0.92/2.3kg) of total effect on weight at 3 and 9-months, respectively. Increased vegetables and decreased sugar-sweetened beverages accounted for the largest components of the indirect weight effect. Thus, our program is suitable for most subgroups and partially explains how the intervention achieved weight loss.

T5:S33:22

Measuring food environment in tertiary education settingsRoy, R.^{*1}; Hebden, L.¹; Kelly, B.²; De Gois, T.¹; Ferrone, E.M.¹; Samrout, M.¹; Vermont, S.² and Allman-Farinelli, M.¹¹The University of Sydney; ²The University of Wollongong

The food environment that people are exposed to influences their dietary behaviors. More young adults are becoming overweight and obese in Australia, UK, and the USA. Evidence is needed to guide interventions to reduce obesity-promoting elements in tertiary education settings. A scoring instrument was developed to collate information on availability, accessibility and promotion of foods and beverages. A total score between 0 (least healthy) to 148 (most healthy) was calculated and outlets ranked into tertiles based on "healthiness". Two hundred and fifty-two outlets were audited across seven institutions; (3 universities and 4 technical and further education (TAFE) campuses). Scores for each outcome measure were compared using one-way ANOVA. Logistic regressions were used to compare the proportion of healthy and unhealthy options within outlet types. Median score across outlets was 72 (IQR = 7). Most frequently available items were sugar-sweetened beverages (20%), chocolates (12%), high-energy (>600 kilojoules/serve) foods (10%), chips (10%), and confectionery (10%). Unhealthy options were more likely to be available (OR=5.5, 95% CI 1.21 - 25.05, P < .05), accessible (OR=13.6, 95% CI 1.46-126.5, P <0.05) and promoted (OR=0.02, 95% CI 0.00 - 0.036, P <0.05) than healthy options in lower scoring outlets such as convenience stores and vending machines. Tertiary education settings are dominated by unhealthy foods/beverages and environmental changes in these settings are warranted.

T5:S33:23

Active school transportation and stroller use in kindergarten children in Toronto, CanadaRothman, L.¹; Macpherson, A.¹; Howard, A.²; Parkin, P.C.³; Richmond, S.A.⁴ and Birken, C.S.^{*3}¹Faculty of Health-School of Kinesiology & Health Science, York University, Toronto, Canada; ²Child Health Evaluative Sciences, SickKids Research Institute, Orthopaedic Surgery, University of Toronto; ³Department of Paediatrics, University of Toronto, Child Health Evaluative Sciences, SickKids Research Institute; ⁴Child Health Evaluative Sciences, SickKids Research Institute

Background: Physical activity promotion in children is important to encourage lifelong healthy lifestyles. Little is known about active school transportation (AST) and stroller use as sedentary travel devices of kindergarten students. Recent recommendations by several professional associations have discouraged stroller use due to concerns their use may lead to reduced physical activity. Few studies have used direct observation to examine AST in young children.

Objective: To determine the prevalence of active school transportation and stroller/wagon use in kindergarten children in Toronto elementary schools and compare to that of students of all ages (kindergarten- grade 6).

Methods: Two samples of transportation mode observational counts were conducted in the spring, 2015 at elementary schools at: 1) kindergarten entrances (n = 26); 2) at general school entrances for all ages (n = 88). Proportions arriving by different modes were compared using Chi-square statistics.

Results: Active mode use was lower in the kindergarten (n = 26) compared to the all-age sample (n = 88, 60% versus 74%, Chi-square = 91.37, p <0.001). The predominant sedentary travel mode was car (38%). Less than 2% of kindergarten children used strollers or wagons.

Conclusion: Observed AST was significantly lower in kindergarten students compared to all ages with few children using stroller/wagons. Interventions to promote AST in children of all ages should be developed and evaluated.

T5:S33:24

Do 'Sporting' agendas limit primary school aged Girls' physical activity?

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Background: Only 16% of girls meet the minimum guidelines for physical activity (PA) in the UK (Scholes & Mindell, 2013). The concern is with whether school environments meet the needs of girls and the impact this has on engagement in PA.

Aims: This study aimed to understand what young girls value in PA and the relationship this has with provision, both structured (physical education) and unstructured (free play).

Key Methods: Drawings are a key method of representing subjective experience (Everley & Macfadyen, 2015). 33 girls aged 6-10yrs drew themselves being physically active and were interviewed about their drawings and engagement in PA in school environments.

Results: Results showed that 94% (n=31) of girls identified non-sporting contexts as of key importance. Girls valued interacting with family and friends and engaging with natural environments as important; cultural associations of 'sport' and in particular football played by boys in recess, created perceived barriers to PA. This contrasted with sports based provision being offered by schools and the dominance of boys in social spaces during free play. **Conclusions:** Where increasing the PA of girls is desirable, reconsideration of opportunities in school contexts is required: interactive, outdoor explorative opportunities in natural environments have greater potential to encourage engagement. Supporting the creation of designated physical space for different activities would be a

T5:S33:25

Primary school aged boys and physical activity in school environments: Subjective experiences and the place of 'Sport' in social identity

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Background: Only 21% of boys meet the minimum recommended guidelines for physical activity (PA) in the UK (Scholes & Mindell, 2013). As fields of compulsory attendance, schools are charged to promote children's engagement in PA. Understanding subjective experiences of children will facilitate the targeting of opportunities.

Aims: This study aimed to understand what young boys value in PA and the relationship this has with provision, both structured (physical education) and unstructured (free play).

Key Methods: Drawings are a key method of representing subjective experience (Everley & Macfadyen, 2015). Boys (n=50, aged 6-10yrs) drew themselves being physically active and were interviewed about their drawings and engagement in PA in school environments.

Results: Results showed 92% (n=46) depicted themselves in 'sporting' contexts with a dominance of team games (84%) and

soccer (82%). Where played in all school contexts, boys emphasised their cultural and social significance. Embedded in participation was the creation of conforming identities; problematic for some. Desired activities were consistent with provision in school.

Conclusions: Schools are providing appropriate opportunities for boys to be physically active. However, the association between identity and participation promotes a particular type of involvement that may not support lifelong engagement and excludes or limits the involvement of those unable to access culturally dominant activities due to social or physical factors

T5:S33:26

Socio-economic patterns in adolescents' dietary and physical activity behaviors and intentions

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Understanding adolescents' lifestyle behavior patterns is key in developing effective healthy lifestyle programs for this group. This study examined socioeconomic status (SES) differences in Year 8 students' (13-14 year olds) reported dietary, physical activity and recreational screen-time behaviors, and associated behavioral intentions, against Australian guidelines. Data were collected from Year 8 students (n=2,538; 84%) from 23 secondary schools recruited to participate in the Students As LifeStyle Activists (SALSA) program. Schools' SES was categorized as at or above average, or below average. Data were analyzed using generalized estimating equations with SES incorporated into a main effects model. Students' [at or above average SES (%); below average SES (%)] compliance with guidelines was: daily breakfast eating [61%; 46%] (P<0.001), >2 fruit serves/day [55%; 49%], >5 vegetable serves/day [12%; 11%], <2 hrs/school day screen-time [56%; 55%] and >60 minutes moderate-to-vigorous physical activity/day [19%; 20%]. Students' intentions for the next month were: eat breakfast daily [74%; 61%] (P<0.001), >2 fruit serves/day [69%; 64%], >5 vegetable serves/day [21%; 18%] (P<0.05), be physically active on all/most days [74%; 72%] and reduce screen-time [36%; 38%]. SES differences were not present for all behaviors. As breakfast skipping can negatively impact on educational outcomes and nutrition, students from below average SES schools may need extra support to eat breakfast daily.

T5:S33:28

Maintaining levels of physical activity (PA) among 9-11 y old children is a challenge. Evidence from SALTEN, a school-based obesity prevention intervention in Argentina

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Introduction: SALTEN! is a 2-year school-based intervention aimed at improving healthy eating and PA in public school children of grades 4 & 5.

Objectives: Assess the effectiveness of the intervention in preventing the natural decline in PA.

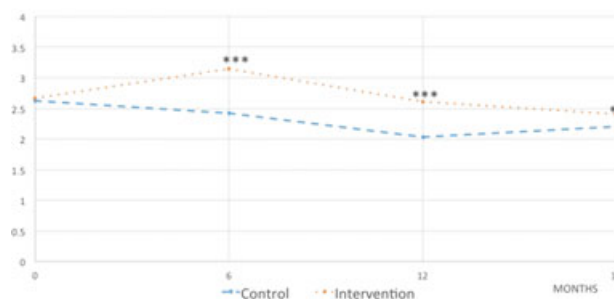
Methods: Eight schools of Moron, Argentina, were randomized (1:1) to Intervention (I) or to Control (C). The intervention: playgrounds were re-designed to promote 30 minutes of

unstructured moderate-to-vigorous PA during school-breaks; a PA instructor acted as facilitator, and an educational component encouraging PA was included in the curricula. PA was assessed by a validated culturally adapted and modified version of the Child and Adolescent Physical Activity and Nutrition Survey at baseline, 6, 12 and 18 months. BMI-z score was calculated from measured weight and height.

Results: 760 students, 424 (I) and 336 (C), were enrolled. Mean age 9.5 y. After 18-m both groups presented a small reduction in BMI-z [C: -0.052 (95% CI: -0.115, 0.012); I: -0.056 (95% CI: -0.104, -0.007), I vs C not significant]. Figure shows mean number of weekly-unstructured vigorous PA activities in each group. Patterns were different in the two groups (interaction: p<0.001). A clear negative trend was detected in controls [12-m mean decrease: -0.31 (-0.41, -0.21), p<0.0001].

Conclusion: An important trend to decrease PA with age was observed among 9-11 y old children. SALTEN contributed to diminish this trend and maintain levels of PA during the intervention year

Number of weekly unstructured vigorous PA



T5:S33:29

Does access to and use of TVs, computers, tablets, video games and cellphones before bedtime affect sleep and body weight of children?

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The use of electronic entertainment and communication devices (EECDs) including TVs, computers, tablets, video games and cellphones, has been suggested to affect sleep. Poor sleep quality and short sleep duration have been proven to increase the risk for obesity. We sought to determine how access to EECDs in the bedroom, use of EECDs during the hour before sleep, and reading books (an established soothing activity) during this hour, influence sleep quality, sleep duration and body weight status. A population-based survey amongst 2,334 grade 5 students was conducted in randomly selected elementary schools in Canada. Sleep quality was 24% less (OR=0.76, 95%CI: 0.69-0.83) and 33% less (OR=0.67, 95%CI: 0.61-0.74) for those who reported access and use of computers and cellphones, respectively. Access to and use of a TV, computer, or cellphone shortened sleep duration in a statistically significant manner. Relative to children without access to and use of a computer or cellphone, those with access and usage were approximately twice as likely to be obese (OR=2.03, 95%CI: 1.72-2.41 and OR=2.60, CI: 2.20-3.08 respectively). Children who reported reading during the hour before sleep displayed better sleep

quality (29%), longer sleep duration and a lower probability of obesity compared to children who did not read. Restricting access to EECs in bedrooms and promoting reading of books before sleep are recommended strategies to improve sleep and to reduce the burden of childhood obesity.

T5:S33:30

Diet quality as measured by diet quality index-international is associated with changes over time in body Fat among Canadian children

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Various studies among children have identified diet as a determinant of adiposity, but none has studied how diet quality affects temporal changes in body fat. We quantified the magnitude of the association linking diet quality with changes in body fat over two years in a cohort of Canadian children. Children aged 8-10 years from a prospective cohort of Caucasian families in Quebec (QUALITY cohort) underwent examination at baseline and 2-year follow-up (n=546). Diet quality was assessed by the validated Diet Quality Index International (DQII) scoring system based on three consecutive 24-hour diet recalls at baseline. The total DQII score ranges from 0-100 (0 is the poorest and 100 is the highest possible score). Total and central body fat indices were calculated as Fat Mass Index (FMI) = total fat mass (kg)/height (m)² and Central FMI (CFMI) = trunk fat mass (kg)/height (m)² based on DEXA measures. Multivariable linear regression models that adjusted for age, sex, and Tanner stage showed that greater DQII score was associated with a decrease in CFMI ($\beta=-0.008$; 95%CI:-0.02, -0.0005), percent body fat ($\beta=-0.05$; -0.10, -0.002), and percent central body fat ($\beta=-0.03$; -0.05, -0.0008) over two years. Further adjustment with physical activity, measured through accelerometry, and total energy intake (kcal/d) did not change the results. Given that these effects accumulate over time, this finding suggest that improving diet quality in children may promote development of healthy weigh.

T5:S33:31

Implementation intentions intervention to promote fruit and vegetable intake in childbearing age women at risk for gestational diabetes mellitus: 6-month follow-up of a randomized controlled trial

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Background: Implementation intentions (II) are an effective strategy to promote healthy eating in adults.

Aims: To test the efficacy of an II intervention to promote fruit and vegetable (FV) intake in childbearing age women (18-44 years) at risk for gestational diabetes mellitus (GDM).

Methods: Eligibility criteria included having a body mass index ≥ 25 kg/m² and/or having a prior diagnosis of GDM. Women were randomly assigned to the experimental (EXP, n=24) and control

(CON, n=26) group. A questionnaire on beliefs concerning FV intake was administered to both groups. Women in the EXP group had to answer a second questionnaire in which they had to link perceived FV barriers to relevant solutions. FV intake was assessed using a self-administered questionnaire (Godin et al., 2008). The protocol included two visits at the research center (0 and 6 months) and a mailing at 3 months. The outcomes were FV intake, weight, waist circumference and fasting glycaemia at 3 and 6 months.

Results: A total of 50 women completed the first visit, 44 returned their questionnaires at 3 months and 40 completed the visit at 6 months. At baseline, women in the EXP and CON groups were similar in terms of age, FV intake, weight, waist circumference and glycaemia. At 3 and 6 months, the EXP group significantly increased its FV intake compared to baseline ($p=0.0050$ and $p=0.0145$, respectively).

Conclusions: II are an effective technique to increase FV intake among childbearing age women at risk for GDM.

T5:S33:32

Marketing and health-related labelling on the front-of-pack of milk and dairy products in Mexico

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Marketing and health-related labelling on the Front-of-Package (FoP) of food and non-alcoholic beverages may influence consumers' purchases and dietary behaviour.

The aim of this study was to investigate the extent and nature of labelling and promotion on the FoP of milk and dairy products sold in the major supermarkets in Mexico.

Pictures of the FoP of all 508 milk and dairy products available in 13 different supermarkets of 6 different cities in Mexico were collected between August 2014 and July 2015. The internationally standardized INFORMAS taxonomy was used to classify the health-related labelling components (e.g. claims) and marketing techniques. Descriptive statistics and χ^2 test were used; statistical significance was set at $p<0.05$.

Overall 67.9% of the milk and dairy products featured claims on the FoP, 67.3% displayed nutrition claims and 37% included a marketing technique. On average, each product showed more than one claim and three quarters of products had GDA. The most popular format of claim was verbal 85.9% compared to 7.4% symbolic 6.7% and numeric format. The most commonly used marketing technique was a promotional character such as cartoon/company characters.

Over the half of the products presented a nutrition or related claim, while the promotional technique more depicted was the usage of promotional characters. Our results caution against the excessive and confusing use of nutrition claims, especially on the verbal format, and encourage Mexican government to regulate their use.

T5:S33:33

A descriptive analysis of lunches served in New Brunswick and Saskatchewan childcare centres

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Over half of Canadian children under the age of 5 attend childcare centres for >30 hours per week. Childcare centres (CC) typically

offer one meal and snacks daily and can therefore contribute to children's recommended food and nutrient intake.

The aim was to describe the nutritional composition of lunches served in CC in two Canadian provinces, to compare them to recommendations, and to examine correlates of their nutritional quality.

This study included 51 randomly-selected CC in New Brunswick and Saskatchewan, Canada. CC lunches were measured on two consecutive days by weighing each food item served to preschoolers. Content in calories, macro- and micronutrients and in Canada's food groups was analysed using a food analysis software. Descriptive analyses were used to describe lunch content and compare it to guidelines. Correlates of the nutritional content of the lunches were assessed by univariate linear regressions.

None of the CC met recommended servings of fruit or vegetables and fluid milk. Lunches were low in calories (<517kcal) and in fibre (<7.0g), and contained considerable amounts of sodium (>400mg) and sugar (>5.0g). In New Brunswick, French language was associated with lunches higher in calories, fibre, fat, saturated fat, sodium and sugar.

Results showed that few CC offer lunches that meet nutritional recommendations. The quality of lunches served can vary depending on whether children attend French or English language CC, particularly in New Brunswick.

T5:S33:34

Dietary habits and nutritional knowledge among Indian college students

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Background: Rising rates of obesity and diabetes threaten India's growing middle class and its rates are rising among college students as well.

Aim: Assess the diet, exercise, and nutritional knowledge among Indian College students.

Methods: A nutritional knowledge questionnaire was developed at the University of Iowa. The instrument covered topics including general health, knowledge of foods, dietary habits, and nutrients. The instrument was validated in India and administered along with a food frequency questionnaire developed at RVS. 2000 college students completed the instrument anonymously and electronically. The results were compiled in a database and descriptive statistics were used to spots trend in the group responses.

Results: Most students eat 2-3 meals a day and make an effort to monitor their weight. Binge eating was reported in less than 30% of students, however missing meals occurred more frequently. 68% of Health, 56% of the dietary practice responses were accurate.

Conclusion: The students who took part in the study demonstrated a high general knowledge of nutrition. Behavior and education efforts that focus on micronutrients, exercise, and diabetes may benefit participants the most. The data suggest students are already familiar with good practices; learning modules should elaborate on mechanisms of health benefits. Dietary patterns data suggest that future efforts should focus on encouraging students to control portion sizes and avoid skipping meals.

T5:S33:35

Prevalence of price promotions for food and beverage products in a nationwide sample of US food stores, by store type, product healthfulness, and package size

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Background: Food and beverage price promotions (discounts) may be potential targets for obesity prevention initiatives but have not been well documented.

Aims: Study objectives were to assess prevalence and patterns of price promotions for food and beverage products in a nationwide sample of food stores and to assess associations of price promotions with community characteristics and shelf prices.

Methods: Data were collected in 2010-2012 from 8,959 food stores in 468 communities spanning 46 US states. Differences in prevalence of price promotions were tested by store type, product package size, and product healthfulness. Multivariable regression analyses examined associations of prevalence with community racial/ethnic and socioeconomic characteristics and shelf prices.

Results: Average prevalence of price promotions across all 44 products sampled was 13.4% in supermarkets (range 9.1% for fresh fruits and vegetables to 18.2% for sugar-sweetened beverages), 4.5% in grocery stores (range of 2.5% to 6.7%), and 2.6% in limited service stores (range of 1.2% to 9.5%). No differences were observed by community characteristics. Price promotions were generally more common for less-healthy versus more-healthy products and larger versus smaller package sizes. Supermarket price promotions were associated with 15.2% lower shelf prices than when not promoted. **Conclusion:** Patterns of price promotions warrant more attention in research on obesity promoting factors in food environments.

T5:S33:36

Gonadal axis hormones in breast cancer: pre and postmenopausal obese women

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Obesity in women is a definite risk factor in breast cancer (BC), due to hormonal imbalance which is mainly related to excessive exposure of mammary tissue to circulating estrogen hormones.

The study compared plasma reproductive hormones in obese BC women during the premenopausal (PrBC) and post menopausal (PoBC) periods, under chemo or hormone therapy.

81 women were recruited, 54 (30 PrBC and 24 PoBC) treated for ER/PR+ prognosis with adjuvant chemo or hormone therapy, and 27 healthy (17 PrC and 10 PoC) as controls. Body mass index (BMI), lipidemia, CRP score assessed by latex agglutination and plasma estradiol, testosterone, androstenedione, DHEA-S, LH, FSH, PRL estimated by RIA were analyzed.

The prevalence of obesity (BMI≥30) in PoBC vs PrBC groups was 50% and 35% respectively, associated to dyslipidemia in obese PoBC patients, whereas CRP score ≥6 reveals an inflammatory state among 36% of PoBC and 48% of PrBC. Estradiol level was lower in PoBC (p=0.05), as well as testosterone and androstenedione in

both PrBC and PoBC, while DHEA-S is decreased in PrBC ($p=0.037$) and increased in PoBC ($p=0.031$). LH and FSH show the same profile, but FSH level is higher in PrBC ($p=0.01$) compared to controls.

The decrease of oestradiol levels appear to be more efficient in non obese PoBC patients (BMI \geq 30) and was probably correlated to leptin/adiponectin ratio. To improve the percentage of remission, we suggest to combine hormone therapy with strict diet and exercise schedule in obese patients.

T5:S33:37

The effectiveness of a Soy-yoghurt-honey meal replacement diet against overweight and obesity and related health risk (ACOOHR) - results of an interim analysis

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It is shown that a meal replacement (MR) diet, high in soy protein is more effective in improving body composition and risk factors than conventional lifestyle changes. To confirm this, a 1- year multicenter RCT for overweight patients (ACOOHR) was designed to evaluate the effects of a low-glycemic, soy-protein-rich product (Almased®) in a meal replacement strategy.

Meanwhile (key date 1st Sept. 2015), 263 non-diabetic participants (BMI 27-35 kg/m², 21-65 yrs) with at least one criterion of the metabolic syndrome were randomized into a supervised MR diet group (A) or a telemedically controlled lifestyle group (B). For 181 of the 263 participants paired data were available after 12 weeks of intervention (interim analysis); primary target variable was total body weight (BW), secondary targets included BMI, WC, FM and skeletal muscle mass, fasting insulin level, HbA_{1c}, Apo B, leptin.

The outcome values of group A (n=125) and B (n=56) were tested for differences in baseline vs. after 12 weeks of intervention. Significantly higher differences ($p=0.001$) were observed in anthropometric variables in group A (A: BW -6.6 \pm 3.90kg, BMI -2.3 \pm 1.39kg/m², WC -7.0 \pm 4.61cm, FM -5.4 \pm 3.47kg; B: BW -4.2 \pm 5.86kg, BMI -1.3 \pm 1.41kg/m², WC -4.8 \pm 4.32cm, FM -4.0 \pm 3.59kg).

The results demonstrated significant benefits of the meal replacement strategy for weight control. Results for weight management (12 months) and metabolic variables will be presented in the second half of 2016.

T5:S33:38

Antidiabetic impact of stevia rebaudiana addition into glicemic index confectionery product

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Introduction: The consumption high glycemic index (GI) food products among population with decreased insulin resistance should be lowered. The replacement of sugars by *s. rebaudiana* and its influence on glycemic index has not been investigated yet. **OBJECTIVES:** To study the impact of the sugars replacement by *s. rebaudiana* addition on it glycemic index. **METHODS:** The GI was calculated basing on the incremental area under the curve of

glycemic response after consuming the product containing 50 g of digestible carbohydrates to the area under the glucose response curve when consuming the reference product. Marshmallows were prepared with stevia rebaudiana instead of 30 percentage of sugar reduction and a product control (100% sugar). and glycemic index was evaluated. In total 15 healthy subjects were included into the study. **RESULTS:** Mean value of GI marshmallows included 30 % replacement of sugar presented 42% GI decrease. The mean value of GI marshmallow included stevia was 34 vs 59 included sugar. Additionally stevia sugar replacement has allowed significantly reduced caloric content of the tested product. **CONCLUSIONS:** The results confirm the assumption that stevia can be used in the production of foods with decreased GI and low calorie foods. The favorable changes in GI level of studied product provide the basis to future studies

T5:S33:39

Shaping of the nutritional value and antiradical potential of phytochemicals enriched food products for obese consumers

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Background: WHO indicates that obesity, next to diabetes are two of the most common and dangerous diseases, that is why food market demands new low calories with high nutritional and biological value products. Modern consumer highly appreciates food, that besides its basic nutritional function, possess also significant prophylactic and therapeutic potential.

Aim: Study aimed at designing low calories snacks enriched with phytochemicals.

Key methods: Snacks were prepared with use of a combination of whole grain buckwheat flour, freeze-dried rose fruits, collagen peptides and stevia leaves, selected as the source of valuable for human health bioactive components, as well as low calories products. Samples were evaluated with nutritional value (lipids, protein, fiber, carbohydrates, vitamin C and total polyphenols content), antiradical activity (ORAC, DPPH, ABTS, chelating potential) and sensory value.

Results and conclusions: As a result of the experiment four different variants of sponge biscuits sandwiched with fruit jelly were designed. The experimental product included an innovative combination of low calories plant materials in the food industry. Results showed high consumer's acceptance of designed products, which differed with antiradical activity as well as with the nutritional value.

Key words – nutritional value, antioxidant potential, buckwheat, phytochemicals, rose fruit, collagen, stevia, obesity

All contributing authors declare no conflicts of interest.

T5:S33:40

Obesity prevention in a rural and remote Australian community - Not your obvious suspects

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The Yarriambiack Shire in rural and remote Victoria, Australia has a population of 7082 across 7160 kms. Although Yarriambiack has no fast food chains and a culture of community built around its many sporting clubs, it has the highest overweight and obesity prevalence and the highest per capita consumption of sugar sweetened beverages in Victoria. The rural health service requested

assistance to reduce avoidable hospital admissions. Aims: 1. To use systems dynamics and complex adaptive systems to map the key drivers of obesity in the Shire. 2. To identify key leverage points for effective intervention. 3. To evaluate these interventions. Systems thinking and acting, underpinned by the Collective Impact Framework has guided the evolution of a whole of community multi-strategy, multi-agency obesity prevention initiative. Nine working groups are acting on leverage points within the system, adopting a common agenda, mutually reinforcing activities, a shared measurement system and continuous communication, all of which feed into the Backbone Organisation. Mixed methods evaluation utilise existing databases and pre and post measures. This presentation will report on environmental and policy audits, sales data on selected food/beverages pre and post intervention, changes to food composition at restaurants and changes to policy. Key informant interviews suggest it is possible for a well-supported community to take action and ownership of sustainable obesity prevention within 3-5 yrs.

T5:S33:41

Preventing obesity in infants with a novel M-health intervention: The growing healthy feasibility trial

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Early childhood provides an important window for establishing behaviours that promote healthy rather than excess weight gain. One emerging and promising medium to deliver health related information and support for healthy parenting is via mobile phone apps and via websites due to the relatively low cost and high potential reach. This study reports the findings from the Growing healthy trial: an intervention delivered via smartphone app (or website) for parents living in socioeconomically disadvantaged areas. This study aimed to promote breastfeeding, best practice bottle feeding (if parents were no longer breastfeeding), delaying introduction of solids until around 6 months and healthy weight gain. Parents were recruited to the study via their primary care provider and we also test the feasibility of this as an approach. The app content was developed by experts in obesity prevention and infant feeding with extensive input from nurses and parents. At baseline, 315 parents were recruited and completed the baseline survey. Retention to 6 months was over 75%. A non randomised comparison group was recruited via social media with similar numbers and retention. Final results will be available at ICO. Engagement was high with most parents using the app and reporting high levels of satisfaction with the content and mode of delivery.

T5:S33:42

Perceived barriers to physical activity and healthy eating differ by race/ethnicity

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Healthy eating and physical activity are important factors for weight loss. This study explored perceived barriers to healthy eating (BHE) and physical activity (BPA) in employees who had

participated in a workplace weight management program. Follow-up surveys were conducted with former participants, all of whom were obese when starting the program. BPA and BHE were assessed with 19-item and a 21-item scales, respectively. Participants were asked about the barriers they encountered while participating in the program. Responses were obtained from 111 participants. Barriers did not differ by gender, age or BMI change; although, barriers differed significantly by race/ethnicity. Barriers common to all racial groups included: BHE: "Holidays and special occasions were a problem", "I felt like eating whatever I want"; and BPA: "Procrastination", "Lack of self-discipline", "Lack of time", and "Family Responsibilities". Largest barriers in African Americans (n=54) included "Healthier foods were too expensive", "There were no healthier foods in vending machines," and "cost of exercising." Barriers in Whites (n=47) included "High fat foods tasted better", "I ate a lot of meals away from home" and "inconvenient exercise schedule." This study suggests some barriers differ significantly by race. Knowledge of BHE and BPA can provide insight for future weight loss interventions.

T5:S33:43

Between the lines: Coaching & mentoring for obesity treatment and prevention

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HealthLinkBC

Background: At HealthLinkBC, registered dietitians provide evidence-informed food and nutrition counseling and resources via a free provincial telehealth delivery model. Client services include medical nutritional therapy. The overweight adult category is identified as a top 10 topic for client call (#6) and e-mail (#1) encounters. From fall 2011, a 'soft' evaluative, self-reflective coaching approach has been used to enhance dietitian impact and client outcomes for obesity and other conditions.

Aims: For mentor, mentee and client, to continue to promote and practice: 1. active listening; 2. compassion; 3. goal setting; 4. prioritizing; 5. problem solving or 'opportunity building'; and 6. increased comfort with 'grey' concepts.

Key methods: Through client call, chart and e-mail reviews and reflections, practitioner and client-centred strategies are thoughtfully orchestrated for the prevention and treatment of obesity and other conditions. Client-focused strategies include: care coordination, self-management, energy balance, and common messaging across chronic diseases.

Results: Reported and observed dietitian (n≥15) practice evolutions are discussed, including a 'less is more' approach to client calls and e-mails. The recurring emphasis is on co-creating core focused and practical goals.

Conclusions: Central to successful coaching and mentoring is creating compassion-filled, collaborative strategies to meet both practitioner and client where they are at, and provision of choice.

T5:S33:44

A 2015 survey of sweeteners in the American food supply

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Current guidelines for caloric sweeteners consumption is <10% of energy intake. However, consumers are largely unaware of whether they are consuming caloric sweeteners, which are not labelled on nutrition facts panels. Caloric sweeteners, especially fructose and high-fructose corn syrup (HFCS), have been implicated for contributing to obesity and diabetes. Consumers need information

and guidance regarding their presence in foods. Thus, this study surveyed the presence of sweeteners in items at two USA grocery store chains. Using ingredients lists, researchers identified whether each product contained HFCS, additional caloric sweeteners, non-caloric sweeteners or were no sweeteners added. Frequencies were run using SPSS 22.0, for 30 food and beverage categories. Of the 4430 items currently entered, 69.9% contained any caloric sweetener and 7.5% contained HFCS plus additional caloric sweeteners. In total, 8.1% contained HFCS, 69.4% contained other caloric sweeteners; 5.2% contained non-caloric sweeteners and 29.3% contained no sweeteners. Currently, bread has the highest prevalence of HFCS at 41.2% and snack cakes the second at 36.8%. The range in prevalence of total caloric sweeteners is 0% (unpopped popcorn) to 100% (snack cakes, beef jerky, ice cream and fruit snacks) of items. Our results suggest sweeteners are present in many foods and beverages, and in most cases several sweeteners are combined in items. Many of these are generally not recognized as 'sweets'.

T5:S33:45

A 2015 survey of sweeteners in the American fast-food supply

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There are over 250,000 fast-food restaurants in the United States of America (USA), and adolescents eat at them an average of twice per week. Little is known about the presence of sweeteners in fast-food. Caloric sweeteners, especially fructose and high fructose-corn syrup (HFCS), have been implicated for contributing to obesity and diabetes. Therefore, the goal of this study was to survey the presence of sweeteners in the top 10 highest grossing USA fast-food restaurant chains. Using the ingredients lists from the restaurants' websites, researchers identified whether each product contained HFCS, additional caloric sweeteners, non-caloric sweeteners or no sweeteners. Frequencies were run on food and beverages using SPSS 22.0. From all 10 restaurants, the percent of food and beverage items with any caloric sweetener was 86.6% and 76.0%, respectively. The range of foods with any caloric sweetener was 64.9% to 98.9% (Subway to Dunkin Donuts), and beverages 25.0% to 94.1% (Wendy's to Starbucks). On average 25.1% of food items and 29.0% of beverage items were sweetened with HFCS. Dunkin Donuts had the highest percentage of food items with HFCS (48.9%) and Starbucks the lowest (0%). The range of beverages with HFCS was 11.1% to 65.0% (Subway to Taco Bell). The range of non-caloric sweeteners in beverages is 0% to 50% (Dunkin Donuts to Pizza Hut). Our findings suggest that the majority of items from the top grossing USA fast-food restaurants contain some form of sweetener.

T5:S33:46

Patient perceptions of healthy weight promotion in dental settings

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Excess weight is a risk factor for oral diseases. Dental professionals are involved in imparting overall health messages when conditions impact oral health as in smoking counselling and diabetes screening. Discussions on healthy beverages, highlighting their role in both dental diseases and weight management may present the dental team with a platform to project healthy weight messages.

Evidence however, is scarce on patient views on receiving such advice.

This study was a multi - centre, cross - sectional health survey. The primary objective was to investigate the perceptions of adult on healthy weight promotion provided by the dental team. Height and weight were measured and then the patients completed a self administered questionnaire.

213 individuals were recruited with an overwhelming majority of participants endorsing healthy weight promotion by the dental team although the overweight/obese were significantly more sensitive towards BMI screening (χ^2 trend = 6.840; p = 0.009) and healthy weight information (χ^2 trend = 6.231; p = 0.013). Awareness of risks of periodontitis, carcinoma and overall associated adverse health outcomes was low.

Dental professionals should consider routine healthy weight promotion including BMI screening of their patients. A lack of awareness exists of oral disease risks associated with overweight/obesity. A potential role presents for dental teams to promote healthy weight parallel with oral health promotion as part of common risk factor approach.

Session 34: Special populations and indigenous health

T5:S34:01

Obesity in remote and impoverished communities

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There is growing realisation that body composition is programmed in utero. There are few studies which are able to relate adult body composition to early life factors. Prospective follow up in two birth cohorts (Pune Children's Study, PCS and Pune Maternal Nutrition Study, PMNS) provides a unique opportunity to relate adult body composition to early life determinants. Serial body composition has been measured from childhood to young adult age, and in PMNS extensive information is available from preconceptional period through pregnancy, childhood and adolescence.

In this population obesity is uncommon, but thin-fat phenotype (low BMI, higher adiposity) is common. Adult adiposity was associated with parental size and body composition, maternal micronutrient deficiencies (vitamins B12 and D), higher folate concentrations and lower physical activity during pregnancy. Anthropometry at birth was predictive in girls but not boys. There was tracking of body composition through childhood and adolescence.

This novel description provides clues to windows of opportunity in a lifecourse model to influence body composition of an individual. Validation in other cohorts and testing for causality will help design public health measures to influence incidence of adiposity related non-communicable disease epidemics.

T5:34:02

Obesity and related risks in indigenous populations: Insights from Australia

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University of South Australia

Substantial evidence indicates that when Australian Aboriginal people lived traditionally as hunter-gatherers they were lean, fit and free of the serious chronic diseases that plague them today. They lived on a diet derived from wild animals and marine species, and uncultivated plant foods. Fresh water was the major liquid

consumed. The contrast with the present day diet and lifestyle of most Indigenous Australians today is profound.

Low birth weight, failure-to-thrive and high burden of infectious disease in early life are followed by overweight and obesity in adolescence which drive the high incidence of early onset diabetes, cardiovascular disease and related conditions. While governments in Australia recognize the importance of healthy diets in chronic disease prevention, they focus almost exclusively on health promotion campaigns and individual behavior change – which cannot succeed without also addressing systemic issues of availability, cost and sustainability. Food security programs are out-sourced to a range of non-government organisations and charities, and are generally ad hoc, uncoordinated and with little evidence of evaluation of effectiveness. There is a need for system-level change. Governments need to be convinced of the value of high quality programs directed at obesity prevention from early life. There are strong arguments for both general food supply programs to minimize to minimize the disadvantage of communities in rural and remote areas, and targeted programs for vulnerable population groups. Programs need to be well-designed, implemented with fidelity, and evaluated rigorously.

T5:S34:03

Migrant health and obesity — is there a "healthy migrant effect"?

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For the first time in history, most of the world's population lives now in urban areas. In many low- and middle-income settings such increases in population in urban areas is largely driven by within-country migration. Therefore, migrant groups offer unique opportunities to explore patterns of disease and/or disease risk relative to non-migrant groups. The "healthy migrant effect" has been described largely for patterns of international migration and certain outcomes, but little has been done for within-country migration especially in low-resource settings. In these context, two of such studies allow us to explore patterns of cardiometabolic risk factors, including obesity: the PERU MIGRANT (PERU's Rural to Urban MIGRANTS) study —designed to contrast risk between rural, rural-to-urban migrants, and urban groups—, and the

CRONICAS Cohort Study —designed to characterize risk in a combination of rural/urban and sea level/high altitude settings. Drawing from these experiences, we observed in longitudinal analyses that migrant and urban groups had an 8- to 9.5-fold higher risk of obesity compared with the rural group; whereas in terms of central obesity, such increased risk was only noted in the migrant group but with a decreased 2-fold magnitude. In terms of urbanicity, the degree of contributions of obesity as leading risk factor for hypertension and for diabetes varies widely, e.g. ranging from 2.4% in rural Puno to 61.2% in Lima for diabetes, indicating that context matters. Given the ongoing urbanization occurring in middle-income countries, the rapid development of increased obesity risk observed in rural-to-urban migrants calls, as a minimum, to revisit the assumption of a "healthy migrant effect." It follows that developing measures to reduce obesity as a priority in such migrant groups is needed.

T5:S34:04

Health literacy, binge eating and obesity

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Obesity is regarded as a major global health problem. However, gaps in health literacy as well as concomitant problems with binge eating likely contribute to the increasing prevalence of obesity in our communities. This paper will present a recent study of health literacy in 100 adults with BMI>30 (mean age 41, BMI 39) recruited for an investigation of psychological constructs in the Clinical Obesity Maintenance Model – the COMM (Raman et al., Journal of Obesity, 2013). Data were collected on neurocognitive outcomes and psychological self-report measures including health literacy with the Eating Beliefs Questionnaire (measuring positive and negative beliefs about eating) and the modified Mental Health Literacy Questionnaire for Binge Eating Disorder and Obesity (BEDO-MHL). Findings suggested that poor beliefs about eating were an important risk factor for adverse behaviours that maintain obesity. Lower levels of perceived severity were associated with higher levels of stigmatising attitudes to both BED and obesity. Obesity was perceived as a less severe problem but with similar levels of stigmatising beliefs to BED. Improving appreciation of the severity and relationships between binge eating and obesity is important for both prevention as well as treatments for obesity. An integrated model of care for obesity and eating disorders, a Healthy Approach to weight management and Food in Eating Disorders (HAPIFED) will be presented.