women. Vaccination against HPV offers a primary prevention strategy. This study investigates knowledge of and attitudes towards CC and HPV vaccine in Japanese mothers.

Methods Mothers (n=2192) with daughters aged 10–14 yrs were recruited from five elementary and 14 junior high schools in Sapporo city. After ethical approval, an anonymous questionnaire was distributed in schools and returned to the main investigator by post between July and September 2010.

Results In total 876 questionnaires (40%) were returned and 862 used for analysis. Median age was 42 yrs. A total of 61.6% of mothers had undergone recent CC screening and 12.3% had experienced abnormalities. If vaccination were free 92.6% of mothers would vaccinate, but this decreased to 4.3% if the cost was >40 000 yen. While 52% of mothers knew of HPV, only 6.4% knew it caused CC. While, 73.1% thought their daughter was at risk of HPV infection, 72.5% also believed their daughter may die from it. While 85.7% wanted more information, 67.6% said they would use the Internet. Only 9.8% would ask a doctor. Factors significantly associated with vaccination intent were recent screening (OR=1.6, 95% CI 1.0 to 2.7), >13 yrs education (OR=1.4, 95% CI 1.0 to 2.3), believing vaccines prevented disease (OR=15.1, 95% CI 6.3 to 36.5) and no concerns about childhood vaccine safety (OR=3.8, 95% CI 1.9 to 7.9). Abnormal smears were not significant.

Conclusion Knowledge of HPV is poor. However, high HPV vaccination coverage may be possible if appropriate funding and education are provided.

P2-112 | **ASSOCIATION BETWEEN *PPARG2* PRO12ALA GENE VARIANT AND HBA1C IN A MIDDLE-AGED JAPANESE POPULATION**

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[1]M Hara,* [1]H Nanri, [1]K Nakamura, [2]Y Higaki, [1]T Imaizumi, [1]N Taguchi, [3]T Sakamoto, [1]M Horita, [4]K Shinchi, [1]K Tanaka. [1]*Department of Preventive Medicine, Faculty of Medicine, Saga University, Saga, Japan;* [2]*Laboratory of Exercise Physiology, Faculty of Sports and Health Science, Fukuoka University, Fukuoka, Japan;* [3]*Asakura Health Welfare Environment Office, Fukuoka, Japan;* [4]*Division of International Health and Nursing, Faculty of Medicine, Saga University, Saga, Japan*

Introduction The peroxisome proliferator-activated receptor-γ2 (*PPARG2*) Pro12Ala gene variant has been consistently associated with diabetes mellitus (DM). However, interactions between this polymorphism and lifestyle factors on DM remain poorly understood. The purpose of this study was to examine if carrying Ala allele was inversely associated with haemoglobin A1c (HbA1c) levels with any such interactions.

Methods We made a cross-sectional analysis using the data from the baseline survey of the Japan Multi-institutional Collaborative Cohort Study. After excluding 1882 participants who had medication for DM, dietary energy intake >4000 kcal/day, and/or any missing data on *PPARG2* polymorphism or HbA1c, 1281 men and 1356 women aged 40–69 were analysed. *PPARG2* polymorphism was determined by multiplex PCR-based invader assay. BMI and fat/energy intake were categorised into four levels. Multiple linear regression analysis and analysis of covariance were used to control for confounding variables (age, BMI, fat/energy intake, alcohol, smoking, and physical activity) and to examine possible interactions.

Results After adjustment for the above covariates, Ala allele was significantly inversely associated with HbA1c in women, but not in men. This inverse association in women was evident in the highest level of BMI or fat/energy intake. Contrarily, in men, a significant positive association between Ala allele and HbA1c was observed in the highest level of fat/energy.

Conclusion These results indicate that the association between *PPARG2* Pro12Ala polymorphism and HbA1c may be modified by gender, obesity, and high fat diet. This study was conducted for J-MICC Study Group.

P2-113 | **EVALUATION OF VITAMIN D DEFICIENCY DETERMINANTS IN URBAN AREAS OF IRAN BY GENERALISED ESTIMATING EQUATIONS ANALYSIS METHOD**

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[1]R Heshmat,* [2]K Mohammad, [2]S R Majdzadeh, [1]B Larijani, [2]M H Forouzanfar. [1]*Endocrinology & Metabolism Research Institute, Tehran University of Medical Sciences, Tehran, Iran;* [2]*School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*

Introduction Vitamin D plays an integral role in bone mineralisation. Its deficiency has been shown to be associated with some cancers, cardiovascular disease, diabetes and osteoporosis. We aimed to evaluate the factors determining vitamin D levels using Generalised Estimating Equation (GEE). Its main application is evaluation of related data in longitudinal and hierarchal states, especially in cluster samples which can result in an unbiased estimation.

Methods In a random cluster sample, 5232 subjects from five urban areas (Tehran, Tabriz, Mashhad, Shiraz and Booshehr) were recruited. A fasting blood sample was taken for measurement of 25-hydroxy vitamin D levels.

Results In the GEE model, age group, sun block usage, use of Islamic coverage and geographical variables were removed from the model as was city of residence (as it was collinear with geographical and environmental factors), sex and the interaction of age and sex group were correlated with vitamin D deficiency. Living in Tehran, Mashhad and Shiraz was associated with vitamin D deficiency [OR (95% CI) 2.1 (1.7 to 2.5), 0.9 (0.7 to 1.1) and 0.7 (0.5 to 0.9) respectively]. The ratio for males to females was 1.3 (1.1 to 1.6).

Conclusion Analyses showed that environmental factors in residential locations, female sex and the interaction of sex and age are protective on vitamin D levels. Moreover, analysis by GEE method compared to logistic regression did not show any significant variation in the results which indicate that variation in vitamin D deficiency is due to differences between factors such as location and sex rather than deviation in samples of each cluster.

P2-114 | **HETEROCYCLIC AROMATIC AMINES AND CANCER RISK - A STUDY OF DIETARY EXPOSURE AND BIOMARKERS OF EARLY BIOLOGIC EFFECT**

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V Ho,* T E Massey, W D King. *Queen's University, Kingston, Ontario, Canada*

Background Heterocyclic aromatic amines (HAAs) are formed during the cooking of meats at high temperatures and are a suspected risk factor for cancer. However, inconsistent results have been reported on the HAA-cancer relationship in epidemiologic studies. This is potentially due to the difficulty in measuring HAA exposures and variation in individual susceptibilities to HAAs. Metabolites of HAAs form DNA adducts in cells, an initiating step in chemical carcinogenesis, which may represent an early carcinogenic effect of HAA exposure.

Methods This cross-sectional study aims to provide further understanding of the relationship between dietary exposure to HAAs and levels of HAA-DNA adducts measured in easily accessible white blood cells among a sample of 125 healthy volunteers. A detailed questionnaire was used in combination with a database that estimates average intake of HAAs in cooked meats. A blood sample was

used to quantify HAA-DNA adduct concentration and determine polymorphisms in genes involved in HAA metabolism and DNA repair.

Results In the preliminary data, HAA-DNA adducts were detectable in 17 of 23 individuals. Results show that dietary HAAs were predictive of adduct levels (Spearman Correlation Coefficient=0.39, p=0.06). Further analyses on the remaining cohort will be conducted to model adduct levels as a function of dietary HAAs and other relevant dietary, lifestyle and genetic factors; gene-diet interactions will also be explored.

Conclusion This research aims to contribute to understanding the initial steps in this potentially carcinogenic pathway between meat consumption and cancer - important for assessing causality and the prevention of modifiable exposures.

P2-115 | DEMAND AND CONTROL AT WORK AND BLOOD PRESSURE: SYSTEMATIC REVIEW AND META-ANALYSIS

[1]Y H M Hökerberg,* [2]E Faerstein, [1]C A F de Andrade, [1]R Fernandes, [1]S R L Passos. [1]Evandro Chagas Clinical Research Institute, Oswaldo Cruz Foundation, Rio de Janeiro, RJ, Brazil; [2]Institute of Social Medicine, University of the Rio de Janeiro State, Rio de Janeiro, RJ, Brazil

Karasek postulated that high job strain, an interaction between high psychological demands and low control at work, increases the risk of ill-health.

Objective Systematic review/meta-analysis of the association between job strain and blood pressure (BP).

Methods Target studies were published on Pubmed, Lilacs, SciELO, PsycInfo, Embase and Web of Science, until July 2009. Data extraction was conducted independently by 2 of 3 reviewers using a standardised form.

Results The search retrieved 1377 studies and 51 fulfilled the eligibility criteria, mostly cross-sectional and conducted in Europe or USA. Most of them applied the job content questionnaire (89.4%) and used the Karasek's quadrant categories (78.4%). Casual BP was measured in 26 (50%), ambulatory BP monitored in 22 (84.6%), self-measured BP in two (3.8%) and self-reported hypertension in two studies (3.8%). Hypertension was the outcome in 16 studies (30.8%), 9 of them defined by BP>140/90 mm Hg. High strain was associated with high BP/hypertension in 27/51 (52.9%) studies. Meta-analysis could be only performed for nine hypertension studies, for which the association was not confirmed neither for high strain (ORc=1.08, 95% CI 0.98 to 1.19), high psychological demands (ORc=1.08, 95% CI 0.98 to 1.19) nor for high control (ORc=1.02, 95% CI 0.94 to 1.11), with no evidence of publication bias.

Conclusion There is weak evidence in favour of the association between job strain and BP/hypertension. Comparisons were hampered by methods heterogeneity, particularly: inclusion criteria, data collection and exposure/outcome definition. Further research should include longitudinal design, low and middle-income countries and female workers, still lacking.

P2-116 | ADIPOSITY AND ITS CONTRIBUTION TO INDIVIDUAL AND REGIONAL DIFFERENCES IN BLOOD PRESSURE: THE KADOORIE BIOBANK STUDY OF 0.5 MILLION PEOPLE IN CHINA

[1]L S Hong,* [2]L Li, [1]M Smith, [1]B Lacey, [2]Y Guo, [1]S Lewington, [1]G Whitlock, [1]R Collins, [3]J Chen, [1]R Peto, [1]Z Chen. [1]Clinical Trial Service Unit & Epidemiological Studies Unit (CTSU), Nuffield Department of Clinical Medicine, University of Oxford, Oxford, UK; [2]Chinese Academy of Medical Sciences, Dong Cheng District, Beijing, China; [3]Chinese Centre for Disease Control and Prevention, Chang Ping District, Beijing, China

Introduction Raised blood pressure (BP) is a leading cause of premature death in China, but its determinants are not well understood. One likely determinant, adiposity, is increasing rapidly in much of China. We assessed the extent to which differences in BP can be accounted for by differences in body mass index (BMI) and in waist circumference (WC).

Methods We examined cross-sectional data from >510 000 adults aged 30−79 recruited from five rural and five urban areas in China. Height, weight, systolic BP and WC were measured for all participants. Means and associations of SBP with age, BMI and WC were estimated in men and women separately.

Results The population means (SD) of SBP and BMI in men were 132 (20) mm Hg and 23.4 (3.2) kg/m^2. Age-adjusted area means of SBP ranged from 126 to 136 mm Hg (F=77 p<0.0001, R^2=0.09), and area means of BMI ranged from 22.0 kg/m^2 to 25.4 kg/m^2. Overall, and within each area, SBP was approximately linearly associated with BMI: overall +17 mm Hg SBP per +10 kg/m^2 BMI. However, further adjusting SBP for BMI only accounted for an additional 7% of individual variation in SBP, and had little effect on differences between area means of SBP (F=30 p<0.0001). Despite lower BMI in rural vs urban areas (22.7 vs 24.3 kg/m^2), mean SBP was higher in rural areas (132 vs 131 mm Hg, p<0.0001). Similar patterns were found for WC, and in women.

Conclusions SBP is consistently associated with adiposity in individuals, but differences in adiposity do not account for most of the differences in SBP between individuals or between areas.

P2-117 | THE HYPERTRIGLYCERIDEMIC-WAIST PHENOTYPE AND WEIGHT GAIN IN CHILDHOOD

B Horta,* D Gigante, R Haack. Universidade Federal de Pelotas, Pelotas, Brazil

Evidence suggests that the hypertriglyceridemic-waist phenotype is related to the occurrence of cardiovascular metabolic risk factors. This study was aimed at assessing the relationship between weight in childhood and the presence of hypertriglyceridemic-waist phenotype. The 1982 Pelotas birth cohort included 5914 children who were born in three maternities in Pelotas, southern Brazil. The subjects have been followed-up for several times. In 2004−2005 (mean age 23 years), we attempted to trace the whole cohort and obtain blood samples. Conditional growth modelling was used to assess the association between the phenotype and weight gain from birth to 20, and from 20 to 42 months. Adjusted analyses controlled for household assets index, family income, maternal schooling at birth, maternal smoking during pregnancy, and breastfeeding duration. In 2004−2005, we interviewed 4297 subjects, and collected blood of 3911. Among small-for-gestational age subjects, weight gain in the first 20 months was not associated with the phenotype. But, those subjects whose weight gain from 20 to 42 months of age was faster than that predicted from birthweight and weight-for-age z-score at mean age of 20 months had a higher risk of presenting the phenotype [1.73 (95% CI 1.15 to 2.79)]. Among subjects whose birthweight was adequate-for-gestational age weight gain in childhood increased the risk of having the phenotype. These findings suggest that among small-for-gestational age infants, early weight gain is not related to the presence of metabolic cardiovascular risk factors.