

**Methods** All incident cases of thyroid cancer (C73) in the Arkhangelsk region in 2000–2009 as well as information about deaths were extracted from the regional cancer registry. Population size was obtained from the Regional Bureau of Statistics. Incidence and mortality were calculated per 100 000. Survival was analysed using Kaplan–Meier curves with log rank tests.

**Results** Altogether, 529 new cases of thyroid cancer occurred in the region during the study period. Females comprised 82.8% of cases. Papillary carcinoma, follicular carcinoma and other forms was found in 56.3%, 27.7% and 21.9% of patients, respectively. Stages 0, 1, 2, 3, and 4 were diagnosed in 1.1%, 58.0%, 16.4%, 13.2%, and 11.0% of patients respectively. The incidence increased from 4.3 in 2000 to 4.7 in 2009. Mortality decreased from 0.42 in 2000 to 0.24 in 2009. By 2010, 50 (9.5%) died from thyroid cancer and 33 (6.2%) were censored. Mean overall survival was 108 (95% CI 105 to 111) months. Males, patients aged 45+ years and those having stages 3–4 had significantly lower survival than the reference groups (all at  $p<0.001$ ). Average survival time for patients with papillary, follicular and other morphology types was 117, 107 and 83 months, respectively ( $p<0.001$ ).

**Conclusions** Incidence of thyroid cancer in Arkhangelsk region of Russia slightly increased while the mortality decreased. Age, stage, morphology and gender were all associated with survival.

## P2-108 TRENDS IN MORTALITY FROM BREAST AND CERVICAL CANCER IN THE BRAZILIAN CAPITAL CITIES, 1996–2007

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**Objective** To analyse the trend in mortality from breast cancer and cervical cancer in Brazilian capitals from 1996 to 2007.

**Materials and Methods** We calculated mortality rates for breast cancer and cervical cancer in Brazilian capital cities from 1996 to 2007, standardised for the Brazilian population and for the world's population. Trend analysis was performed using the polynomial regression model.

**Results** Cancer of the cervix showed a considerable reduction in mortality rate in most capital cities, although in some cities the rate rose. Breast cancer mortality remained high in most of the capital cities. Trends were predominantly linear.

**Conclusion** It may be that mortality from cancer of the cervix may be falling due to increased adherence with Pap smear screening. The high breast cancer mortality rates may relate to its associations with habits, lifestyles and culture.

## P2-109 INCREASE INCOME AND MORTALITY OF COLORECTAL CANCER IN BRAZIL

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**Objective** The objective of this study is to determine the correlation between average per capita income and the rate of colorectal cancer mortality in Brazil between 2000 and 2007.

**Materials and Methods** We obtained data on median household income and mortality rate for colon, rectum and anus between 2001

and 2007 by DATASUS. A trend analysis was performed using linear regression, and correlation between variables by Pearson's correlation coefficient.

**Results** There was a tendency towards an increase average family income and standardised mortality rate of colon, rectum and anus in Brazil. There was also strong positive correlation ( $r=0.81$ ,  $p<0.001$ ) between income and mortality for this cancer located throughout the study period.

**Conclusion** The increase in income may partially explain the increased occurrence of cancer of the colon, rectum and anus, and this is possibly due to differential access to food recognised as a risk factor, such as red meat and fat food. It is therefore important to assess the priority of public health programs addressing nutrition in countries with intermediate economy, as is the case in Brazil.

## P2-110 NUMBER OF TEETH IS ASSOCIATED WITH THE LEVEL OF SALIVARY NITRIC OXIDE

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**Introduction** Nitric oxide (NO) is involved in second messenger formation, osteoblast and osteoclast function, and blood flow. This raises the question of whether or not altered salivary NO levels interfere with tooth loss by influencing the bone remodelling cycle. This study investigates if different levels of salivary NO are associated with existing number of teeth among Korean elderly.

**Methods** A total of 178 subjects (68 males and 110 females; age range 48–84 years) received a dental and general examination in 2009 and 2010. Number of remaining teeth and salivary flow rate were evaluated by a dentist. Fasting plasma glucose level and blood pressure were also measured. Age, gender, education level, and smoking were evaluated through interview. Salivary NO was determined by the Griess reagent. ANCOVA and Multiple linear regression analyses were applied.

**Results** After controlling for age, gender, education level, smoking, physical activity, salivary flow rate, fasting plasma glucose level, systolic blood pressure and diastolic blood pressure, higher NO level group showed increased number of teeth compared to moderate and lower NO level group, which is not significant. However, salivary NO levels had a dose-response relationship with the existing number of teeth in Korean elderly ( $\beta=-0.007$ ,  $p=0.046$ ).

**Conclusion** This study presents for the first time a dose-dependent relationship between salivary NO levels and number of teeth, indicating a link between oral health and salivary NO levels, and that the levels of salivary NO could be a proper indicator for oral health in this respect.

## P2-111 IMPROVING THE HEALTH OF JAPANESE WOMEN: ACCEPTANCE OF HPV VACCINATION IN MOTHERS OF ADOLESCENT GIRLS

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**Introduction** Cervical Cancer (CC) caused by oncogenic Human Papillomavirus (HPV) is the most common cancer in young Japanese

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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**Introduction** The peroxisome proliferator-activated receptor- $\gamma$ 2 (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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**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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**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